



## Worksheet 5.4

### Price Controls Cause Petrol Shortages in China

In the fall of 2007, oil prices were hitting record levels worldwide, leading to rising petrol prices for drivers in most places. At the time, one could spot an unusual site at petrol stations across China: enormous queues of blue trucks (the ubiquitous means of cargo transport in China), snaking up and down the block.

Why the long lines? As it turns out, there was a simple explanation rooted in the principles of supply and demand that any first semester IB economics student would understand! The Chinese government had been forced to ration petrol (limiting the amount that a driver can buy at one go) due to the shortages resulting from the government's price controls in the petrol market. Read the fourth and seventh paragraphs from [this article](#).

China is a major importer of oil. With an economy growing around 12% in 2007, much of the country's growth depended on the availability of crude oil at reasonable prices, which China's oil refining firms turn into diesel and petrol, needed to get Chinese manufactured products from factory to port and from port to overseas consumers.

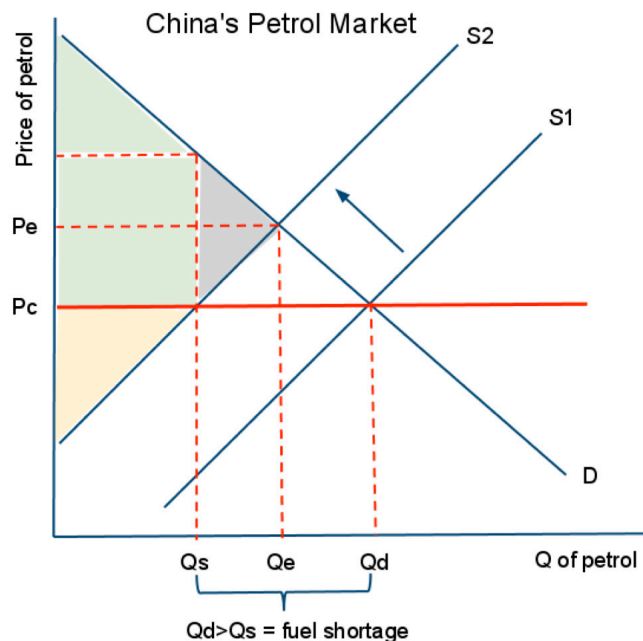
The problem with the oil market in China, however, was that as 'Chinese refiners cannot pass the souring crude costs on to consumers'. Oil is an input needed to make a finished product: diesel. As the price of oil rose in 2007 (it reached a record of \$92 per barrel in October of that year), the resource costs to petrol and diesel producers also rose, shifting the supply of petrol and diesel to the left, putting upward pressure on the equilibrium price. As a first semester AP or IB student knows, resource costs are a determinant of supply, and as oil (the main resource in the production of petrol and diesel) increased in price, the supply of these important commodities invariably decreased.

In a free market, a decrease in supply leads to an increase in price. Herein lies the answer to the riddle of the long lines at petrol stations in Shanghai: ***the Chinese petrol and diesel market is not a free market***. The government plays an active role in controlling prices paid by consumers for the finished product refiners are producing, petrol fuel: read 'Beijing fears...' to the end of the paragraph from the article linked to above.

As the costs to petrol and diesel producers rose in 2007, the government in Beijing took the side of consumers and forbade fuel producers from raising the price they charge consumers. The Chinese government essentially imposed a *price ceiling* in the market for petrol. A price ceiling is a *maximum price* set by a government aimed at helping consumers by keeping essential commodities like fuel affordable. As you have learned so far in IB Economics, price controls such as this end up hurting BOTH producers AND consumers, since they only lead to a *disequilibrium* in the market in which the quantity demanded for a product rises while the quantity supplied by firms falls. The *shortage of petrol and diesel* resulting from the government's price control are the perfect explanation for the long lines of blue trucks and motor scooters at all the gas stations in Shanghai during October of 2007.



So why, exactly, does the government's enforcement of a lower than equilibrium price result in such severe shortages that truck drivers are only allowed to pump 20 litres of petrol per visit and made to wait hours each time they need to refill? Below is a supply and demand diagram that illustrates the situation in the Chinese fuel market in 2007:



In the graph above, the supply of petrol has decreased due to the increasing cost of the main resource that goes into petrol: oil. This decrease in supply means that petrol has become more scarce, and correspondingly the equilibrium price should rise. However, due to the government's intervention in the petrol and diesel markets, the price *was not allowed to rise* and instead remained at the *maximum price* of  $P_c$ .

At the government-mandated maximum price of  $P_c$ , the quantity of fuel demanded by drivers far exceeds the quantity supplied by China's petrol producers. The result is a shortage of petrol equal to  $Q_d - Q_s$ .

The government's intention for keeping petrol prices low is clear: to make consumers happy and keep the costs of transportation among China's manufacturers low so as to not risk a slow-down in economic growth in China. However, the net effect of the price controls is a loss of total welfare in the petrol market. Notice the colored areas in the graph above. These represent the effect on welfare (consumer and producer surplus) of the price control.

1. The total areas of the green, orange and grey shapes represent the total amount of consumer and producer surplus in the petrol market assuming there were NO price controls. At a price of  $P_e$ , the quantity demanded and the quantity supplied are equal (at  $Q_e$ ) and the consumer surplus and



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producer surplus are maximized. The market is *efficient* at a price of  $P_e$ . Neither shortages nor surpluses of petrol exist.

2. However, at a price of  $P_c$  (the maximum price set by the government), the amount of petrol actually produced and consumed in the market is only  $Q_s$ . Clearly, those who are able to buy petrol are better off, because they paid a lower price than they would have to without the price ceiling. But notice that there is a huge shortage of fuel now; many people who are willing and able to buy petrol at  $P_c$  simply cannot get the quantity they demand, because firms are simply not producing enough!
3. The total consumer surplus changes to the area below the demand curve and above  $P_c$ , but only out to  $Q_s$ . The green area represents the consumer surplus after the price control. It is not at all obvious whether or not consumers are actually better off with the price ceiling.
4. The total producer surplus clearly shrinks to the orange triangle below  $P_c$  and above the supply curve. Petrol producers are definitely worse off due to the government's action.
5. So how is the market as a whole affected? The black triangle represents the *net welfare loss* of the government's price control. Notice that with a price of  $P_e$ , the black triangle would be added to consumer and producer surplus, but with a disequilibrium in the market at  $P_c$ , the black triangle is welfare lost to society.

Price controls by government's clearly have an intended purpose of helping either consumers (in the case of a maximum price or price ceiling) or producers (in the case of a minimum price or price floor). But the effect is always predictable from an economist's perspective. A price set by a government above or below the equilibrium price will *always* lead to either a shortage or a surplus of the product in question. In addition, there will always be a loss of total welfare resulting from price controls, meaning that society as a *whole* is worse off than it would be without government intervention.

## Questions:

1. Why has the supply of petrol decreased?
2. With a fall in supply of a commodity like petrol, does the demand change, or the quantity demanded? What is the difference?
3. Define 'consumer surplus' and 'producer surplus'. Why does a government's control of prices reduce the total welfare of consumers and producers in a market like petrol?
4. How would a government subsidy to petrol producers provide a more desirable solution to the high oil prices than the maximum price described in this post? In your notes, sketch a new market diagram for petrol and show the effects on supply, demand, price and quantity of a government subsidy to petrol producers. Does a subsidy create a loss of welfare? Why or why not?