

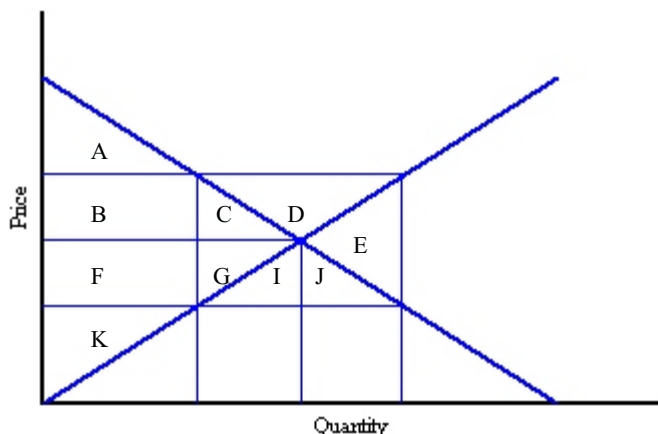
Answer Key: Homework Assignment #8

Energy Economics 399

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1. a. Southwest needs 14 million barrels. At \$49.27/barrel, this is $(14)(49.27) = \$689.78$ million.
- b. Southwest needs 3.5 million barrels/month. $49.27(3.5) + 52.35(3.5) + 54.76(3.5) + 56.02(3.5) = \743.51 million.
- c. If they purchase now on the spot market they need to store the fuel. They are unlikely to have storage capacity for 14 million barrels of oil. If they buy on spot markets as they go along, they are subject to the risk of oil price fluctuations.
- d. Since futures prices are rising over time, investors must expect prices to rise in the future.
- e. Southwest needs to buy 3.5 million call options with a strike price of 60 and an expiration of August. These cost \$4.52/option. Total cost = $(3.5)4.52 = \$15.82$ million.
- f. Since the strike price is above the spot price you will not exercise the option.
- g. Total cost = $3.5(55) + 3.5(4.52) = \$208.32$ million.
- h. You would have paid \$55 per barrel or $55(3.5) = \$192.5$ million.
- i. You lose the cost of the option = \$15.82 million.
- j. Since the strike price is below the spot price you will exercise the option.
- k. Total cost = $3.5(60) + 3.5(4.52) = \$225.82$ million.
- l. You would have paid \$70 per barrel or $70(3.5) = \$245$ million.
- m. You gain the difference between parts k. and l. or \$19.18 million.
- n. We know that oil prices have been extremely volatile over the past year with oil prices rising as high as a record \$147/barrel in the summer of 2008 and as low as \$40/barrel in the winter of 2009. According to the Black Scholes option pricing model, volatility increases the price of options, so we should expect that the price of options has increased over the past several years.
- o. Again, according to Black Scholes, the longer the maturity, the higher the option price. For example, as of 4/21/09, a call option with a strike price of \$60 and an August expiration sold for \$2.97 while the same option with an October expiration sold for \$4.81.

2. a.



Before the subsidy:

$$CS = A + B + C \quad PS = F + G + K$$

After the subsidy:

$$CS = A + B + C + F + G + I + J$$

$$PS = K + F + G + B + C + D$$

$$Gov. = -(B + C + D + F + G + I + J + E)$$

Net changes:

$$CS = F + G + I + J \quad PS = B + C + D$$

$$Gov. = -(B + C + D + F + G + I + J + E)$$

$$DWL = E$$

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- b. This is obviously a retread from the midterm, but I really want you to get this one right.
- Since the benefits are accruing primarily to the poor and middle class, if we have a distributional preference towards these groups, we may favor the project even if it has negative benefits overall.
 - These projects may have positive benefits but they are not undertaken due to status quo bias. The subsidy may help eliminate this bias.
 - These projects may have positive benefits but they are not undertaken due to informational bias. Consumers may not realize their benefits. The subsidy may help eliminate this bias.
 - Consumers may not have personal discount rates that are far higher than societally efficient discount rates. The subsidy may help eliminate this inefficiency.
 - There may be environmental or national defense externalities associated with energy consumption that consumers do not take into account when making decisions. Subsidizing conservation may move to a more efficient allocation.
 - There may be inefficiencies in the intertemporal distribution of resources over time that subsidizing conservation may help alleviate.
 - From a macroeconomic aspect, since this is stimulus spending rather than investment spending, it does not need to satisfy cost benefit analysis in the same way.
3. a. Barsky and Killian suggest that while there are some obvious timing coincidences between oil shocks and macroeconomic disturbances, especially in the 1970s, there is little reason to believe that oil shocks are primarily responsible for macroeconomic fluctuations and stagflation. They point to shocks in 2003 and 1985, which did not lead to noticeable economic changes as evidence of the lack of a direct influence. Furthermore, they point out that other macroeconomic variables besides oil prices that can explain the stagflation suffered in the 1970s.
- b. Rubin and Buchanan place the blame for the current recession squarely on the high oil prices of last summer. As the U.S. imports a significant quantity of its oil, the high prices act as a direct drain on the economy as the trade deficit widens due to oil payments.
- c. Given the mild nature of the current recession up through last fall, Rubin and Buchanan might have had a point that the high oil prices were enough to nudge a weak economy from a definition of a significant slowdown into the recession category. However, the real collapse in the economy has occurred in the past 6 months, during a period of much lower oil prices. Certainly the economy didn't follow Rubin and Buchanan's prescription that a simple reduction in oil prices back to the \$60 barrel level would be enough to end the recession. In fact, more jobs have been lost since oil broke back through the \$60 level than were lost during the run up in oil prices.