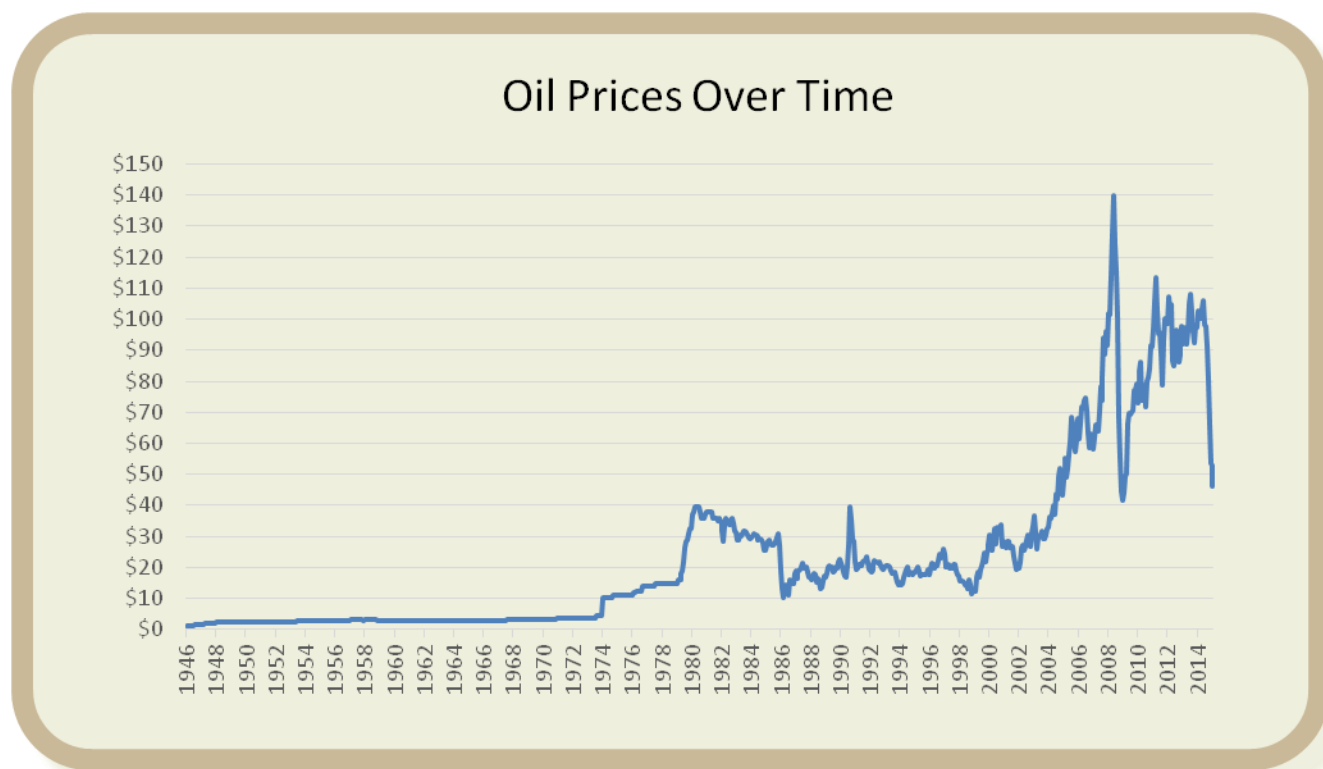




Dropping Oil Prices: The Effects of Oil Price Changes

By Kevin Chambers

Recently headlines have been dominated by stories concerning the dramatic drop in oil prices around the world. US oil prices¹ have dropped over 50% from summer 2014 highs. A barrel of crude oil in the US now costs about \$46, similar to prices experienced in the depth of the Great Recession in late 2008 and early 2009. The recent crash has been spurred by a glut of supply into global markets from oil originating in the United States.



Source: FRED and prior to 1986 inflationdata.com

Oil Market Background:

Reading through news articles or watching CNBC, the interpretation of this drop in prices might be that there is solely one worldwide market for oil. However, the oil prices discussed by the various news outlets are actually based on benchmarks and not a specific oil company's price for oil. Just as there are different various types of crude oil found around the world, there are multiple oil benchmarks to track oil prices.



Crude oil is the term used for the unrefined liquid that is extracted straight out of the earth. It is oil in its most natural form and unusable to burn as an energy source.

To make crude oil into functional gasoline, it needs to go through a refining process. Some crude oil is easier to refine. Two factors determine the ease of the refining process.

Density or thickness: In the oil industry, a “light” oil means it is less dense, and thus, easier to refine.

Sulfur concentration: “Sweet” crude oil has low sulfur content and is easier to refine; “sour” crude has higher levels of sulfur and is less desirable.

The different benchmarks for crude oil reflect these differences in the lightness and sweetness of crude oil and also take into consideration the ease of transportation based on the location the oil is found.

The Four Main Benchmarks:

- **West Texas Intermediate (WTI):** WTI is the main benchmark for oil consumed in the United States. When news outlets are referring to US oil prices (at the pump) they will usually be quoting prices from the WTI. The WTI is also the underlying commodity of the Chicago Mercantile Exchange’s oil future contracts. WTI refers to most of the oil extracted in the United States coming from the Midwest and Gulf Coast and stored at the gigantic storage and pricing facility in Cushing, Oklahoma. WTI is light and sweet, making it very easy to refine. However, due to US law and the land-locked nature of most of the WTI, transportation is very expensive and sale outside of the United States is restricted. These logistical issues effect the price of WTI compared to other benchmarks.
- **Brent Crude:** Originally, the Brent Crude referred to oil in the Brent Oil Field in the North Sea, but now it encompasses three other major fields as well: Forties, Oseberg, and Ekofisk fields. The Brent is the most widely used benchmark globally. About two-thirds of all crude contracts use the Brent as their standard. The oil from the Brent is slightly less sweet and lighter than the WTI, but is still considered very high grade. It is also considered very easy to transport because all of the supply is in the ocean and is located very close to continental Europe for easy sale and transfer.
- **OPEC Basket:** The Organization of the Petroleum Exporting Counties (OPEC) is an international organization that attempts to coordinate the price of oil coming from 12 oil producing counties: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the UAE, and Venezuela. The OPEC basket is the weighted average of the oil prices from the member countries. The OPEC Basket is considered more sour and heavier than both the WTI and Brent. This is the benchmark for most of the oil flowing out of the Middle East to Europe and the US.
- **Dubai Crude:** Dubai Crude oil is a lower grade oil from the Persian Gulf. The oil is much more sour and heavier than WTI or Brent equivalent oil. The Dubai Crude, also called the Fateh Crude, is a basket of oils from Dubai, Oman, and Abu Dhabi. This is the benchmark used for Middle Eastern Oil shipped to China and the rest of Asia.

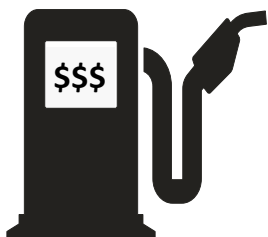


Most of the world's oil is benchmarked against one of these benchmarks. There are many other oil prices that are tracked, for example Ural Oil (Russian oil), or Bakken Oil (North Dakota fracking oil); however, they are not considered benchmarks for the oil industry as a whole. Because of the dominance of the WTI, Brent, OPEC, and Dubai, oil competing on a global scale trends toward one of these benchmarks. The prices of the various benchmarks change daily due mostly to supply factors. The WTI, Brent, and OPEC have historically traded very closely together. Though, at times the prices have significantly deviated. Especially now, with the recent volatility in oil prices worldwide, it is important to know which price the news outlets are quoting.



Oil Markets:

There are two oil markets. The “spot market” is the place where buyers can buy barrels at the current price and expect a speedy delivery of their product. Prior to the 1970s, this is how all oil exchanges took place. This is similar to how consumers buy gasoline at the pump;



we have to take the current price. But, after the OPEC oil embargo shot up oil prices for a brief period, buyers wanted to protect themselves from a similar future scenario.

The solution was the creation of an oil futures market. Future contracts allow buyers to buy oil at a locked in price for delivery at a future date, say 6 months or a year in the future. The different types of crude oil trade on different markets. WTI trades on the New York Mercantile Exchange (NYMEX), Brent Crude trades on the Intercontinental Exchange Futures Europe (ICE-FE), and the Dubai Crude trades on the Dubai Mercantile Exchange (DME). Most OPEC oil gets traded through

Brent Crude contracts and is priced according to that benchmark's prices. Most future contracts stipulate the location the oil is to be drilled and the quality of the oil. Investors and speculators can also buy oil futures for investment purposes. Futures market prices are a good place to track the expected price of oil.

Past Oil Price Events:

Throughout modern history, there has been a few times that oil prices have dramatically risen or fallen. The first oil shock came in 1973 when Organization of Arab Petroleum Exporting Countries (OAPEC, all of the Arab members of OPEC²) instituted an oil embargo against the United States, Netherlands, Portugal, and South Africa. The embargo was in retaliation for those countries' support of Israel in the Arab-Israeli war. Due to the embargo, the price of oil quadrupled and pushed the United States to realize the dangers of reliance on foreign oil. It triggered new measures by the US government that focused on energy conservation, domestic oil exploration, and industry development. These measures included the creation of the Strategic Petroleum Reserve (an emergency fuel storage facility that can hold up to 727 million barrels), efficiency standards on automobiles, and the establishment of 55 mile per hour speed limits on US highways. The embargo also cemented OPEC as a global force that could use its cartel power to effect global oil prices (US Department of State, 2013).



The next crisis came in 1979, when the price of oil doubled in response to the Iranian Revolution. As the Shah in Tehran fell, Iranian oil production dropped by 4.8 million barrels per day. Although this drop in production was only 4-7% of global supply, the price of oil shot up due mostly to an overreaction of the markets building on fear from the 1973 crisis (Graefe, 2013). The 1979 crisis showed how oil prices can be affected by public sentiment.

Both the crisis in 1970 and again in 1979 created an ethos of fear surrounding oil prices that kept prices

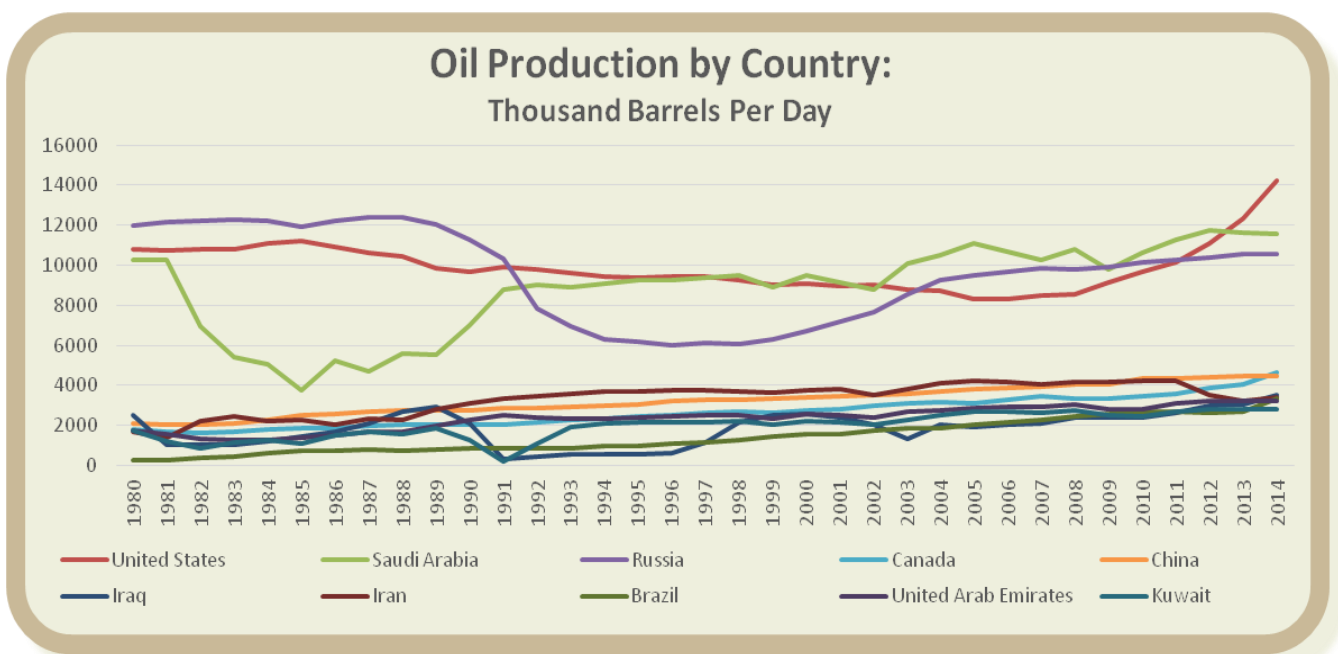


high. After the turbid and volatile 1970s, the 1980s was a decade of dropping oil prices. The decline was due to three dominate reasons: overinflated oil prices, increases in production, and reduction in demand (Georgetown University). Due to the high prices, consumers focused on conservation of their homes and cars in order to lower their oil and gas expenses. Business's increased their production efficiency and invested in new technology. A worldwide recession also hit in the early 1980s, further decreasing demand for oil. Oil production also increased during this period as high prices encouraged companies and governments to invest in exploration and capital. The increase came mostly from non-OPEC countries. During this time, the US's Prudhoe Bay oil field came online. Saudi Arabia decreased their production in the early 1980s to try and keep the price inflated, dropping OPEC production to the lowest level since 1969.

Through the 1990s, oil prices were fairly flat, hovering around \$20-\$25 a barrel. In 1990, there was a brief spike in prices in response to the first US-Iraq war, but prices quickly fell back to previous levels. It wasn't until 2003 when oil prices really started to rise. From 2003 - 2008, oil prices rose by over 300%. The soaring prices were caused by a series of compounding factors. In 2003, oil prices jumped at the onset of second US-Iraq war. In 2004, Hurricane Katrina destroyed many oil facilities in the Gulf of Mexico, continuing the increase in prices. Ongoing war in the Middle East, as well as heightened tensions on the Korean Peninsula and in Nigeria, contributed to the upward pressure. The onset of the 2008 credit crisis caused prices to fall down dramatically. However, prices quickly rebounded to about \$100 a barrel, the level at which prices have been until this most recent decline.

Where Oil Comes From:

Although the Brent Crude market is the largest in the world, there is actually very little production coming out of Europe in today's market. The top 3 producers in the world, as of September 2014, are the United States (14.2 million barrels a day), Saudi Arabia (11.6 million barrels a day), and Russia (10.6 million barrels a day). The production from these three countries makes up 39% of global oil production. They are far and away the largest



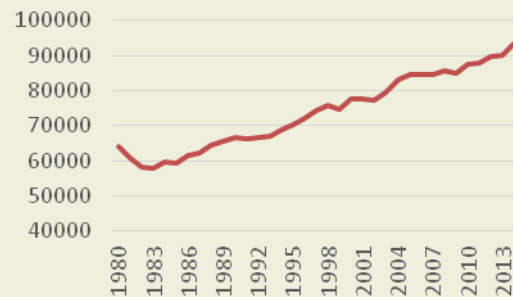
Source: EIA, through September 2014; prior to 1992 Russian production is production for the former USSR



producers, and have been for some time. They are all now producing oil at the highest levels in last 20 years, making worldwide production at its highest point in history. Venezuela (298 billion barrels), Saudi Arabia (268 billion barrels), and Canada (173 billion barrels) have the largest reserves of oil. Russia and the United States fall significantly below in terms of reserves with 80 billion barrels and 30 billion barrels, respectively.

Oil reserves are the amount of feasibly recoverable oil.

World Oil Production 1980-2014



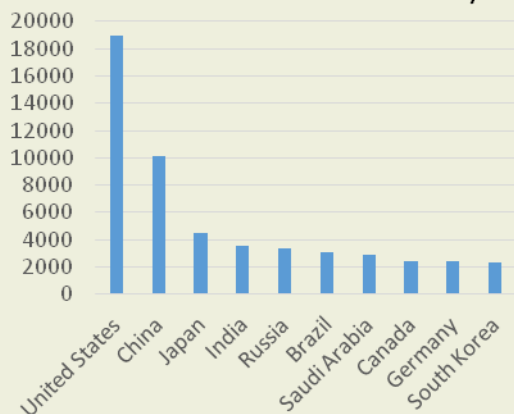
Source: EIA, through September 2014

Oil Consumption:

The United States is the largest consumer of oil in the world, using almost 19 million barrels per day. This means the US still needs to import some of its oil. US daily consumption is almost double the amount of oil consumed by China per day, which is about 10 million barrels. The US consumes about 20% of all the oil produced per day. As a region, Asia consumes the most oil, using 31% of produced oil.

By Country 2013:

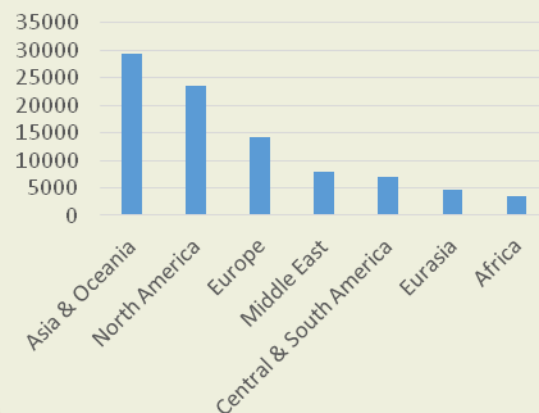
Thousands of Barrels Per Day



Source: EIA

By Region 2013:

Thousands of Barrels Per Day



Source: EIA



The Oil Business:

The oil business is bifurcated into two types of companies: private and public. Of the 11 largest oil companies in the world (in terms of production), 4 of the companies are privately held while 7 are owned by national governments. Saudi Aramco is the state-owned oil company of the Kingdom of Saudi Arabia and produces more oil than any other company. State owned companies are very hard to value, since most do not trade on a stock market. The Financial Times has estimated that Aramco could be valued at \$10 trillion, making it the most valuable company in the world. Shell makes the most money a year, producing \$467 billion in revenue (Dutta, 2013).

Largest Oil Companies	Country	Production (Million Barrels Per Day)	Revenue (US\$ Billion)
Aramco	Saudi Arabia	12.5	356
Gazprom	Russia	9.7	158
National Iranian	Iran	6.4	85
Exxon Mobile	USA	5.3	453
Rosneft	Russia	4.6	102
Shell	UK/Netherlands	4.0	467
PetroChina	China	3.9	320
Pemex	Mexico	3.6	129
Chevron	USA	3.5	242
Kuwait Petroleum	Kuwait	3.2	N/A
BP	UK	3.1	388

Source: oilandgasiq.com

“unconventional” sources. Unconventional oil is extracted using techniques other than the traditional drills on land and at sea. Usually these sources are in rock formations that have low permeability. The two most common sources of unconventional oil are oil sands and oil shale.

Current Oil Situation:

Since June of 2014, the price of the oil across the benchmarks has fallen over 50%. In June, the price WTI peaked at \$108 a barrel; as of January 20, 2015, the price was \$47. Brent Crude was priced at about \$115 a barrel this summer and has also fallen to about \$47. At the pump, Americans have seen average prices of about \$3.80 per gallon in April 2014 fall to about \$2.15 in January 2015. Part of the seemingly sudden drop has been the escalation in supply from the US and Canada. US production increased by 15% from the end of 2013 to September 2014, the largest expansion in US production since 1980. This follows the annual increases in production in 2011-2012 of 10% and in 2012-2013 of 11%. Canadian oil production has grown by 7% (2012), 6% (2013), and 13% (2014) over the same periods.

The surge in supply from North America is due to the improved feasibility for companies to extract oil from

Permeability refers to the ability for fluids to move through the rock.

Oil sands:

Oil sands are a mixture of sand, water, clay, and a type of oil called bitumen. Bitumen is too thick and heavy to be pumped straight out of the ground. Bitumen needs to be separated from the sand and clay through chemical processes and under high temperatures. Therefore, oil sands are mined using either open pit mining or in situ drilling. Open pit mining is similar to coal mines. Large machines collect the earth and transport it to a facility to be processed into usable oil. In situ drilling liquefies the oil underground and pumps it to the surface. The largest deposits of oil sands are in Canada and they have been the main reason for



increased production in that country (Canadian Association of Petroleum Producers, 2013).

Oil Shale

Oil shale is a sedimentary rock that is rich in a mineral called kerogen. Similar to oil sands, through chemical and thermic means, kerogen is separated from the rock and processed. The oil shale is extracted mostly using the controversial method of hydraulic fracturing or “fracking”. In the United States, as of 2013, up to 95% of new US oil wells employ fracking and more than 43% of US oil production comes from fracked wells (US Department of Energy, 2013). Fracking operations exist across the country, however; they are concentrated in North Dakota, Texas, West Virginia, Colorado, and Pennsylvania.

The other factor that has hurt the price of oil is on the demand side. In the US and Europe, cars and trucks have become much more fuel efficient. Between 2011 and 2013, average fuel efficiency increased from 22 MPG to 24 MPG. This was due to the high oil prices, increasing use of hybrids, and to stricter government standards for car makers. The ongoing recession in Europe has also decreased demand for oil.

OPEC’s Production Decision:

As the price of oil began to slip, OPEC had to make a decision. One option was to cut production and curb the oversupply of oil. This would keep oil prices higher, but would lower the amount of oil in the market coming from their wells, resulting in a decrease in revenue for their wells. OPEC ultimately decided in November to continue pumping at current levels, allowing the price of oil to continue to fall. Why would OPEC do this?

OPEC, who is basically controlled by Saudi Arabia, might actually stand to gain from lower oil prices. First, lower prices hurt two of OPEC’s biggest competitors: Iran and Russia. Both countries are already struggling to compete with sanctions put on them by many western countries.

Fracking forces a mixture of water, propellants⁴, and chemicals into the rock. The mixture creates pressure which opens up cracks in the rock to allow oil and gas to be extracted more easily.

Iran will see billions of dollars in lost revenue to the oil price decrease. The fairly new Iranian President Rohani came to power with promises of removing Western sanctions and building up the Iranian middle class (World

Bulletin, 2014). Many experts have put the breakeven price point of oil for stabilizing the Iran economy at \$75 - \$100 a barrel (Amsdorf & Kennedy, 2014), a price that doesn’t seem likely in the current climate.

The Russian situation may be worse than Iran’s. Russia’s oil economy has allowed them to weather many of the sanctions placed on them by the US and European leaders. When oil prices started to slip, Russia’s economy was hit especially hard. The Russian ruble fell 46% in 2014. The Russian central bank reported that they are planning for the Russian economy to shrink by almost 5% if the price of oil averages \$60 a barrel for 2015.

OPEC’s decision to not decrease production will hurt unconventional oil producers, possibly allowing OPEC to regain their market control. Their hope is that lower oil prices will hurt the

margins of companies that use the more expensive processes of getting oil from sand and shale, essentially pricing those producers out of the market and allowing their cheaper conventional methods to rule the market. The debate is open whether or not this will happen, but most major drilling companies are

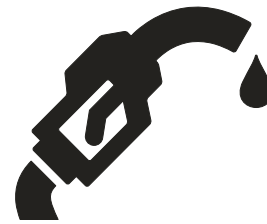


planning to scale back future shale drilling operations (Amsdorf & Kennedy, 2014). It may take a year or so for the full impact on shale production. Most shale operations are very short term. Output at an average well falls to 60% after the first year (The Economist, 2014).

Oil Price and Investments:

In terms of investment portfolios, falling oil prices are a mixed bag. It is a good thing for US consumers. Americans can probably expect oil prices at the pump to continue to fall over the next few months and probably stay low for a time. Theoretically, lower prices at the pump will allow consumers to have more disposable income to spend on other things and this could stimulate the US economy. European economies and Japan, which are net oil importers, could also be helped out of their recession. The world's biggest emerging economy, China, also an oil importer, has been aided by lower energy costs. The MSCI China index, which covers 85% of China's equity universe, was up 7% for the 4th quarter of 2014. Companies that are large users of oil will definitely benefit from lower input costs. Companies such as airlines, retail stores, and plastics and rubber producers will all benefit as their cost will decrease in 2015.

On the other hand, low oil prices will hurt some investors. Oil exporting countries will be hurt by low prices. Many oil dependent emerging markets have reacted poorly to low prices. In the 4th quarter of 2014, the MSCI EM index fell 4.5%. Energy stocks make up 8% of the companies in that index. Countries that heavily rely on oil revenue, such as Venezuela, are going to be looking at tough times ahead. Domestically, oil and gas companies have not fared well. The iShares US Oil & Gas Exploration & Production ETF (IEO), an ETF that offers exposure to 78 Oil & Gas companies was down 17.6% in the 4th quarter of 2014 and down 26% for the last 6 months. Chevron, Exxon Mobil, Shell, and BP stocks have all fallen off of 2014 highs by about



20%. Some analysts have also been lowering expectations for companies like Boeing, Ford, and Tesla, which have put lots of money into research to develop products to combat high oil prices for consumers (Amsdorf & Kennedy, 2014).

The Future:

Cheaper oil should help the overall global economy. The Economist estimated that the recent drop in prices, if maintained, will give \$1.3 trillion more to global consumers. This should fuel a global increase in GDP. While low oil prices will further curb fears of inflation, it will likely exacerbate the deflation issues in Europe. It is probable that the economics of oil markets have irreversibly changed. If oil markets settle into a new normal of \$50 a barrel vs. \$100, there will be some painful adjustments as many oil companies, especially those reliant on shale oil, go bankrupt and governments that have budgeted for \$100 a barrel price reconfigure their systems. It does appear that shale oil production is here to stay, and that OPEC's control over the global market is faltering. Sustained lower oil prices could bring more stability to the market as supply levels out to meet demand. (The Economist, 2014). There are still risk factors outstanding, including a collapse of Putin's power or a large scale Middle Eastern war, that could send the price of oil soaring. Going forward, the US and the global economy will continue to be heavily reliant on oil. Oil prices can have a profound impact on national economies and geopolitical stability. While it is beneficial to have basic understanding of how oil markets work, it is a fool's game to try and predict where they are going to go.

¹ WTI Spot Price

² Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, Syria, Tunisia, and the UAE

³ EIA

⁴ Sand or manmade ceramic material that is used to keep fractures open during and after the fracking process.



Works Cited:

Amsdorf, I., & Kennedy, S. (2014). How \$50 Oil Changes Almost Everything. Bloomberg.

Canadian Association of Petroleum Producers . (2013). What are Oil Sands. Ontario : Canadian Association of Petroleum Producers .

Dutta, S. (2013). The World's Biggest Oil & Gas Company. oilandgasiq.com.

Georgetown University. (n.d.). Demand for Oil and Excess Supply Since 1980. Washington DC: Georgetown University.

Graefe, L. (2013). Oil Shock of 1978–79. Atlanta: Federal Reserve Bank of Atlanta.

The Economist. (2014, Dec). Sheikhs v shale. The Economist.

US Department of State. (2013). Oil Embargo, 1973–1974. Washington DC: US Department of State, Office of the Historian.

US Department of Energy. (2013). How is Shale Gas Produced. Washington DC: US Department of Energy.

World Bulletin. (2014). Low oil prices to effect Iran more than sanctions. World Bulletin News Desk.

