3. Option Strategies
Covered writing

- you have long asset already.
- (option overwriting).
- called naked writing if you don't have asset.

Floors

- Calls (short asset)
- Covered Call
- Covered put (short asset)
Floors (protective put)

long asset + long put = long call

→ Guarantees sales price of asset.
Caps

Short asset + long call = long put.

→ Guarantees purchase price of buying back the asset.
Covered Call

\[ \text{long asset + short call} = \text{short put} \]

- Used when price may stay the same or go up.
covered Put

short asset + long put

- used when price may stay or go down.
Naked writing

No asset is hard.

Spreads

\{ Bull spread
  \Box spread
  \text{Ratio spread}
\}

Collars -
You think a stock price will rise. (Current spot price $1000).

→ Long pos. in future at $1000.
  Risky.

→ Long call at $1000.
  Less risky.
  Must pay premium.

Is there anything that is low risk, but less cost?
Pull Spread = long call \_k_1 + short call \_k_2 (Vertical Spread)

= long put \_k_1 + short put \_k_2
Example 3.2

40-strike Call Long 3mo.  \[ \text{pct} \] $2.78 \quad \text{sell} \quad 1.81 \]

45-strike Call Short 3mo.  \[ \text{buy} \] $0.47

Payoff

Payoff Combined

Profit

\[ 1.81 \left(1 + j\right) \]
Box Spreads

= Synthetic long forward + Synthetic short forward.

- Guaranteed cash flow in future.
- Not affected by stock price.

Like
- Lending / borrowing money

- Like buying a bond.
Ratio Spreads

Long \( n \) calls at \( k_1 \)-strike \( \Rightarrow \) same maturity date same asset.
Short \( n \) calls at \( k_2 \)-strike

- can be constructed by puts
- can make premium = 0
- related to payer/seller strategy
- Insurance that cost you 0 if not needed but cost more if you need it.
Collars

Long put + Short Call

$K_1$  $K_2$

Collar width

$K_1  K_2$
Collard Stock (covered writing)

= Long asset + collar

→ like a bull spread.
Zero-cost Collars

Collar = long put + short call

\[ k_1 \leq \text{ underlying} \leq k_2 \]

Adjust \( k_1 \) so that premium for put and call will cancel out.
Non-Directional Strategies

(Naked)

\[ \{ \]

- Straddles
- Strangles
- Butterfly Spreads

\[ \} \]
Straddles

Long call + Long put

same k
same T

→ make profit either way
→ high premium
Written Straddles

short call + short put

Same $k$
Same $T$

→ profit if volatility is low.
**Strangle**

long call + long put = same T, K_1 < K_2

Same as straddle, but buy them out-of-money so that the premium will be cheaper, i.e. smaller potential loss.
Butterfly Spreads

Short Straddle + Long Strangle