

ECO 300 – MICROECONOMIC THEORY – FALL 2005
QUESTIONS FOR PRECEPTS WEEK 3 – OCTOBER 4-5

This week we will use the basic supply-demand framework to analyze the effects of the recent supply disruption in U.S. crude petroleum production caused by hurricanes Katrina and Rita. The method of analysis is outlined in Pindyck-Rubinfeld, pp. 47-57. As in P-R, we will assume that the supply and demand curves are straight lines. (Note – We will discuss this assumption in the precept.) We use estimates of elasticities produced by previous researchers, and current quantity and price information, to find the equations of these lines. The effects of various shifts in the circumstances or in policies can then be calculated.

Pindyck-Rubinfeld quote the following figures for the relevant elasticities:

	Short Run	Long Run
World Demand	- 0.05	- 0.40
Competitive supply	0.10	0.40

All quantities are measured in barrels per day. Suppose U.S. consumption is 20 million, and U.S. production is 10 million. The whole world (including U.S.) consumption (equals production) is 80 million. OPEC production is 25 million, and competitive (non-OPEC, non-U.S.) production is 45 million. (All these numbers have been rounded to keep the calculations simple, but they are reasonably good approximations to reality.) OPEC production is fixed, that is, OPEC supply is totally inelastic, but the quantity may be shifted by the decision of that organization.

(a) Initial equilibrium:

Suppose the market is initially in equilibrium at the price of \$50 per barrel. Use the method of P-R to calculate the equations of the world demand and supply curves.

(b) Short run after the hurricanes hit:

Now suppose the hurricanes knock out 20% of U.S. production capacity, so at the price of \$50 per barrel the U.S. would produce only 8 million, and the supply elasticities are as stated above. Calculate the equation of the world supply curve after this happens, and the new equilibrium price in the short run.

How much crude petroleum would the U.S. government have to release from its strategic petroleum reserve to restore the price to \$50? If the reserve holds a total of 700 million barrels, how long will it last?

(c) Long run after the hurricanes hit

Suppose the damaged U.S. capacity cannot be brought back on line even in the long run. Calculate the equation of the world supply curve in this long run, and the resulting equilibrium price.

(d) Further topics for discussion

We will think of different scenarios along these lines and repeat similar calculations for them. Some examples: [1] What if in the short run the rest of the world (ROW) cannot increase its supply to the U.S., that is, the ROW's supply to the U.S. is totally inelastic at the original equilibrium quantity. [2] What if the US government imposes a price ceiling at the old price? How much quantity shortfall will develop - in the short run, and in the long run? How might this shortfall be handled - rationing, odd/even driving restrictions etc. What further problems (e.g. a black or gray market in gasoline or ration coupons) could arise? What are the economic costs (or benefits) of these alternative methods as opposed to allowing the price to increase. [3] You should think of further questions along these lines and contribute them to the discussion.