

Homework Assignment #8: Energy Economics 399

Due Monday, April 27

1. Southwest Airlines typically uses the equivalent of 3.5 million barrels of crude oil per month in its flight operations. As of 4/14/09, crude oil was selling for \$49.27 barrel for delivery at anytime from now through May. Use the tables on the last page to answer the following questions.
 - a. What will it cost Southwest to purchase its entire fuel needs for May, June, July, and August at the current spot price?
 - b. What will it cost Southwest to purchase its entire fuel needs for May, June, July, and August at the current respective futures prices?
 - c. Why would Southwest be willing to pay more for oil in the futures markets rather than simply purchasing oil on the spot market?
 - d. Based on observed futures prices for crude oil, do traders expect oil prices to rise or fall over the next 6 months?

Now let's just look at your demand for oil in August. Suppose that you do not buy a forward contract but are still planning on purchasing 3.5 million barrels of oil in August, and you want to guarantee that you will not pay more than a certain amount for this oil. You want the option to buy this oil at some maximum price, so you decide to buy a futures option. You buy an option that guarantees you the right to buy the entire shipment at a price of \$60 per barrel.

- e. How much does this options contract cost?

You have purchased this contract, and now August arrives. Assume the price of oil has moved to \$55/barrel.

- f. Will you exercise the option?
- g. How many dollars will you pay for the oil after accounting for the price of the options contract?
- h. How many dollars would you have paid without the options contract? (Assuming you did not purchase a forward contract either.)
- i. What is your gain or loss on the purchase of the option?

Now assume instead by August the price of oil has moved to \$70/barrel.

- j. Will you exercise the option?
- k. How many dollars will you pay for the oil after accounting for the price of the options contract?
- l. How many dollars would you have paid without the options contract? (Assuming you did not purchase a forward contract either.)
- m. What is your gain or loss on the purchase of the option?

Homework Assignment #8: Page 2

- o. Based on your knowledge of oil prices over the past several years, do you suppose that oil options at a given spot price/strike price spread have generally increased or decreased in price over the past several years? Explain.
 - p. Suppose that you also wished to purchase options to cover your fuel purchases in October. At a given strike price, would these options cost more or less than the ones you purchased for August? Why?
2. Subsidies generally lead to dead-weight because they cause people to consume more goods whose marginal costs exceeds their marginal benefits to the consumers who use them.
 - a. In a simple supply/demand graph show an example of a subsidy, clearly labeling the areas of consumer surplus, producer surplus, government expenditures, and dead-weight loss.
 - b. The current stimulus package contains significant funding for energy efficiency projects for low and middle income households and continues generous other efficiency subsidies for persons of all income levels . Given the fact subsidies generally result in dead-weight loss (as in part a.), why would anyone believe that this spending will result in an increase in societal welfare? Be clear, concise, and specific, and give at least four reasons.
3. Read the two articles Barsky and Kilian (2004) and Rubin and Buchanan (2008, pp. 4-6) regarding the effects of oil prices on the macroeconomy. They are available on the class website on my homepage (not in Blackboard or Moodle).
 - a. To what extent do Barsky and Kilian believe that oil shocks lead to macroeconomic disturbances, and what evidence do they give for their conclusions?
 - b. To what extent do Rubin and Buchanan believe that last summer's record oil prices led to the current "macroeconomic disturbance," and what evidence do they give for their conclusions?
 - c. Who do you find more persuasive and why?

Homework Assignment #8: Page 3

4/14/2009 Session Overview Crude Oil Futures - NYMEX

<u>Month</u>	<u>Last</u>	<u>High</u>	<u>Low</u>	<u>Open</u>	<u>Change</u>	<u>Open Volume</u>
May 2009	49.27	51.12	48.85	50.05	-0.78	132,583
June 2009	52.38	54.15	52.02	52.98	-0.60	299,309
July 2009	54.76	56.51	54.48	55.33	-0.57	142,044
Aug 2009	56.02	57.55	56.00	56.83	-0.81	43,386
Sep 2009	57.15	58.55	57.00	57.86	-0.71	33,480
Oct 2009	58.70	59.43	58.01	58.73	-0.03	29,864
Nov 2009	59.69	59.99	59.33	59.52	+0.17	24,332
Dec 2009	59.81	61.41	59.50	60.30	-0.49	103,461
Jan 2010	60.55	61.54	60.55	61.06	-0.51	25,774
Feb 2010	61.53	61.53	61.53	61.76	-0.23	12,671
Mar 2010	62.00	62.00	61.79	62.44	-0.44	13,176
April 2010	63.25	63.25	63.25	63.08	+0.17	5,459
May 2010	64.00	64.00	64.00	63.71	+0.29	5,078

4/14/2009 Session Overview Crude Oil Options - NYMEX

Month	Strike Price	Position	Price	Open Volume
June 2009	50	Put	2.85	28,459
June 2009	50	Call	4.62	19,438
June 2009	60	Put	9.21	20,737
June 2009	60	Call	0.99	25,348
June 2009	70	Put	18.38	17,873
June 2009	70	Call	0.16	30,572
July 2009	50	Put	3.47	4,291
July 2009	50	Call	7.55	2,727
July 2009	60	Put	8.90	3,160
July 2009	60	Call	3.00	11,330
July 2009	70	Put	16.85	625
July 2009	70	Call	0.96	5,342
Aug 2009	50	Put	3.85	183
Aug 2009	50	Call	9.45	645
Aug 2009	60	Put	8.90	1,100
Aug 2009	60	Call	4.52	7,417
Aug 2009	70	Put	16.19	167
Aug 2009	70	Call	1.86	5,617