

Use Numbers: Assignment 1 of 3
Equilibrium Prices, Supply and Demand

Due September 12, 2023

Bring a digital or hard copy of the assignment to class; we will discuss it in class the day you turn it in.

We have learned that the price we observe in the market is the equilibrium price. This equilibrium price is influenced by both supply and demand.

In this assignment, you analyze one specific equilibrium price over time. You choose two big changes in price and evaluate, using news sources, whether those changes are due to supply or demand.

We focus on oil prices, and you can find the data files with monthly oil prices here: [\[csv\]](#), [\[xls\]](#), [\[rds\]](#). If you prefer annual data, you can find these at [\[csv\]](#), [\[xls\]](#), [\[rds\]](#). These are all the same data, just in different formats.

These oil price data come from [FRED](#), the St. Louis Federal Reserve Bank's data warehouse. Specifically, we are looking at the spot price of one barrel of West Texas Intermediate crude oil, which is the type of oil produced in Texas.¹

Google and news archives should be sufficient to answer these questions. This is not a major research paper, so please scale your effort accordingly. When needed, cite sources so a researcher could find them. I do not care about specific citation format.

While your analysis should rely on outside sources, any phrase of more than two words from another source should have quotes around it and a citation (any format is fine). If we detect plagiarism (see [here](#) if you are uncertain what this means) you will get a zero on this assignment and may face additional consequences depending on the severity of your actions.

You are welcome to discuss parts of this assignment with other students, or to query ChatGPT (recalling that ChatGPT sometimes makes up sources). However, any work you turn in must be your own and written in your own words.

To make graphs, you can use Excel, R (entirely not required, or even suggested) or the software of your choice. We can support technical questions in Excel, R or Stata.

¹While the FRED data are nominal (not adjusted for inflation), the dataset you have is already in real dollars. "Real dollars" means dollars corrected for inflation. Intuitively, this means that a dollar purchases the same amount over time. If you are curious, we use [this](#) series to deflate the prices.

1 Questions

1. Graph the price of WTI over time, for all years in the data.



2. Find the average oil price in each decade and make a table that reports this. Use years 1946-1949 as the first decade, 1950-1959 as the second decade, etc.

Table 1: Average West Texas Intermediate Price by Decade

Decade	Average WTI
1940	28.0
1950	31.6
1960	28.8
1970	53.7
1980	81.1
1990	40.6
2000	78.5
2010	94.3
2020	74.3

3. Consider the average price by decade from your table from Question 2. In looking at the pattern of price change by decade over time, choose a decade that stands out from the overall pattern (do not include the current decade, which is still too short to consider!). Write which decade you have chosen, and write a brief paragraph giving at least one reason that this particular decade sticks out from the rest. Explain whether this reason is supply or demand.

To me, the anomalous decade in the table below is the 1990s. Prices are generally increasing over time, but they drop substantially and stay low in the 1990s. I graded this problem with great le-

niency, since the decade that “sticks out” depends greatly on the start and end years you choose for the decade.

We accept any factually well-argued answer here.

4. Pick out two large price changes from the graph you made for question 1. By “large price change,” I mean a period where the line is steeply sloped, which is when the price rises or falls quickly. (The data are monthly, but these changes need not be monthly.) What drove these changes? Identify whether they are driven primarily by supply or demand. If you can’t differentiate between supply and demand in the price change, choose another price change. Write one short paragraph for each price change explaining

- (a) the date of the price change
- (b) what caused the change
- (c) whether this was a change in demand or supply

We accept any factually well-argued answer here.

Almost all oil price movements, except for the covid-related drop, are supply, rather than demand driven. To give a precise answer to this question, it is important to pick a specific, sharp price change. This allows you to isolate supply from demand.

Most, though not all, sharp changes are supply-driven. Here are some points that many of you noted. This list is not exhaustive.

- 1973/4, first oil shock: We see a steep increase in the price of oil, driven by OPEC’s oil embargo on the US and other countries (in response to US support for Israel in the Yom Kippur war). Prices increase.
- 1979, second oil shock: The Iranian Revolution leads to a sharp decrease in supply. Prices increase.
- 1986, OPEC action: Sharp drop in prices led by OPEC’s decision to increase production. Prices fall (but OPEC gains market share from new competitors).
- 2010s, growth of US oil production: US oil producers use new technology to increase production of domestic oil. Prices decline.
- 2020, early pandemic: World demand for oil dips sharply in response to the cessation of much production in the face of the pandemic. Prices decrease.

5. Find another price series over time. That is, find data that report the price over time on a product or commodity of your choosing that is not oil or gasoline. Any frequency – daily, weekly, annual – is fine. There are many great places to find price data online: the Bureau of Labor Statistics, the Bureau of Economic Analysis, and many zillions of other private sources.

Identify two changes to the prices you found and explain whether they are supply or demand driven. You should be able to answer this in under one page. Your answer should include the following

- (a) What the price series is
- (b) Where you got it from
- (c) A graph of the price over time
- (d) A description (as in 3) of when the change occurred and whether it was supply or demand driven

A complete answer here needs all the elements discussed above, along with a factually well-argued discussion.