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# 2003-2008 Oil Price Shock: Changing Effects of Oil Shocks on the Economy

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# **2003-2008 Oil Price Shock**

## **Changing Effects of Oil Shocks on the Economy**

Emma Stevenson

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IR 344 International Politics of Oil

December 6, 2017

### **2003-2008 Oil Price Shock**

British novelist James Buchan said, “A century ago, petroleum, what we call oil – was just an obscure commodity; today it is almost as vital to human existence as water (Buchan 2006).” The world’s dependence on oil has rapidly changed since the mid-1900s. Countries depend on the supply of crude oil for economic growth. Crude oil is the naturally occurring, unrefined petroleum that can be used to produce gasoline, diesel, and other petrochemicals. Since it is a nonrenewable resource, supply is limited.

In the 1970s, the price of oil became more important than the question of supply. It became apparent that the world was not in immediate danger of an oil shortage. Prices are susceptible to supply and demand shocks and changes in global stability. Oil became “just another commodity” as Daniel Yergin put it, meaning the prices began to be determined in the market. Like any other commodity, if the price of oil increases, the price of everything connected to oil also increases. This includes the price of inputs such as drilling lands and the price of outputs that require oil. Consequentially, this can cause inflation, declining growth rates, rising unemployment and occasionally recessions.

From the mid-1980s-2003 the price of crude oil was generally under \$25 per barrel. During the 2000s, oil prices gradually increased. Within the span of 2003 to 2008, the price went from 30/barrel to \$60 in August 2005 and in July 2008 it hit a peak of \$147.30 (World Heritage Organization). In the 2000s, demand shocks due to the unprecedented economic growth of newly industrialized countries were the main cause of oil price increases. Economies were growing rapidly during the first half of the 2000s. Increased globalization, trade liberalization,

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and economic growth impacted the demand for oil by governments, businesses, and consumers. The global business cycle was in an expansionary phase, which drove persistent global demand. Oil demand often fluctuates with the business cycle and GDP growth. Due to the growth of demand and the inability to produce the level of supply necessary to meet demand, crude oil prices went up. The role of speculation is controversial but did not appear to play a large role in the 2000s oil price increase. A falling US dollar is often downplayed as a cause of oil price increases and the dollar's importance should not be ignored.

Oil price increases are considered harmful to importing countries, but often are beneficial for exporting countries in terms of economic growth and generating government revenue. However, during the 2000s, increased oil prices did not instantly impact economic growth. In turn, there were few policies or political actions to reduce the price of oil. This could be partly due to the nature of the oil price increase. The sources of the price increase were either too widespread or difficult to pinpoint. Another more reasonable explanation is that the global surge in economic growth offset the effects of the oil prices. It could be that the relationship between economic growth and the price of oil is weakening.

The oil policies of Russia, China, the United States, and Saudi Arabia during this period will be discussed. As major oil exporters, Russia and Saudi Arabia benefit from higher oil prices. However, Russia was far more interested in expanding its power and influence. Saudi Arabia has been known as a swing producer and acts as the leader of the Organization of Petroleum Exporting Countries (OPEC) to keep markets stable and prices low. The 2000s saw a shift in policy and Saudi Arabia did not drive prices down by producing more oil. The United States and China are large oil producers but depend more on imports, which make them vulnerable to oil

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price shocks. China tried to manage the effects of rising prices by increasing energy producing capacity. The United States' strategy was also to increase oil independence and energy security to counter the rising prices. In addition, the U.S. urged OPEC to increase production.

The future of oil is changing quickly. With the rise of new technologies, renewable energy, and the U.S. shale revolution, there is uncertainty about how the energy picture will look in the next decade. Price volatility will never completely vanish, but more sustainable long-term solutions to manage future price shocks should be considered.

### **What is an Oil Shock?**

An oil shock is defined as an unexpected and dramatic change in the price of oil. Sharp increases in oil prices contribute to several negative economic consequences. Hamilton's research suggests that oil price shocks have an asymmetric and non-linear effect. This is referred to as directional asymmetry (Engermann, Owyang, and Wall 2011, 1). That means that oil price increases have an adverse effect on the economy, while sharp price decreases often have little to no consequences. Price shocks often have a large exogenous impact on macroeconomic fluctuations. It is often thought that there is a negative correlation between higher energy prices and aggregate measures of output, productivity, price levels and employment. Oil shocks have historically preceded or accompanied recessions (Kliesen 2001).

Price shocks that increase the price of oil are important because they tend to disrupt consumption, production, and GDP growth. However, correlation does not equal causation. Therefore, Hamilton concluded that a non-linear model of oil price changes is most useful for forecasting GDP growth. Specifically, these models are more useful for positive price shocks

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rather than negative. In addition, oil price changes are less useful for predicting GDP trends if they follow a period of volatility (Hamilton 2003, 34).

The impacts of an oil price shock on the economy depend on several factors. First is the size of the shock in terms of changes in real prices of oil. Second is the durability of the shock and its perceived length. This can depend on the global economic and political environment. The third factor is the level of dependency on oil and energy. Energy-intensive countries will feel a shock more than ones that do not heavily rely on oil. Finally, the long-term impacts rely on the responses of policymakers. Responses require both fiscal and monetary policy considerations. (Roubini and Setser 2004, 1). Diplomatic solutions and military interventions have also been implemented in the past.

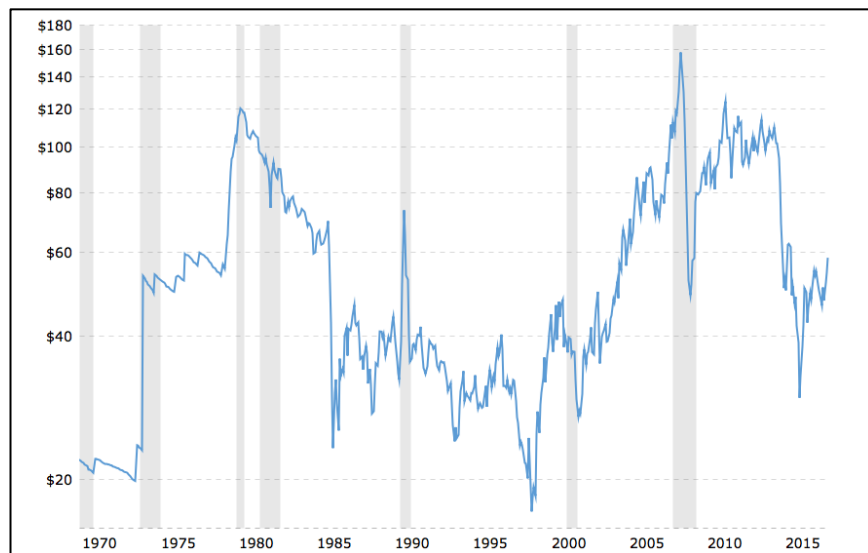
There have been three notable positive oil price shocks in the past 50 years, along with several smaller ones. The first was in 1973 when the members of OPEC imposed an embargo on countries that supported Israel during the Yom Kippur War. The second shock was in 1979 following the Iranian revolution when Iraq invaded Iran in 1980. Oil production in both countries decreased significantly, which accounted for a 6% overall loss in global oil supply (Hamilton 2013, 17). As with the first crisis, the second was driven by geopolitical events in the Middle East, but was also impacted by an increase in global demand. After 1980, there was a 20-year decline in prices with only a minor shock due to the Persian Gulf War in 1990. The inflation-adjusted price of a barrel of oil, according to NYMEX, was generally low and stable. Prices began to increase again in 2003 and continued to rise, causing the 3<sup>rd</sup> oil price shock.

## 2000s Oil Price Increase

The turn of the century saw multiple transformations. Several countries made the transition from agriculture to modern industrialized economies. Industrialization and urbanization are inextricably tied oil consumption. The newly industrialized countries accounted for 69% of the increase in global consumption. Rising living standards means citizens can buy cars and tend to consume more energy to power their homes. Particularly, China and India drastically increased their oil usage. Oil had to meet the demand of the newly industrialized countries (Hamilton 2013, 19).

The 2000s energy crisis between 2003-2008 hit inflation-adjusted records for the price of oil. Below, the graph represents crude prices in terms of USD since the 1970s. In 2000, the oil price was generally around \$30/barrel. From 2003-2008 there is a slightly volatile, but visibly upward trend.

**Crude Oil Prices**



Source: <http://www.macrotrends.net/1369/crude-oil-price-history-chart>

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## **Possible Causes**

The most convincing cause of the oil price increases is the surge in the growing demand due to an expansion in the global business cycle paired with stagnating supply. Typically, prices fluctuate to balance supply and demand. "In the oil market, however supply and demand are extremely slow to respond to price shifts, which means that prices can undergo big swings before a balance is restored (McNally, Levi 2011)." Oil has no exact substitutes, which makes it difficult for consumers to adjust to prices in the short run. In addition, oil supply does not have the ability to change quickly (Konrad 2012).

Kilian argued that the price of oil is driven by distinct demand and supply shocks that have dynamic effects (Kilian 2009, 1053). He developed a structural vector autoregressive model (VAR), which is an econometric model used to measure the linear interdependencies of certain variables among multiple time series. His results implied that the price surge was driven by positive shocks of demand for industrial commodities.

Hamilton cited three causes of the oil price rise (2009). The first was the fact that oil has a low-price elasticity of demand. Second, there was strong growth of demand from large newly industrialized countries, such as Brazil, Russia, India, and China (The BRIC countries). Third, was the stagnation of global oil production. In support of the demand driving prices, Hamilton argued that the price spike from 2007-8 was a result of global economic growth impacting demand and a stagnant supply. Another third possibility is the impact of the speculators and the futures market. Speculation can affect people's perceptions of the markets, which can cause alterations of prices. The rise of speculators in the 2000s may have caused a speculation bubble



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that popped in 2008. Lastly, a falling value of the U.S. dollar may have played a role in the rising oil prices.

### ***Demand***

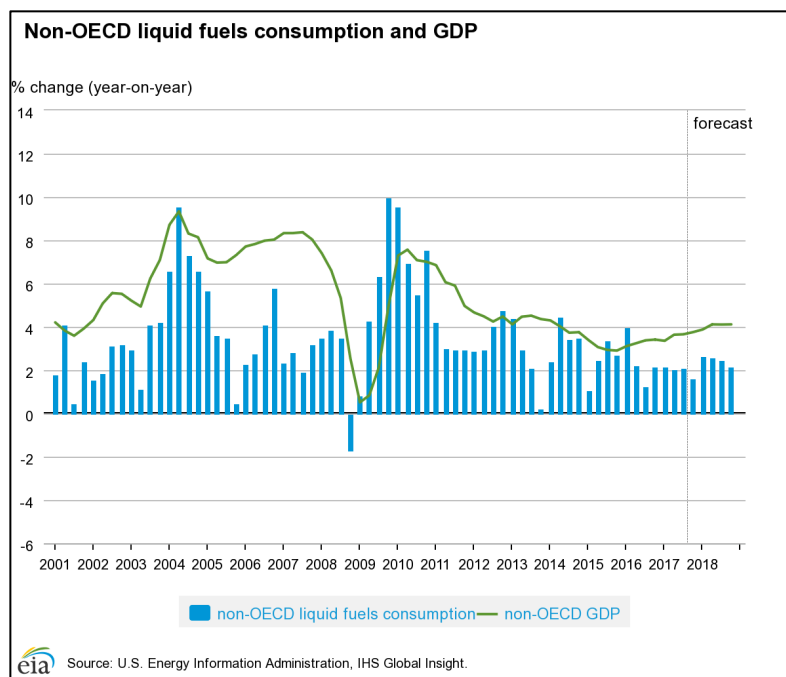
Demand is determined by expectations that coincide with the global business cycle and uncertainty associated with unanticipated decreases in levels in available supply. Shocks to demand are driven by fluctuations in the global business cycle. This is referred to the “World Business Cycle” view (IMF working paper 2015, 10). From 2003-5, the IMF estimated that the real gross world product grew at a rate of 9.4%, indicating the global business cycle was in an expansion (Hamilton 2010, 21). This increase in economic growth is considered the primary cause of the upsurge in oil consumption.

Oil demand is known to have a low-price elasticity in the short run, meaning that people respond to changes in prices slowly. Hamilton argued that demand in the short run is determined by income rather than prices (2009,216). It is difficult to adjust oil consumption, so people are usually willing to pay more rather than consume less if the price change is perceived to be temporary. If individual incomes do not decline, then demand will not fall with rising prices. The increase in prices in 2003 did not cause a major recession because it was driven by sustained demand paired with a booming world economy.

Kilian argued that even though exogenous political events impacted prices, it was the increased precautionary demand for oil driven by uncertainty about the future supply of oil that pushed the price of oil up in 2003. Precautionary demand shocks are influenced by perceived changes in the demand for oil. It arises from the uncertainty of shortfalls or of expected oil

supply relative to demand (Kilian 2009, 1054.) Precautionary demand causes an immediate, and persistent increase in the real price of crude oil. Since supply was stagnating in the late 2000s, it led some to believe that it was going to decline in the future. This could have led to a rise in precautionary demand.

Demand specifically increased from 2000-2008 in countries that were not a part of the Organization of Cooperation and Development (OECD). These countries include China, India, and Saudi Arabia. The graph below shows the rise in fuel consumption in non-OECD countries as well as their GDP growth rates. Much of this rise in increase in fuel consumption was due to the rise in increased use and purchases of personal vehicles. The transportation sector took up about 55% of oil worldwide in 2006, according to the Hirsch report (World Heritage Organization). Increased demand for industrial goods because of expansion of economic activity played a large role in driving prices up.



Source: U.S. Energy Information Administration

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From 2006-7, world GDP grew 5% and no more oil was being produced. Therefore some countries had to reduce their consumption despite high growth. A high price increase was necessary to put a lid on demand (Hamilton 2013, 22). Rapidly increasing demand in developing countries offset the effect of slight declines in developed countries. In general, the world demand for oil increased without growth in supply, which pushed up prices (Energy Information Administration 2017).

“This is the world’s first demand-led energy shock,” Lawrence Goldstein, an economist at the Energy Policy Research Foundation, said in 2007 (Mouawad 2007). The surge in demand, especially among emerging economies created a pressure on supply. Demand fluctuated with the upswing of the global business cycle. The main problem was that producers were unable or unwilling to meet the boom in demand.

### ***Supply***

Supply is influenced by the physical availability of proven crude oil reserves and the uncertainty of expectations related to the future ability of production. Shocks to supply are events that impact the availability of crude oil. In the short run, supply is also relatively inelastic because it takes time for refineries to adjust production levels.

An inelastic supply curve means that a change in price will not significantly change the amount supplied. It takes longer for oil producers to adjust the availability of oil because of the extensive process of oil production and distribution. In addition, many OPEC nations need at least \$100/billion for oil to balance their budgets. If consumption rises faster than supply, exports will fall which will cause the need to raise prices to offset budget imbalances (Konrad 2012).

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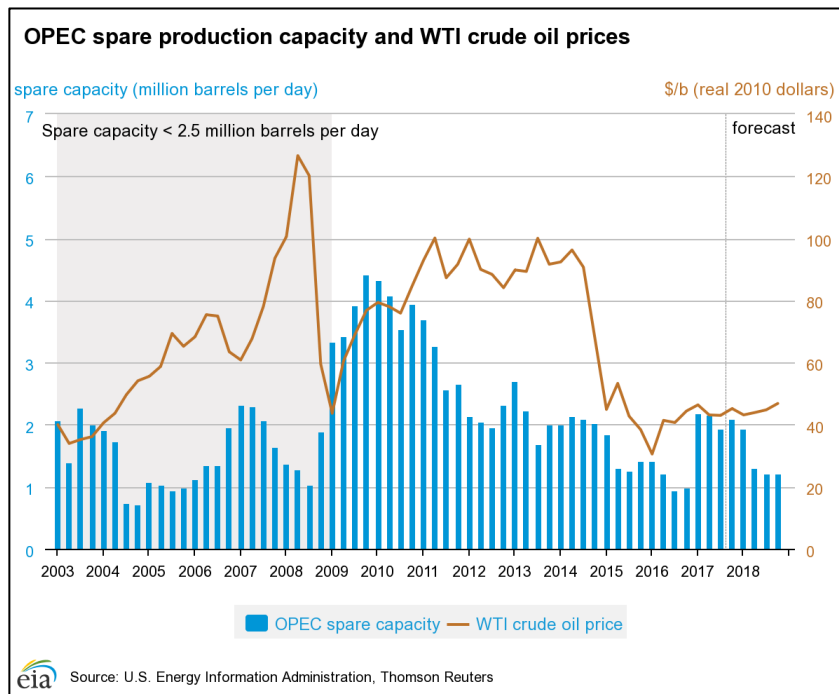
A number of exogenous geopolitical events contributed to decreases in supply. Decreases in Venezuelan production removed a large amount of oil from the market. Venezuela is the 4<sup>th</sup> largest producer of oil. Between 2002 and 2003, a general strike took away 2.1mb/day of oil production. Workers were upset with Chavez's policies and the strike threatened to stop oil production of the national oil company, PDVSA.

On March 20, 2003, the U.S. invaded Iraq, which marked the start of the Iraq War (2003-2011). The US attack on Iraq took away another 2.2 mb/day from April to July of 2003 (Smith 2009). Arguments have been made that this war was really about oil and the fact the U.S. did not like the idea of Iraq being controlled by Saddam. The United States was wary of the prospects of energy insecurity and price volatility. Oil may not have been the leading reason the war was fought, but its strategic importance cannot be ignored. Overall, these events had a little effect on global oil supplies.

In 2008, Venezuela cut off sales to Exxon Mobil in February 2008 due to a battle over the nationalization of the company's properties. Then, in March, saboteurs in Iraq blew up two main oil export pipelines in the south, which cut off 300,000 barrels of production a day. On April 25, Nigerian union workers went on strike and cut down production by 780,000 barrels a day for ExxonMobil. Another 1.36 million barrels a day was shut down in May because of military attacks, sabotage, and labor strife. Mexico saw a decline in production at the Cantarell field and Saudi Arabia also lowered production (Smith 2009).

Despite all these smaller supply disruptions; the predominant problem during 2003-2008, was a stagnating supply growth and limited spare capacity. Supply lagged behind the growth in

demand. The graph shows OPEC's spare capacity in relation to WTI crude oil prices. Spare production capacity is defined as when an industry has the ability to produce more than it is actually producing and can produce more if necessary. A limited spare capacity limits the ability to respond to demand and increases prices. Spare capacity declined in 2007-8, which coincided with an increase in prices.



Source: U.S. Energy Information Administration

OPEC also cut production in 2007 for the first time in years. This was seen as a major reason for price increases. Due to global instability and a faltering economy, OPEC sought to keep prices high. The first cut was in November, which reduced production by 1.2 million barrels a day. Then in February, OPEC cut another .5 million barrels. In the past, OPEC production cuts have been relatively successful in keeping prices high. Many were surprised by the decision to cut production and it was seen as an act of assertiveness to keep prices above \$60/barrel (Farivar 2007).

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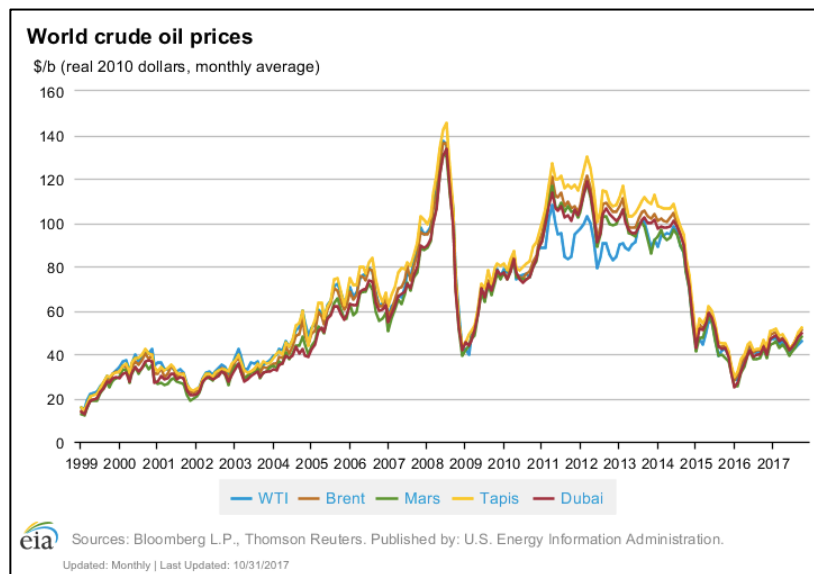
In sum, oil prices had to go up to make up for the imbalance between supply and demand. Supply lagged behind growing demand from emerging market economies, especially China and India.

### ***Speculation – Futures Market***

Speculation is a relatively recent development in the oil market. It could be argued that the speed and magnitude of the price shock cannot be explained by supply and demand analysis, which indicated that other factors were in play. Since 2003, there has been an increase in the number of financial investors entering the futures market. During that period, spot and futures prices also increased and continued to rise until mid-2008. The difference between the spot market and the futures market indicates the overall state of the oil market and can be used to formulate expectations.

The futures market is characterized by contracts that agree to buy or sell a certain number of barrels of oil a day at a predetermined price at a specific date. Investors bet on a price and make a profit when they guess correctly. In other words, speculation is the act of purchasing something now in hopes of selling it for more in the future. There are two major oil benchmarks for oil futures that oil contracts depend on. For North American oil, the benchmark is West Texas Intermediate (WTI) that trades on the New York Mercantile Exchange (NYMEX). In Europe, Africa, and the Middle East, the Brent benchmark is used and is traded on the Intercontinental Exchange (ICE). Although there are many types of contracts that are open at once, most of the trading depends on the front-month contract, which is the nearest futures contract.

The graph below shows the rising world crude oil prices as calculated by the major benchmarks. From 2003-2008 there was a general upwards trend that dipped slightly in 2006-7, but quickly shot up and spiked in 2008 (Energy Information Administration 2017).



Source: U.S. Energy Information Administration

According to Michael Masters, the increasing number of financial investors taking a speculative position resulted in the rise of futures prices and caused the surge in spot prices. He argued that the number of buyers of futures contracts exceeded the sales of expiring contracts, which caused a speculative price bubble (Hamilton 2009, 234). The Master's hypothesis gained attention among policymakers because it provided a sound explanation and solution for the problem of rising oil prices. Policymakers would just need to control trades in the oil futures markets.

However, there is not enough solid evidence that speculation was the cause of oil price increases from 2003-2008. First of all, speculators could not figure out where prices were going to go. Some saw them falling in 2007, while others predicted an increase (Mouawad 2007).

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Second, Kilian argued that speculation relies on common economic fundamentals. According to VAR models created by Kilian and others, results indicated that speculation did not play a large role in determining prices (Kilian 2009). Finally, there is not a clear, widely accepted definition of speculation and many cannot agree on why oil speculation could be harmful to the economy. There is evidence that the role of oil futures market has evolved, but the question of speculation playing a role in the movement of prices remains.

### ***A Falling US Dollar***

The value of the U.S. dollar fell during 2003-8, which disrupted the international finance system. The U.S. dollar is used in the world oil industry because it is the reserve currency. When the dollar falls, the nominal dollar prices of internationally traded commodities, like oil and gold, rise because more dollars are needed for their purchases. The falling U.S. dollar accounted for 51% of the \$97/barrel increase from May 2003-2008 (Hanke 2008).

In 2006, the U.S. dollar was at its weakest against the euro at a 1 euro to 1.6 dollar ratio. There is a relatively consistent correlation between oil prices and the value of the dollar. As the dollar falls, oil prices rise, which is principally because the U.S. imports large amounts of oil. The United States was also importing a net 12 million barrels of oil per day in 2008 (Holodny 2014).

Devaluation also interrupts supply and demand and decreases the purchasing power of oil exporting countries. This makes producers demand more dollars for their oil in order to counter the falling dollar value. A declining dollar also weakens the value of U.S. assets and reduces the foreign exchange reserves in central banks (Hanke 2008). The Bush administration and U.S.



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Central Bank did not take measures to boost up the value of the dollar. Interest rates were kept low and inflation was high under U.S. expansionary monetary policy.

### ***Conclusions***

Among scholars who researched the 2008 oil price shock, all agreed that it was demand driven price paired with stagnating supply. Therefore, the conclusion is consistent with what others have reasoned. While some believed that speculation had more of a role, it does not seem likely that speculation was a major reason the prices surged. However, the impacts of the decline of the U.S. dollar should not be unrecognized.

### **End of Crisis and the Great Recession**

The oil price shock ended in September 2008. Oil prices began to fall because of the Great Recession that began in August 2007. Expectations of a deep recession caused the consumption of oil to drop. Output and employment declined causing demand for oil to fall and prices dropped to \$32/barrel by December, only 5 months after hitting the peak of \$147. OPEC responded by cutting production in order to stabilize prices. However, prices still declined because of the sharp decline in demand.

Hamilton (2009) believed that there was a connection between the financial crisis and the oil price rise. He argued that rising oil prices preceded 9 out of 10 U.S. recessions post-WWII. According to this logic, if there were no price increase in oil from 2007-8, there may not have been a Great Recession (Monandjemi 2017). However, there is more evidence that the financial crisis and the oil price increase occurred independently of each other. Kilian (2009) argued that the effect of oil prices on the global economy that explained output declines in the 1970s was no longer apparent. Results from a study by Monandjemi (2017) supported that claim and indicated

that in the past, oil prices may have impacted the global growth rate. In the 2000s, this was not the case. The chart from the study shows the coefficients of oil prices changes (in the parentheses) are positive and insignificant to in relation to output, suggesting that recent oil prices had a weak relationship to world output

Table 3. Regression Results 2006 - 2014

Dependent Variable	Constant	Real interest rate	% change in real oil price
World growth rate	-5.69	0.84 (3.08)	0.18 (0.64)
OECD growth rate	-7.07	0.80 (1.15)	0.23 (0.32)
US growth rate	8.84	-0.02 (-1.82)	0.23 (4.07)

The findings conclude that oil prices do not have the same macroeconomic effect that they used to. It is likely that the Great Recession would have happened whether or not the oil price rise occurred; indicating that the financial crisis and oil price increases occurred independently of one another (Monadjemi 2017).

### **General Effects of an Oil Price Increase**

The general effects of an oil price increase are that it increases the costs of producing in oil importing countries. In turn, this will have a negative effect on output and shift in the aggregate demand curve. With higher prices, spending on oil uses more disposable income and consumption will most likely decrease. Hamilton argued that since short-run demand for oil is relatively inelastic, the decrease in consumption would be relatively small (Hamilton 2013, 28.) If the price rises are seen as long-term, consumption will fall more and investment will also

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decline. Prices for anything connected to oil will increase and can increase inflation. Rising inflation puts pressure on central banks to alter their monetary policy and raise interest rates to cut inflation. Tax revenues decrease and budget deficits increase.

Another impact is on trade and exchange rates. Oil consumption does not change much in the short run. If demand is inelastic, then the spending on imports must increase to satisfy demand. This has an effect on the exchange rate and depreciates the local currency, which has a negative economic effect. Depreciation of currencies raises prices of imports due to rising exchange rates (Hamilton 2009).

Industries tied to oil such as automobiles and machinery are impacted by oil prices. In the United States, spending on automobiles decreased, especially on larger vehicles. As a result, labor and capital that contribute to automobile manufacturing and sales suffer. There are declines in seasonally adjusted manufacturing employment in motorized vehicles and parts. Hamilton raised the question is if the decline in auto sales are due to rising oil prices or decreases in income. (Hamilton 2009, 28).

In general, oil shocks impact countries in different ways. Countries that are energy intensive or rely on oil imports will react when oil prices rise. Most oil producing countries benefit when oil prices rise and generate more government revenue. Therefore, oil price increases produce winners and losers.

### **Past Crises**

It is argued that the 2000s crisis is different than past crises in 1973 and 1979. The previous crises were caused by physical disruptions in supply. The 1970s crises took place in a

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unique historical period. There were high rates of inflation, economic downturn, and increasing unemployment leading to stagflation (Kilian 2010, 60). Events like the end of the gold standard introduced the role of monetary policy and oil prices. The OPEC embargo limited or cut shipments of oil to countries it was imposed upon. This was an act of retaliation against those who supported Israel during the Arab-Israeli war (Mohan 2015). The embargo posed a significant challenge for US policy towards the Middle East. Due to the nature of the supply cuts, the price surge was caused by political motivations. For the case of 1979, another geopolitical event caused the shortage of supply because of the conflict between Iraq and Iran.

A main difference from the past is that the crisis in the 2000s cannot be traced to any one political event. It was a combination of supply and demand shifts that influenced the price increase. Some exogenous political events caused supply to stagnate, but not in the same way that caused the 1973 and 1979 crises. Another difference is that oil shocks in the past had a larger effect on the output and inflation. One reason for this is the speed of the change was much quicker. Monetary policy responses were not as effective, which led to increased inflation on top of already high inflation expectations (Roubini and Sester 2004). Shocks in the past were also more persistent, meaning it took several years for the prices to drop again. In 2008, the prices dropped immediately because of the Great Recession.

### **Effects of the 2003-2008 Oil Price Rise**

The effects of the most recent major oil price increase were less dramatic than shocks in the past. Since the oil price was driven by global economic activity and a rise in demand, many countries experienced a short burst of economic activity paired with high inflation. Economic

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activity soon fell in 2008 when the recession hit. High oil prices affected the prices of goods made with petroleum products and increased costs of transportation, manufacturing, and heating. Rising prices also reduced demand for certain goods due to constraints on consumer wealth.

These simple macroeconomic effects on supply and demand of other goods directly or indirectly related to oil do not show a large impact on economic growth. The 2008 oil price shock has changed conventional wisdom about oil prices having direct adverse consequences for economic growth. Oil price increases from 2003-8 did not have a traditional positive relationship with inflation and unemployment. In addition, the rising oil prices did not coincide with a decrease in real GDP growth (Arezki et al. 2015). A reason that the price gradually increased without causing concern was that consumers could afford higher prices, signifying the strength of economies during the first half of the 2000s.

According to several econometric structural models, the relationship between GDP and oil prices has deteriorated over time (Arezki et al. 2015, 6). There are several prospective explanations for this weakening relationship. First of all, there was greater energy efficiency than before. Energy prices no longer have the same effect as they used to on consumers. Other explanations are that flexibility in labor markets has increased and monetary policy has improved. Past shocks may have had more negative effects because of compounding effects of other economic factors. In the 2000s, the world had drastically changed and effects of oil prices shocks were less dramatic (Federal Reserve Bank of San Francisco 2007).

## **Country Cases**

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Oil prices affect countries in different ways depending on their economic structure, energy dependence, the composition of their energy mix, and dependence on oil imports or exports. Countries respond with policies that reflect their political and economic priorities. Exporting countries benefit from the rise in oil prices because much of their GDP relies on oil. However, oil price volatility is a challenge for policymakers of oil-exporting governments. Oil importing countries are viewed as the losers of price increases because it harms the domestic economy by raising the price of inputs and reducing output. Forecasters in 2007 predicted that the oil price shock would pose a long-term problem for the world. If the prices had not collapsed after 2008, the effects of the crisis could have been very different. Russia, the United States, China, and Saudi Arabia as the leader of OPEC have some of the greatest influences as the major oil producing and/or consuming countries.

### ***Russia***

Russia is the world's second-largest oil exporter. The price increases drastically increased its exports and positively impacted Russia's economy. From 2003-2007, oil production increased. The rise of oil prices caused major Russian oil companies to reduce incentives to increase production and prompted the government and companies to restrict foreign investment. Price increases meant that income from the export of one barrel of crude oil increases (Komori 2010, 3). In other terms, the same amount of oil could be exported to receive more income when prices increase.

The Russian government views the domestic oil industry as a major source of income. They use taxes to collect rents, which are what the government views as excessive profit from

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major Russian oil companies (Brugato 2007). With oil prices rising from 2003-2008, Russia's oil profits increased, making them strategically more important in the world oil market. Brugato argued that Russia became increasingly aggressive abroad beginning in 2000. Deteriorating relations between the United States and Russia also marked this period. Putin supported countries that have been historically unfriendly towards the United States and bullied neighboring countries to get economic and political influence. Russian power increased due to the price increases and Putin began to use oil as a political weapon. This caused the government to solidify state control over oil resources, pipeline networks and other aspects of energy production in surrounding countries (Brugato 2007, 29).

Another measure Russia took was restricting foreign investment. This act could indicate that the Russian government felt confident that their independent oil development was going well. Two policies that the Russians took were revising its production sharing law and imposing restrictions on foreign investment in strategic concession areas (Komori 2010, 3). The production sharing law was revised to raise barriers against the foreign companies' shares in oil development projects.

In 2008, the government only allowed companies with more than 50% Russian ownership to partake in projects for developing strategic oilfields. A strategic oil field is defined as oil reserves with more than 150 million tons and gas fields with more than 1 trillion cubic meters. This definition was meant to limit the number of oilfields available to foreign companies. In short, Russian recognized that their domestic companies could develop oil fields without outside help and saw this independence as a way to increase their wealth and power (Komori 2010).

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### *The United States*

The United States is a large producing country, but also heavily depends on oil imports. This makes them susceptible to oil price changes. Oil shocks have contributed to U.S. recessions over the past 30 years. Although recessions are influenced by price shocks, not all shocks will lead to a recession. In the United States, the major concerns were that high oil prices would harm the U.S. economy and that a political shock in the Middle East will lead to a reduction in oil supply.

The Bush Administration pushed the concepts of energy independence and security. In 2005, the Energy Policy Act was passed in response to the rising concerns about energy security and increased prices. This act included incentives for increasing transportation fuel alternatives and subsidized new domestic oil exploration. Then in 2007, the Energy Independence and Security Act was passed which increased Corporate Average Fuel Economy (CAFE) standards from 27.5 mpg to 35 mpg (Council on Foreign Relations 2017).

In addition, Bush strongly urged OPEC to produce more oil in order to decrease prices. OPEC's response was that the US needed to fix their economic problems, notably the weak dollar. Rising oil prices hurt the US economy and reduced consumer purchasing power. However, OPEC did not respond well to Bush's request and the Saudi oil minister reported that the kingdom would "raise production levels when the markets justify it (NPR 2008)."

A change in US oil production occurred with the discovery of shale formations. The shale revolution allowed the U.S. to extract more oil and expand the oil and gas sector. Therefore, rising oil prices caused employment in the oil and gas industry to increase. Perceived increases in



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the future supply of oil from shale basins may have helped to offset the effects of the oil price increase in the United States, or at least began to change the future of U.S. energy production.

### *China*

Over the past decade, China has become a major energy user. Its economy has aggressively grown at an unusually high rate since the 1990s and is only currently slowing down. Millions of people were lifted out of poverty and moved into the industrial sector. Oil demand has tripled since 1980 due to the increased industrialization (Mouawad 2007). Although China uses less oil in comparison to the United States, the growth of consumption has been higher.

China also uses a lot of coal in its energy mix and has a specialization in inexpensive manufacturing, which helps it withstand oil price increases. The growth of the Chinese economy can be contributed to cheap labor and low costs of production. A slowdown of economic growth was a major concern for China, which made them wary of the rising oil prices. In turn, China sought out ways to add energy production capacity by diversifying their oil mix and investing abroad.

Energy security largely depends on relations with the Middle East. China's energy policy is to maintain positive relations with Middle Eastern and North African countries (MENA). Since 1999, China has followed a "Going Out" strategy, referring to encouraging investments abroad including seeking out overseas exploration, production, and investment in oil and gas (Lai 2012, 59). This area has long been controlled by Western Europe and the United States, creating competition for influence. In addition, there were the problems of resource nationalization, pipeline control, and other geopolitical risks.

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China has worked to diversify their energy mix and also diversify oil transportation routes in order to increase their energy security (Lai 2012). China lacked the ability to exert its influence over the region as a developing nation but is increasingly becoming more active in oil politics.

### ***Saudi Arabia and OPEC***

Saudi Arabia is the largest oil producer in OPEC and has the world's largest national oil company, Aramco. Therefore, the country has the largest share of power in the organization. In 2005, Saudi Arabia alone accounted for 13% of global production (Hamilton 2013, 21). During 2006-7 Saudi Arabia took the lead in cutting production in order to keep prices high. With OPEC and especially Saudi Arabia keeping oil prices high, it posed concerns for the United States. U.S.-Saudi relations have a long legacy in the oil industry. President Bush very publicly urged Saudi Arabia to consider the impacts of high prices on the American economy. Saudi Arabia depends on the United States for military protection and the U.S is a large selling market. In return, they agree to manage the market so prices stay stable and low.

In 2006, OPEC raised the target price of oil to \$55, when it was typically between \$22-\$28 (Yetiv, Feld 2011). Saudi Arabia has long acted as a swing producer, meaning it can easily alter supply to adjust prices. The country has a history of modifying production in order to keep markets balanced and maintain stable prices, especially during the 1980s and 90s. When prices began to rise, the Saudis did not take action to decrease prices. In fact, their production declined by 850,000 barrels by 2007 (Hamilton 2013, 21-2). This could indicate that they were unable or unwilling to produce more.

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The policy of letting oil prices rise signified a strategic shift in policy especially with the prospects of a global recession on the table, which would hurt OPEC countries. The Saudis began to behave more aggressively. Reasons for this shift in behavior could be contributed to a few factors. First, the population of Saudi Arabia has drastically increased, making the government more responsible for providing jobs, food, and housing for its people (Yetiv, Feld 2011). Another reason could be strategic. Tensions in the Middle East and within OPEC could also influence how Saudi Arabia chooses to produce oil. Third, perhaps Saudi Arabia did not want to take responsibility for the entire oil market and began acting more assertively in order to increase domestic benefits.

### **Future Implications**

The prospects of peak oil demand will become more relevant as time goes on. Although it is rather unlikely that the world will ever be 100% oil independent, the use of oil will decrease with improving technologies, innovation, increasing fuel efficiency, and emerging renewable energy markets. Alternative fuels, especially natural gas, are becoming more popular in order to create a cleaner and more sustainable future. New cars are being made to use electricity or have higher fuel economy. A combination of oil substitution and oil conservation could potentially reduce global oil demand.

The “constrained supply” view is losing credibility especially with the emergence of shale oil, deep-water and oil sands. Shale oil and gas is the largest emerging source of energy that is increasing supply. The discovery of shale has large economic implications and appears that it will have a large role in the world's energy supply in the future. The United States has a

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large supply of shale oil. It is now beginning to be extracted at a rapid rate, making the United States a major oil producer and exporter. Extracting these unconventional types of oil will require large investments but improvements in technology are expected to continue to decrease costs in the future (Arezki et al. 2015, 8).

If supply is no longer a serious issue, energy demand might not decrease in the future. In fact, there are several statistics that indicate that energy demand will increase until 2030. If energy increases by 35-40% as some have predicted, will supply be able to meet that demand? Daniel Yergin calls the growth a "globalization of oil demand," indicating that there are changes in the world economy. Some countries like the United States, Japan, and Europe may have seen their peak in oil demand, but there are still developing countries with emerging markets whose oil consumption is predicted to increase (Yergin 2013). Even with increasing technologies and greater energy efficiency, economic growth will improve countries standards of living and increase the demand for energy. The question still lies in how energy will be supplied in the future.

On the more positive side, there is evidence that as time goes on, oil prices do not impact the macro economy at the same levels as in the past. This change in the relationship between prices and growth can be contributed to the fact supply is becoming less of a concern. The true driver of prices tends to be demand shocks. Supply shocks are different than demand shocks because supply shocks can alter the structure of economies and cause a need for more strategic policy impositions (Arezki et al. 2015, 6). Another possible factor could be that monetary policy has become better equipped for dealing with oil price shocks. In general, the traditional negative relationship between global GDP growth rates and oil price increases appears to be deteriorating.

## **Policy Recommendations**

Whether or not oil prices will surpass the record height of \$147/barrel in the future is unknown. Oil price stability is still a desirable goal. With rising concerns about climate change, oil independence is also seen as favorable for the environment. Carbon-based fuels such as oil, natural gas, and coal are harmful to the environment because they emit carbon dioxide and raise global temperatures. However, when prices are higher, it can cause companies to expand drilling and seek out new locations for oil extraction (Johnson 2010), which would not improve the environmental situation.

Oil prices will be unavoidably volatile in the future and price swings are expected. Managing volatility and helping consumers deal with oil price changes should be a priority. This could include government diplomacy during geopolitical shocks and encouraging consumers to use less gas. Implementing a gradually increasing gas tax, like most of Europe has done, may help to decrease personal consumption. If consumers do not depend as much on oil, then a change in price will not affect them as much. Restructuring the transportation system to allow for hybrid and electric vehicles would help to decrease oil dependency (Johnson 2010).

Government management of the oil industry could also cause more volatility if done improperly. Markets do a relatively good job at self-regulating, therefore government intervention may not always be the best solution. Nonetheless, the government can play a role in improving market efficiency and transparency. More accurate and reliable data about the oil market could help speculators make smarter investments and which may help manage perceptions of prices.

Countries should focus on long-term solutions that could help preemptively avoid the negative impacts of oil price crises. By increasing energy efficiency, substituting energy sources, and conservation attempts could help alter energy balances. Developing better fuel economy and using more environmentally friendly vehicles, industries and infrastructure would not only help the environment but also reduce the dependence on oil. Investments in alternative fuels will alter the energy picture in the future. Transitions to different types of energy must be handled carefully in order to avoid overly distorting markets.

## **Conclusion**

The oil price increase from 2003-2008 was caused by a surge in global demand driven by economic growth and a booming global business cycle. Consumption in developed countries remained relatively constant or grew slowly. It was mainly the rise of demand in Asian developing countries that pushed prices up. In addition, the stagnation of supply that failed to keep up with the growth in demand caused prices to increase. Specific supply shocks and speculation had smaller effects but were not the main causes of the price increases.

Effects of the oil price increase were not as dramatic as previous shocks. This could indicate a declining relationship between oil prices and GDP growth. Emerging energy substitutes, stronger global institutions, and more capable monetary policies may contribute to the decreasing dependence on oil price volatility. However, oil prices are not irrelevant and the geopolitics of oil will remain important for years to come.

Policies of countries during 2003-8 depended on if they were oil producers or importers and how reliant the country was on oil. Even though oil has become like other commodities, it

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will remain strategic and a source of wealth and influence for oil-producing countries. The rise of U.S. shale oil will be important for the future of the oil market.

In addition, improving technologies and energy efficiency will reshape the global energy mix as the concept of a sustainable future is becoming more important. Oil will most likely not become unimportant any time in the near future, but dependence on oil as a source of energy is already declining. A decline in oil dependency doesn't translate to a decrease in demand, but it could mean that the world is not as susceptible to oil price shocks as it was in the past. Looking forward, long-term solutions should be implemented in order to manage oil price stability. Oil price volatility may never cease, but policies to improve resilience and absorb the impacts of shocks will benefit economies.

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