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3.5 1. The company may lose money from the hedge. For example, an airline that hedges by buying oil futures may lose money if the price of oil futures drops.

2. Shareholders can hedge themselves and own shares with the purpose of speculation. If they wanted a low risk investment, they could buy Treasury bonds.

3. If a company's competitors don't hedge, then hedging could place a company at a disadvantage by placing the hedging company at a slightly better position in the worst case but a bad position if the hedge is unnecessary. This is because of the power these competitors have to affect the market in the worst case (i.e. they can raise prices).

3.6 $h = \rho \frac{\sigma_S}{\sigma_F} = .8 \frac{.65}{.81} = .642$

↑hedge ratio

$h = .642$, meaning that the ratio of dollars invested in the Future position to the dollars exposed to the commodity is .642.

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3.7 The hedge that minimizes risk is shorting $N^* = \beta \frac{V_A}{V_F} = 1.2 \frac{20,000,000}{1080 \cdot 25} \simeq 89$ index futures.

To reduce the β of the portfolio to .6, the company should short $(\beta - \beta^*) \frac{V_A}{V_F} = .6 \frac{20,000,000}{1080 \cdot 25} \simeq 45$ index futures.

3.16 $h^* = .7 \frac{1.2}{1.4} = .6$

The beef producer should purchase

$$N^* = \frac{h^* Q_A}{Q_F} = \frac{.6 \; 200,000}{40,000} = 3$$

December live cattle futures to hedge their risk, and close out their position on November 15.

3.19 The hedge ratio of 1.5 means that the company shorts 150 oil futures at a time, and so the dollar gain per barrel of oil from shorting the oil futures will be $1.5 \cdot \$1.70 = \$2.55$.

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3.32 h is set to .8

Number of long copper contracts to buy:

$$N = h \frac{Q_A}{Q_F} = .8 \frac{1000000}{25000} = 32$$

Hedging Strategy:

In October 2017, buy 32 March 2018 futures contracts.

In February 2018, sell 32 March 2018 futures contracts. Buy 32 September 2018 futures contracts.

In August 2018, sell 32 September 2018 futures contracts. Buy 32 March 2019 futures contracts.

In February 2019, sell 32 March 2019 futures contracts. Buy 32 September 2019 futures contracts.

In August 2019, sell 32 September 2019 futures contracts.

Profit from Hedging:

$$800000[(369.1-372.3)+(364.8-370.2)+(376.7-364.3)+(388.2-376.5)]$$

Profit from Hedging = \$12,400,000

Company pays \$1000000(369+365+377+388) = \$1,499,000,000 for cooper over this time period

Company saves \$3.10 per pound of copper due to hedging strategy.

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Initial Margin Requirement is \$64,000

Margin Call for Company sometime between October 2017 and February 2018 and between February 2018 and August 2018.