If spot price increases to 1.5

$$\text{Value of contract} = (1,500,000 - 1,456,100) = \$43,900$$

Payoff from a long position

$$\text{Profit} = S_T - K$$

Payoff from short position

$$\text{Profit} = K - S_T$$

$\Big($ S_T – spot price at maturity of contract

K – delivery price

1) $S = 1200$

1-year forward = 1300

$r = 5\%$

$$1200(1.05) = 1260$$

But forward = 1300

$$\Rightarrow \text{Profit } 40$$

borrow 1200 $\longrightarrow$ buy gold $\rightarrow$ sell it forward

2) $S = 1200$

1-y $\bar{F} = 1200$

$r = 5\%$

If own gold → sell gold ($1200)

enter forward contract

Invest $1200 at 5% → $60

<u>Oil</u>

1) $60 \times 1.07 = 53.50$

1) Borrow $50

2) Buy oil

3) Sell forward $60

4) pay loan $53.50 \times$

$\Rightarrow \$6.50$

1) Profit $12.50

$2000

$S = 20$

2-month call option = $1

$K = 22.50$

Strategies

1) buy 100 shares

2) buy 2000 call options

Assume price ↑ 27

1) $100(27-20) = 700$

2) $2000 \times (\$4.5 - 1) = 7000$

Assume price ↓ 15

1) $-\$500$

2) $-\$2000$

Aug 29-4:51 PM

Problem #2

1-year call $C = \$3$　$(K = 30)$

1-year put $P = \$4$　$(K = 30)$

2 call + 1 put ⟹ Cost = $2 \cdot 3 + 4 = \$10$

$$\text{Profit} = 2 \times \text{Max}(S_T - K, 0) + 1 \cdot \text{Max}(K - S_T, 0) - 10$$

Find S_T such that Profit ≥ 0

$$\text{Profit} = 0 \implies 2 \times \text{Max}(S_T - 30, 0) + \text{Max}(30 - S_T, 0) = 10$$

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3

If $S_T = 40 \Rightarrow 20 \neq 10$

$S_T = 35 \Rightarrow 2 \times 5 = 10$

$10 = 10$

$S_T = 20 \Rightarrow \text{Profit} = 0$

Aug 29-5:11 PM

Problem 5

$\text{Profit}_S = 100 \left(S_T - 40 \right)$

$\text{Profit}_D = \text{Max} \left(S_T - 45, 0 \right) \times 1000 - 4000$

Find S_T such that $\text{Profit}_S = \text{Profit}_D$

if $S_T = 50$ $\text{Profit}_S = 100 \left(50 - 40 \right) = 1000$

$\text{Profit}_D = 5 \times 1000 - 4000 = 1000$

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