Futures Markets: Chapter 1

Problem 8. Suppose there is a raspberry contract that allows one to deliver four grades of raspberries to satisfy the contract specifications: grades A,B,C, and D. This contract uses additive invoice price adjustments. You observe the following spot prices, per flat of raspberries, at the expiration of the futures contract, and the grades have the following adjustment factors:

Grade Adjustment Factor Price at Expiration

A $.05 $2.46

B $.00 $2.44

C $-.05 $2.38

D $-$.10 $2.33

a. Which grade will be delivered?

You need to compute a delivery-spot price table for the various grades of raspberries.

Grade Delivery-Adjusted Spot Price

A $2.46 - $.05 = $2.41 Highest Grade

B $2.44 - $.00 = $2.44

C $2.38 + $.05 = $2.43

D $2.33+ $.10 = $2.43 Lowest Grade

In this case, Grade A is the lowest deliverable grade with a delivery-adjusted spot price of $2.41

b. What will be the quoted futures price at the end of the contract?

The quoted futures price will be equal to the delivery-adjusted spot price of the cheapest to deliver grade, in other words,

QFT,T = $2.41

c. How much will the short receive for delivering 5,000 flats of the deliverable grade?

The short receives the invoice price for each flat. Thus, the total receipt will be:

 (5,000) x ($2.41 + $.05) or $12,300 === > Total Receipt

Cost per flat = $12,300/5,000 = $2.46 per flat.

10. Suppose a gold dealer has an inventory of 500,000 ounces of 99.5% fine gold. She is sure that this grade will be cheapest to deliver at the expiration of the December gold futures contract on December 28. Suppose she wishes to hedge the price at which she will be able to sell her gold on December 28th. The current COMEX gold futures price is $435 per oz.

a. Should the dealer who has the 500,000 oz. inventory of gold go long or short COMEX gold futures contracts? How many contracts should she use?

Since she wants to sell her gold on December 28th, her concern is that the amount received on the sale diminishes due to the price of gold going down from $435 oz. Therefore, she will take a short position on the COMEX gold futures contract. In this case, without taking into consideration differences in delivery, one contract involves 100 oz of gold so the number of contracts would be: 500,000/100 = 5,000 contracts.

b. Show the dealer’s unhedged revenues, futures profits and hedged revenues for two scenarios for the December 28 gold spot price for 99.5% fineness of gold: (1) $415 per oz (2) $460 per oz.

Scenario I:

Spot Gold = $415 per oz.

Delivery Adjusted Price: QT,T = $415/.995 = $417.0854

Proceeds of the sale from inventory in the open market:

 500,000 oz of 99.5 gold @ $415/oz = $207,500

Futures Profit: 500,000 x ($435 - $417.0854) = $8,957,300

Total Proceeds from this Hedged Position: $207,500 + $8,957,300 = $216,457,300

Which translates to: $216,457,300/500,000 oz = $432.9146 per oz

Scenario II:

Spot Gold = $460 per oz.

QFT,T = $460/0.995 = $462.3116

Proceeds from Selling Gold out of inventory:

 500,000 oz of 99.5% fine gold x $460 = $230,000,000

Futures Profit = (500,000) ($435 - $462.3116) = - $13,655,800

Total Proceeds from this Hedged Position: $230,000,000 - $13,655,800 = $216,344,200

Which translates to: $216,344,200/500,000 = $432.8250 per oz.

c. What per ounce price has this dealer locked in by hedging? How does this compare with the initial COMEX gold futures price? This part of the problem now takes into consideration differences in delivery.

The dealer does not lock in an exact price because the futures price will converge to 0.995 times the spot price of the .995 fineness gold. Thus, the exact number of ounces of futures contracts the dealer would like to use is (.995) x 500,000 = 497,500 contracts. This represents 4,675 contracts and with this new number of the contracts the hedge yields the following results:

Scenario I:

Spot Gold = $415 per oz.

QFT,T = $415/.995 = $417.0854

Proceeds from the sale of Gold in inventory:

 500,000 x $415 per oz = $207,500,000

Futures Profit [based on 4,975 contracts]: ($497,5000) x ( $435 - $417.0854) = $8,912,513

Total Hedged Proceeds: $207,500,000 + $8,912,513 = $216,412,513 or $432.8250 per oz.

Scenario II:

Spot Gold = $460 per oz.

Proceeds from the sale of Gold in inventory:

 500,000 x $460 = $230,000,000

Futures Profit [Loss]: (497,500) x ($435 - $462.3116) = - $13,587,521

Total Hedged Proceeds: $230,000,000 + (-$13,587,5210 = $216,412,479 or $432.8250 per oz.

Note that ($435) x (.995) = $432.8250 the dealer basically locks in the conversion factor times the current futures price when performing this commodity hedge.