

Proposed Problems

Solutions option – theory

1. A ____ grants the owner the right to purchase a specified financial instrument for a specified price within a specified period of time.
 - a. **call option**
 - b. put option
 - c. sale of a futures contract
 - d. purchase of a futures contract

2. A call option is "in the money" when the
 - a. **market price of the underlying security exceeds the exercise price.**
 - b. market price of the underlying security equals the exercise price.
 - c. market price of the underlying security is less than the exercise price.
 - d. premium on the option is less than the exercise price.

3. A put option is "out of the money" when the
 - a. **market price of the security exceeds the exercise price.**
 - b. market price of the security equals the exercise price.
 - c. market price of the security is less than the exercise price.
 - d. premium on the option is less than the exercise price.

4. When the market price of the underlying security exceeds the exercise price, the
 - a. **call option is in the money.**
 - b. put option is in the money.
 - c. call option is at the money.
 - d. call option is out of the money.

5. When the exercise price exceeds the market price of the underlying security, the
 - a. call option is in the money.
 - b. **put option is in the money.**
 - c. call option is at the money.
 - d. put option is out of the money.

6. Sellers (writers) of call options can offset their position at any point in time by
 - a. selling a put option on the same stock.
 - b. **buying identical call options.**
 - c. selling additional call options on the same stock.
 - d. all of the above
 - e. A and B

Option returns

1. A speculator buys a call option for \$3, with an exercise price of \$50. The stock is currently priced at \$49, and rises to \$55 on the expiration date. The speculator will exercise the option on the expiration date (if it is feasible to do so). What is the speculator's profit per unit?

- Premium=\$3
- Strike=\$50
- S_0 =\$49
- S_T =\$55
- Call payoff= $\max(S_T - \text{Strike}, 0)$.
- Profit= $S_T - \text{Strike} - \text{Premium} = 2$

2. A speculator purchases a put option for a premium of \$4, with an exercise price of \$30. The stock is presently priced at \$29. What is the stock price at which the speculator would break even?

- Premium=\$4
- Strike=\$29
- S_0 =\$29
- S_T : Unknown.
- Put payoff= $\max(\text{Strike} - S_T, 0)$.
- Profit is equal to zero if: Put payoff=Premium. Then $S_T = 25$.

3. Assume a pension fund purchased stock at \$53. Call options at a \$50 exercise price presently have a \$4 premium per share. The pension fund sells a call option on the stock it owns. If the call option is exercised when the price of the stock is \$56, what is the gain or loss per share to the pension fund (including its gain from holding the stock as well)?

- Premium=\$4
- Strike=\$50
- S_0 =\$53
- S_T =56.
- Call payoff= $-\max(S_T - \text{Strike}, 0) = -6$.
- Call gains/losses: Premium + Payoff=-2.
- Stock gains/losses: $S_T - S_0 = 3$.
- Total gain/losses: 1.

4. Assume an insurance company purchases a call option on an S&P 500 Index futures contract for a premium of 3500, with an exercise price of 1800. The value of an S&P 500 futures contract is 250 times the index. If the index on the futures contract increases to 1830, what is the gain on the sale of the futures contract?

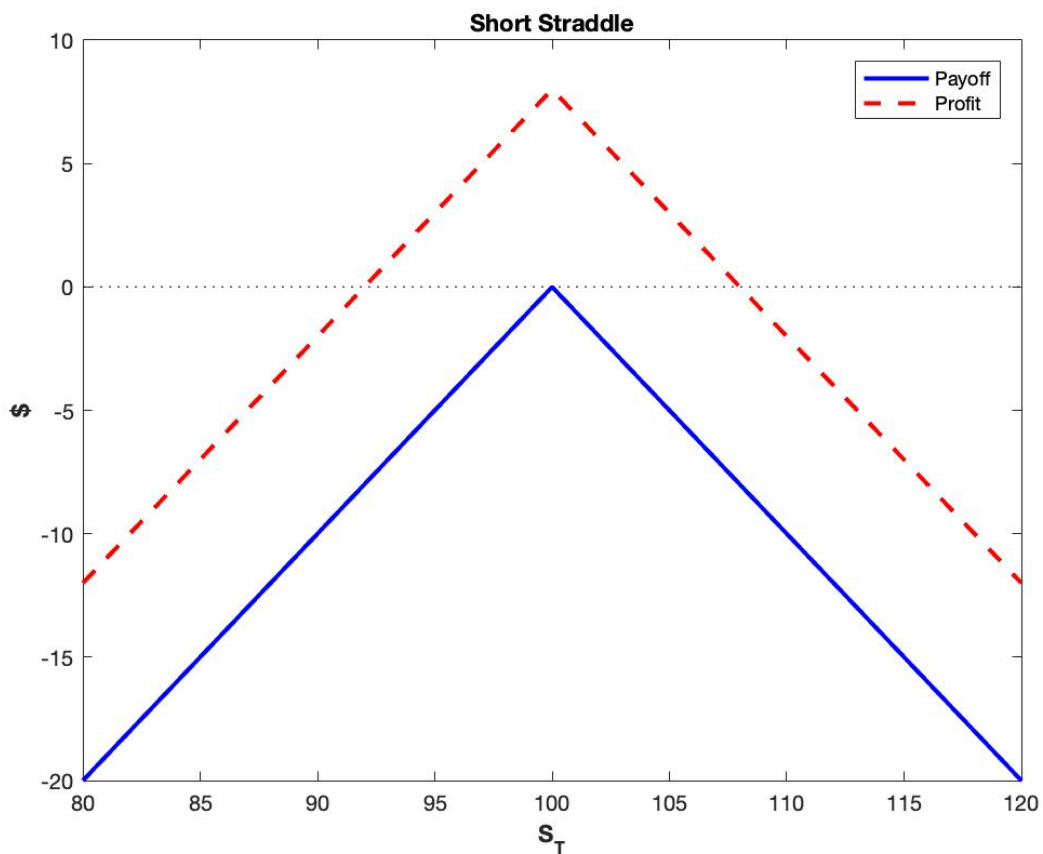
- Premium=\$3500
- Strike=1800 (index units)
- S_T =\$1830 (index units)
- Call payoff= $\max(S_T - \text{Strike}, 0) = 30$ index units.
- Contract gain/losses: $30 * 250 - 3500 = 4000$.

5. A speculator purchased a call option with an exercise price of \$31 for a premium of \$4. The option was exercised a few days later when the stock price was \$34. What was the return to the speculator?
- Premium=\$4
 - Strike=\$31
 - S_T =\$34
 - Call payoff= $\max(S_T - \text{Strike}, 0)$ =\$3.
 - Return: $(3-4)/4 = -1/4$.

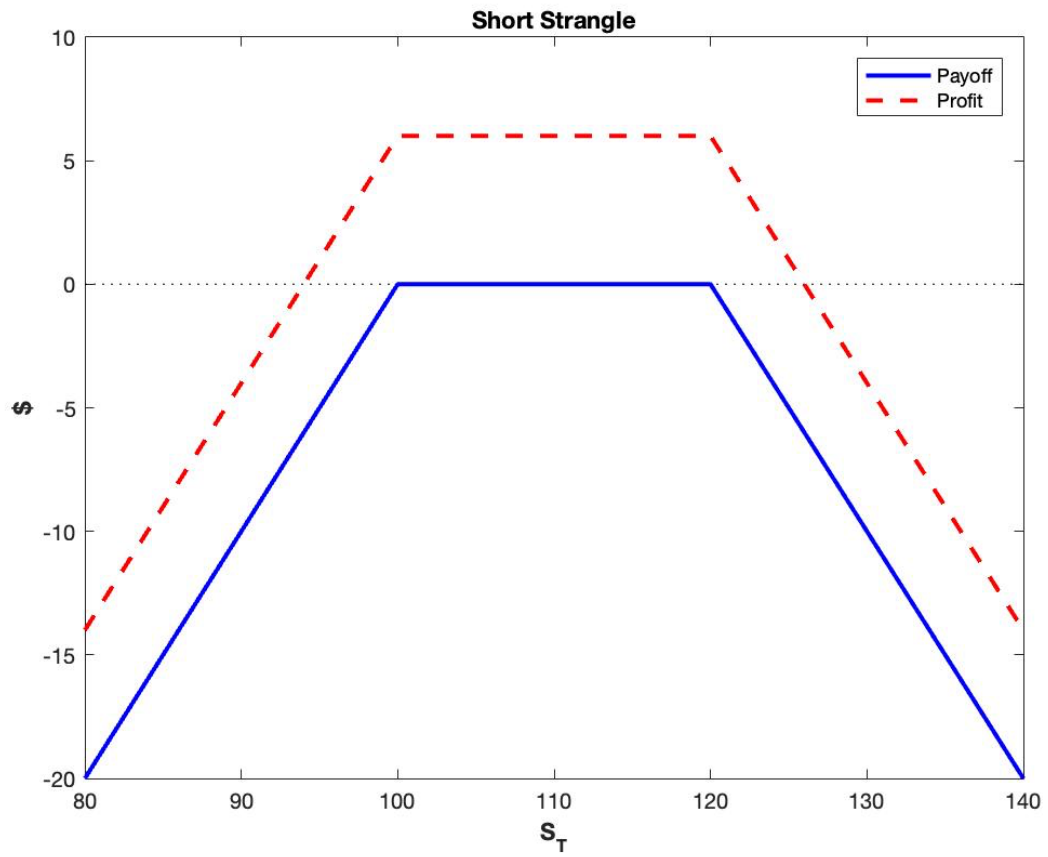
Option Strategies Solutions

Option Strategies

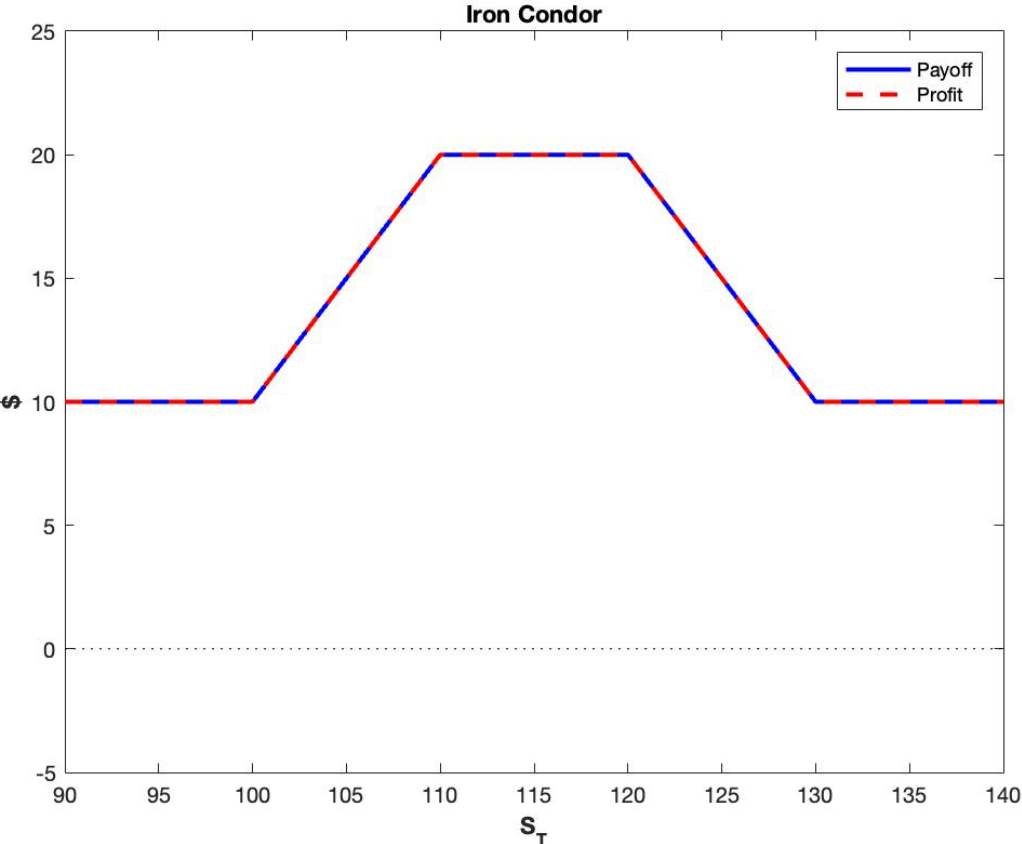
1. **Short Straddle:** sell 1 call ($X1=100$) & premium 3, sell 1 put ($X1=100$) & premium 5, same expiry.



2. **Short Strangle:** sell 1 call ($X_2=120$) & premium 3, sell 1 put ($X_1=100$) & premium 3, same expiry.



3. **Iron Condor:** Buy 1 call ($X1=100$), sell 1 call ($X2=110$), buy 1 put ($X4=130$) and sell 1 put ($X3=120$), total premium = 0, same expiry.



4. **Call backspread:** sell 1 call($X1=100$) & premium 3, buy 2 calls ($X2=120$) & premium 4, same expiry

