Risk Management and Derivatives | Lecture 11

Trading Strategies: Covered Calls, Protective Puts, Spreads, Collars

In Class Group Activity

· SJTU Summer School 2026 · Fatih Kansoy

How this block runs. You work in your home group of four or five, textbook open. Roles rotate today: **Scribe** (writes the answer), **Reporter** (speaks at the microphone), **Sceptic** (must raise one objection), **Timekeeper**. All money today is in pounds sterling (£), with one US dollar ($) and euro (€) example. Each option is on one share, for simplicity; all prices are per share. Ignore interest over the one month and ignore dividends.

- **Phase 1, Concept checks (~10 min).** For each question you vote on your own first. Then you talk for about 90 seconds with the people next to you, and vote again. Do not talk before the first vote.
- **Phase 2, Desk problem (~20 min).** One problem in parts. Your Reporter presents one part when the microphone reaches your group. Then we solve it together, part by part.
- **Phase 3, Case (~25 min).** You read one real story. The ending is hidden on purpose. You answer four questions and take a position. Then we reveal what happened.

A short word list for this block. A **covered call** is owning a share and selling a call on it, to collect a premium. A **protective put** is owning a share and buying a put on it, as insurance. A **bull call spread** buys one call and sells a higher-strike call. A **straddle** buys a call and a put at the same strike, a bet on a big move either way. A **collar** owns the share, buys a put below and sells a call above. The **breakeven** is the share price at expiry where your profit is zero. The **floor** is the lowest value your position can reach; the **cap** is the highest profit it can reach.

Phase 1 – Concept checks

~10 MIN

ConcepTest 1. You own 100 shares of a stock trading at £50. You sell one 1-month call with a strike of £55 and collect a £2 premium per share. The stock jumps to £62 at expiry. Compared with simply holding the shares, your covered call has:

(a) Done better, because you kept the £2 premium on top of the full share gain.

(b) Done worse. Above £55 you gave away the gains; your shares are called away at £55, so you miss the move from £55 to £62.

(c) Done exactly the same, because the premium always offsets the lost upside.

(d) Made an unlimited profit, because you still own the upside.

ConcepTest 2. You own a share worth £50 and buy a protective put with a £48 strike for a £1.50 premium. Over the month the stock drifts quietly up to £52. Versus just holding the share, the protective put has:

(a) Cost you nothing, because the put expired worthless and insurance you do not use is free.

(b) Made you money, because the put protected you.

(c) Cost you the £1.50 premium, so your gain is £1.50 lower than holding the share alone.

(d) Cost you the full £48 strike.

ConcepTest 3. You buy a long straddle: a call and a put on the same stock, both struck at £50, total premium £5.50. At expiry the stock is at £50.20, barely moved. Your result is:

(a) A small profit, because a straddle wins whichever way the stock goes.

(b) Roughly break even, because one leg always covers the other.

(c) A loss of about £5.30: both options are almost worthless and you paid £5.50.

(d) No loss, because you can only lose the premium if the stock goes to zero.

Phase 2 – The desk problem

~20 MIN

Building strategies on the equity-derivatives desk

The setting. One problem in parts. You are on the equity-derivatives desk at a London bank. A client holds shares of a single stock, GLOBEX plc, trading today at $S_0 = £50$. One-month options on GLOBEX are quoted below. Ignore interest over the one month and ignore dividends. Each contract is on one share; all prices are per share.

option (all one-month)	premium
Call, strike £50	£4.00
Call, strike £55	£2.00
Call, strike £56	£1.20
Put, strike £48	£1.50
Put, strike £46	£1.20
Call/Put, strike £50 (for the straddle)	call £3.00, put £2.50

(a) Covered call. The client owns the share at £50 and sells the £55 call for £2.00. Complete the profit table (the first two rows are done for you), then find the maximum profit, the breakeven, and where the upside is capped.

S_T	stock P/L	short call P/L	total
40	−10	+2	−8
48	−2	+2	0
50	?	?	?
55	?	?	?
62	?	?	?

Step prompts: (i) below £55 the call expires worthless, so you keep the £2; (ii) at or above £55 the share is called away at £55, so your stock gain is fixed at £5 and you keep the £2.

(b) Protective put. The client owns the share at £50 and buys the £48 put for £1.50. Complete the profit table, then find the insured floor, the cost, and the breakeven.

S_T	stock P/L	long put P/L	total
40	−10	+6.50	−3.50
46	−4	+0.50	−3.50
48	?	?	?
50	?	?	?
55	?	?	?

(c) Bull call spread. Buy the £50 call for £4.00 and sell the £55 call for £2.00. Use the formulas below (you supply the numbers) to find the net cost, the maximum profit, the maximum loss, and the breakeven.

$$\begin{aligned}\text{Net cost} &= \text{premium paid} - \text{premium received},\\ \text{Max loss} &= \text{net cost (both calls expire worthless, } S_T \le £50),\\ \text{Max profit} &= (\text{high strike} - \text{low strike}) - \text{net cost} \quad (S_T \ge £55),\\ \text{Breakeven} &= \text{low strike} + \text{net cost}.\end{aligned}$$

(d) Long straddle. Buy the £50 call for £3.00 and the £50 put for £2.50, same strike, same month. Find the total premium, the *two* breakevens, and how big a move (in £and in per cent) you need to make a profit. *Hint:* the position only profits once the move is bigger than the total premium, in either direction.

(e) Zero-cost collar. The client owns the share at £50 and wants downside protection at no upfront cash. Buy the £46 put for £1.20 and sell the £56 call for £1.20. Find the net premium, the floor, and the cap, and describe the payoff between them.

Extension (for fast groups). Choose ONE.

(E1) **Butterfly spread.** For this part use the wider quote set: £50 call £6.00, £55 call £3.00, £60 call £1.20. Buy the £50 call, sell TWO £55 calls, buy the £60 call. Find the net cost and the maximum profit, and say where the maximum profit occurs.

(E2) **Put-call parity.** Using $c + Ke^{-rT} = p + S_0$ with $r \approx 0$ so $Ke^{-rT} \approx K$, show that the protective put from part (b) (hold share plus long put, $S_0 + p$) has the same payoff as a fiduciary call (long call plus cash K, $c + K$). State what this means in one sentence.

Phase 3 – The case

~25 MIN

Portfolio insurance and Black Monday (United States)

How to run this. Read the story with your group. The ending is hidden on purpose. Your group must take a position on the four questions and hold your decision. Do not search the internet. Use only what you know from the lecture. I will reveal what happened only after every group has answered.

The story. It is the mid-1980s. A new product is sweeping pension funds and big institutions: "portfolio insurance". The pitch is irresistible. You keep your shares and enjoy the upside of a rising market, but you also get a floor: if the market falls, your losses are capped, just as if you had bought a protective put on your whole portfolio.

But these funds did not buy actual put options for billions of dollars of equity. The options market was far too small for that. Instead they built a **synthetic put**. A computer model watched the market continuously. When prices fell, the program automatically *sold* stock-index futures to cut

the funds' exposure; when prices rose, it *bought* futures back to restore it. Done smoothly, this dynamic trading was supposed to reproduce the exact payoff of a protective put.

By October 1987, an estimated tens of billions of dollars of institutional equity (figures of roughly $60 to $90 billion are commonly cited) were run this way. The strategy depended on one quiet assumption: that you could always trade, in size, near the prices your model expected.

Now it is Friday 16 October 1987. The market has already had a jittery week and closed lower. Over the weekend, the portfolio-insurance models calculate that if Monday opens down, they will need to sell, and to sell a lot.

The story stops here.

Four discussion questions (answer all four in your group; take a position):

1. **Synthetic versus bought.** How is a "synthetic put" built by dynamic trading different from simply buying a protective put outright, as in desk part (b)? List the assumptions the synthetic version needs that the bought put does not.
2. **Everyone at once.** If many big funds all run the same model, what does the model tell ALL of them to do at the same moment when the market falls? What could that do to the price?
3. **Liquidity.** The plan is to sell futures "as the market falls". What has to be true about the futures market for that plan to work? What happens if everyone is a seller and there are almost no buyers?
4. **The gap.** Suppose the market does not fall gently but GAPS down: it jumps straight from one price to a much lower one with no trading in between. Can the dynamic hedge still be executed at the prices the model assumed? What does the fund actually end up holding?

End of activity handout. Solutions are distributed after the block.