

6. Suppose the  $F_i$  in a long futures position are given as 150, 160, 155, 152, 150, 140, 138, 160. Make a table as in Ex. 2.2 in the lecture notes.
7. Suppose the  $F_i$  in a short futures position are given as 140, 130, 132, 135, 140, 130. Make a table as in Ex. 2.2 in the lecture notes.
8. An investor enters into two long July futures contracts on orange juice. Each contract is for the delivery of 15,000 pounds. The current futures price is 170 cents per pound, the initial margin is \$6,000 per contract, and the maintenance margin is \$4,500 per contract. What price change would lead to a margin call? Under what circumstances could \$6,000 be withdrawn from the margin account?
9. An airline expects to purchase 3 million gallons of jet fuel in one month and decides to use heating oil futures for hedging. One futures contract is on 42,000 gallons. It is known that the standard deviations of the changes in the fuel price and in the futures price (per gallon) are \$0.64 and \$0.5, respectively, and the correlation coefficient between these two changes is 0.625. Find the optimal hedge ratio. What does it mean?
10. A beer producer is committed to buy 200,000 pounds of wheat in one month. The only future available is a contract on 40,000 pounds of wheat with a maturity of two months. The values  $\rho = 0.7$ ,  $\sigma_S = 1.2$ , and  $\sigma_F = 1.4$  are known. Find the optimal hedge ratio. What does it mean?
11. The following table gives data on monthly changes in the spot price and the futures price for a certain commodity. Calculate the minimum variance hedge ratio.

$\Delta S$	0.50	0.61	-0.22	-0.35	0.79	0.04	0.15	0.70	-0.51	-0.41
$\Delta F$	0.56	0.63	-0.12	-0.44	0.60	-0.06	0.01	0.80	-0.56	-0.46

12. For the data in Example 3.9, fill the table again when, instead of 30,
  - (a) 20, (b) 40 futures contracts are shorted.
13. A company has a \$20 million portfolio with a beta of 1.1. It would like to use futures contracts on the S&P 500 to hedge its risk. The index is currently standing at 1070, and each contract is for delivery of \$250 times the index. What is the hedge that minimizes risk?