

Take-home Practice Opportunity 8

Due date: December 6, 5:00 p.m.

Basis and Futures Markets

1. In your own words (i.e., in a manner that you would explain it to someone who has not taken this course) explain the intuition behind basis. Why does a basis occur? (Provide some specific factors in answering the latter question.)

Basis occurs because there are differences (mostly geographical/distance related) between the futures market and local markets. We typically think of basis as the transaction costs that are required to transfer a commodity from a local market to the location of the futures market.

2. Is basis risk *less* or *more* risky than price risk?

Basis risk is always less risky than pure price risk, because basis risk occurs after you have hedged most of the price risk away by taking opposite positions in the local and futures markets. Any variation in basis that occurs is substantially smaller than variation in prices.

3. Using the table below, calculate the basis for the month of November in Billings, MT region for feeder cattle. Then, using these calculations, predict the local prices in Billings in 2011 and 2012 based on the known November futures contract prices.

Market	Month	Year	CME Contract \$/lb	Local Price \$/lb.	Basis
Billings	November	2000	0.86	0.82	-0.04
Billings	November	2001	0.90	0.84	-0.06
Billings	November	2002	0.78	0.65	-0.13
Billings	November	2003	0.93	0.88	-0.05
Billings	November	2004	1.15	1.03	-0.12
Billings	November	2005	1.10	1.07	-0.03
Billings	November	2006	1.15	1.18	0.03
Billings	November	2007	1.16	1.18	0.02
Billings	November	2008	1.13	1.06	-0.07
Billings	November	2009	1.00	0.99	-0.01
Billings	November	2010	1.13	1.07	-0.06
Billings	November	2011	1.45	1.40^a	—
Billings	November	2012	1.49	1.44^a	—

^a Calculated using the average basis from the most recent three years, 2008 – 2010.

Price Risk vs. Basis Risk

4. You are a Montana spring wheat farmer who will seek to sell the wheat in September, 20xx at the local cash price. You know that the historical September basis for your region is $-\$0.20/\text{bu}$. In April, the September, 20xx futures contract price is $\$9.25/\text{bu}$. Your total production costs are $\$5.25/\text{bu}$.

Complete the following:

- (a) Calculate the price at which you expect to sell in your local market.
You can use the following relationship to solve for the expected local price:
 $E[\text{Cash}] = \text{Futures} + E[\text{Basis}]$. Therefore, $E[\text{Cash}] = \$9.25 - \$0.20 = \$9.05/\text{bu}$.
- (b) Suppose that you don't hedge. That is, you fully take on price risk. Assuming that the historical basis holds, calculate your profits if the price of a September, 20xx futures contract at expiration when prices are:
- $\$4.25$
 - $\$8.15$
 - $\$10.20$

Prices in Sept	\$4.25/bu	\$8.15/bu	\$10.20/bu
Local Equity [(F + B) - Cost]	[(4.25 - 0.20) - 5.25] -\$1.20	[(8.15 - 0.20) - 5.25] \$2.70	[(10.20 - 0.20) - 5.25] \$4.75
Total per bushel	-\$1.20	\$2.70	\$4.75

(c) Now, suppose that you do hedge, and therefore exchange price risk for basis risk. That is, you establish a futures hedge in April using the September, 20xx contract. In September, 20xx, calculate your local market profit, futures equity, and total profit under the following scenarios (there are 9 total scenarios – 3 basis scenarios associated with a particular futures price):

i. Futures: \$4.25; Actual basis: -\$0.19, -\$0.25, -\$0.30

Actual basis	-\$0.19/bu	-\$0.25/bu	-\$0.30/bu
Local Equity [(F + B) - Cost]	[(4.25 - 0.19) - 5.50] -\$1.44	[(4.25 - 0.25) - 5.50] -\$1.50	[(4.25 - 0.30) - 5.50] -\$1.55
Short Futures Position	(\$9.25 - 4.25) \$5.00	(\$9.25 - 4.25) \$5.00	(\$9.25 - 4.25) \$5.00
Total per bushel	\$3.56	\$3.50	\$3.45

ii. Futures: \$8.15; Actual basis: -\$0.15, -\$0.22, -\$0.28

Actual basis	-\$0.15/bu	-\$0.22/bu	-\$0.28/bu
Local Equity [[$F + B$] - $Cost$]	[($\$8.15 - \0.15) - $\$5.50$] \$2.50	[($\$8.15 - \0.22) - $\$5.50$] \$2.43	[($\$8.15 - \0.28) - $\$5.50$] \$2.37
Short Futures Position	($\$9.25 - \8.15) \$1.10	($\$9.25 - \8.15) \$1.10	($\$9.25 - \8.15) \$1.10
Total per bushel	\$3.60	\$3.53	\$3.47

iii. Futures: \$10.20; Actual basis: -\$0.20, -\$0.30, -\$0.40

Actual basis	-\$0.20/bu	-\$0.30/bu	-\$0.40/bu
Local Equity [[$F + B$] - $Cost$]	[($\$10.20 - \0.20) - $\$5.50$] \$4.50	[($\$10.20 - \0.30) - $\$5.50$] \$4.40	[($\$10.20 - \0.40) - $\$5.50$] \$4.30
Short Futures Position	($\$9.25 - \10.20) -\$0.95	($\$9.25 - \10.20) -\$0.95	($\$9.25 - \10.20) -\$0.95
Total per bushel	\$3.55	\$3.45	\$3.35