
VALUING FUTURES AND FORWARD CONTRACTS

Problem 1

The implied interest rate can be calculated by dividing the futures price by the spot price.

$$\text{Implied interest rate} = (\text{Futures price} / \text{Spot price}) - 1$$

Months to expiration	Trading at	Futures/Spot	Annualized
1	\$404.62	0.3397%	4.1539%
2	\$406.11	0.7092%	4.3316%
3	\$407.70	1.1035%	4.4877%
6	\$412.51	2.2963%	4.6454%
12	\$422.62	4.8035%	4.8035%

Problem 2

a. Theory Price = Spot price + Spot price (Int rate - Div. Yield)

$$= 258.90 + 258.90 (1.06^{(164/365)} - 1.03^{(164/365)}) = 262.306356$$

The actual price is lower than the theory price. The contract is underpriced.

To set up the arbitrage: (1) Buy futures contract (2) Sell short stocks in index (3) Invest in T.Bills

b. Sell futures contracts on the index. # of contracts =

$$(380000/258.90) * 0.8/500 = 2.34839706$$

Problem 3

of contracts that have to be sold = $(100 \text{ mil} / 258.9) * 1.25 / 500 = 965.623793$

3b. Expected Return on the mutual fund = $6 + 1.25(8) = 16\%$

3c. Expected return if you hedge away all market risk = 6% (Riskfree rate)

Problem 4

Theory price = Spot price $(1+r) + kt = 481.40(1.06) + 481.40(.02) = 519.912$

Actual price = 515.60. The contract is underpriced.

To set up arbitrage: (1) Buy futures contract (2) Sell short on gold (3) Invest in T.Bills

To unwind: (1) Collect on T.Bills (2) Pay 515.60. Receive gold (3) Return gold; Collect storage cost;

Net profit = $519.91 - 515.60 = 4.31$

Problem 5

a.	Month	Theory Basis	Actual Basis	
	March	1.26668689	0.43	Underpriced
	June	3.03339624	1.93	Underpriced

b. To set up arbitrage: (1) Buy futures contract (2) Sell short on stocks (3) Invest in T.Bills
 At expiration: (1) Collect on T.Bills (2) Pay \$247.75; Receive stocks. (3) Deliver stocks;
 Pay dividends;

Problem 6

a. $F^* = \text{Spot} (1+r)^t + kt = 19000 (1.10) + 200 = 21,100$

b. Since the actual futures contract price is \$20,400, I would

1. Buy the futures contract for \$20,400
2. Sell short wheat at \$ 19,000
3. Invest the cash at 10%

At expiration:

1. Collect on my cash investment = \$ 20,900
2. Take delivery on the futures contract paying \$ 20,400
3. Return the wheat to the owner; collect saved storage costs of \$ 200

Arbitrage Profit = $(20,900 + 200) - 20,400 = \$ 700$

c. $19,000 (1+r) = 20,400$

Solve for r,

$r = 20,400/19000 = 7.37\%$