Case 2.3 Explaining changes in the price of oil: not so slippery when you use supply and demand

Summary

This case study shows how the demand/supply model can be applied to interpret changes in the world oil price.

Suggested answers

1 An article in The Economist (2007a) described changes in the market for helium: ‘Alas, expected new sources of the stuff have failed to materialise just as high-tech industries that rely on it are booming’.

Use the demand/supply model of a perfectly competitive market to predict the effects on the equilibrium price of helium from the changes in demand and supply described.

Demand for helium is increasing (due to increases in demand by high-tech industries), and supply is not increasing (either constant or decreasing due to no new sources being found). Applying this information to the demand/supply model, we would predict that the equilibrium price of helium will increase (see Figure 1).

The relative effect of the increase in demand on equilibrium price and quantity will depend on the elasticity of supply. The more price elastic is supply of helium, the greater will be the effect of an increase in demand on the equilibrium quantity traded of helium, and the smaller will be the effect on equilibrium price   
(see Figure 2).

Figure 1

Figure 2

P

P

P\*1

P\*1

(inelas) P\*2

(elas) P\*2

P\*2

S1$AU in US

D2

D1

er2

D1

$US per 1$AU

er1

D1$AUin US

D2$AU in US

Q2\* (elas)

S

S (inelastic)

S (elastic)

2 An article in The Economist (2018a) described how despite an agreement by OPEC and Russia to increase output by up to 1m barrels a day (b/d), the price of crude oil increased. The increase in price was instead attributed to supply outages in Libya and Venezuela. At the same time, the Trump administration in the United States was pressuring allies to cut oil imports from Iran to zero, or risk punishment for violating American sanctions.’

Use the demand/supply model to explain how the increase in the price of oil can be explained by:

a supply outages in Libya and Venezuela.

Supply outages cause a decrease in supply. That decrease in supply will then cause a decrease in the price of crude oil. In order for this factor to explain the decrease in the crude oil price that occurred in 2018, it would be necessary for the negative effect on the supply outage from Libya and Venezuela to have been larger than the positive effect from increases in supply from OPEC and Russia.

b future decreases in oil exports by Iran.

Decreased oil exports by Iran in the future will cause a decrease in the world supply of crude oil and hence a decrease in the market price at that time.

For suppliers in 2018 who expect a higher price of oil in the future, there is an incentive to switch some supply from today to that future time when Iranian exports are reduced – in order to take advantage of the higher future price. In taking this action, suppliers reduce the supply of crude oil today. That decrease in supply today would increase the market price in 2018. Hence, even though the effect of US sanctions on Iranian exports will only occur in the future, it can cause an increase in the price of crude oil in 2018 due to the spill-over effect described.

A similar effect can occur from the behaviour of consumers. Where consumers expect a higher price of crude oil in the future, they may bring forward some amount of their demand for oil to 2018. That will increase the demand for oil in 2018. Hence, the market price of crude oil will increase in 2018.

3 For each of the following scenarios, what would be the effect on the equilibrium price and quantity traded in each of the markets described?

a Wheat is an input to bread. Both wheat and bread are traded in perfectly competitive markets. Bans on pesticides increase the cost of production of wheat. What will be the effects on the equilibrium price and quantity traded of wheat and bread?

An increase in the cost of production of wheat will cause a decrease in supply of wheat. This will cause an increase in the equilibrium price and decrease in equilibrium quantity traded of wheat. Wheat is an input to bread, and therefore the cost of production of bread will increase. An increase in the cost of production of bread will cause a decrease in supply of bread. This will cause an increase in the equilibrium price and decrease in equilibrium quantity traded of bread.

A higher price after 1 January 2015 will mean that prior to that date (i) consumers will increase their demand as it is now relatively cheaper to buy before 1 January 2015 than after that date; and (ii) suppliers will decrease their supply as it is now relatively more profitable to sell before 1 January then after that date. An increase in demand and a decrease in supply prior to 1 January 2015 will cause an increase in the equilibrium price, and the effect on the equilibrium quantity traded will depend on the relative size of the effects on demand and supply.

b Bicycles and bike helmets can be considered to be complements. A decrease in the price of aluminium makes it cheaper to manufacture bicycles. Markets for bicycles and bike helmets can both be assumed to be perfectly competitive. What will be the effects on the equilibrium price and quantity traded of bicycles and bicycle helmets?

A decrease in the cost of production of bicycles will cause an increase in supply. This will cause a decrease in the equilibrium price and increase in equilibrium quantity traded of bicycles. Bicycle helmets are a complement for bicycles, and therefore the decrease in the price of bicycles will cause an increase in demand for bicycle helmets. This will cause an increase in the equilibrium price and increase in equilibrium quantity traded of bicycle helmets.

4 An article in The Economist (2018b) described concerns that soaring demand for cobalt would cause a substantial increase in its price. Discuss potential reasons why an increase in demand for cobalt could cause a substantial rise in its equilibrium price?

The size of increase in the price of cobalt due to an increase in demand will depend on:

* The size of the increase in demand (see Figure 3) – with larger increases in demand causing larger increases in price
* The price elasticity of supply (see Figure 4) – with a lower degree of price elasticity of supply implying a larger increase in price.

Figure 3

Price

Supply

Larger increase in demand will cause larger increase in price

Demand

Quantity

Figure 4

Supply – Price inelastic

Price

Supply – Price elastic

Lower degree of price elasticity of supply implies larger increase in in price

Demand 2

Demand 1

Quantity