Risk Management and Derivatives | Lecture 9

Reading the Option Board and the Writer's Obligation

In Class Group Activity

· SJTU Summer School 2026 · Fatih Kansoy

Phase 1: Concept checks

- **CT1: (d).** The written call's obligation grows one for one with the stock, and the stock has no upper bound, so the loss has no ceiling; the \$3 premium is the most the writer can ever gain (breakeven \$53). Why the others fail: (a) gives the writer the buyer's capped-loss rule, but only the buyer pre-pays the risk; (b) applies the naked *put* writer's floor (the stock can only fall to zero) to a *call*, whose danger sits above the strike, not below it; (c) treats margin as a ceiling on the loss, but margin is collateral the broker tops up as the danger grows, never a limit on what is owed.
- **CT2: (a).** The premium is sunk: no decision at the close can bring the \$400 back, so the only live comparison is exercise value against zero, and \$250 per contract beats nothing; exercising cuts the loss on the whole trade from \$400 to \$150. Why the others fail: (b) compares the payoff with the premium, which is the classic sunk-cost slip; refusing to exercise turns a \$150 loss into a \$400 one; (c) counts the \$6,000 paid for the shares but ignores the shares received, which are worth \$6,250, so exercise is a net *gain* of \$250, not new money at risk; (d) picks the right action but reads the \$250 as a profit on the trade; it is the payoff, and after the \$400 premium the trade as a whole still loses \$150.
- **CT3: (b).** The strike and the contract size move together (\$60 to \$30, 100 to 200 shares), so the position is in the money by \$6 on 100 shares before and by \$3 on 200 shares after: \$600 either way, the holder neither helped nor harmed. Why the others fail: (a) compares the post-split price with the pre-split strike, but the strike is rewritten at the same moment, so that comparison is never available; (c) adjusts the strike but forgets the deliverable doubles, which would halve a value the adjustment in fact preserves; (d) invents a cash close-out, but no cash changes hands: the adjusted series stays on the board, flagged as a non-standard "A" contract, with the same holders in place.

Phase 2: Desk problem, fully worked

(a) Read the board

Intuition. A premium is never just one number. It is intrinsic value (what you would get by exercising right now) plus time value (the extra the market charges for the chance the option moves further in your favour). For any live option the time value must be positive, or there would be free money on the table.

Calculation.

(1) **C45** (call, $K = 45$, $S = 48$): intrinsic $= \max(48-45, 0) =$ **\$3.00**. Time value $= 4.50 - 3.00 =$ **\$1.50**. Since $S > K$, it is **in the money**.

(2) **P50** (put, $K = 50$, $S = 48$): intrinsic $= \max(50-48, 0) =$ **\$2.00**. Time value $= 3.80 - 2.00 =$ **\$1.80**. Since $S < K$, it is **in the money**.

(3) Check: both time values are positive (\$1.50 and \$1.80), and each premium exceeds its intrinsic value. Consistent. A fat premium is not the same as a deeply in-the-money option: much of it can be time value.

(b) The naked call writer's margin

Intuition. The premium the writer collects does not cover the obligation. The broker holds margin as collateral against the open position. The rule takes the larger of two formulas, so the deep-out-of-the-money floor (method B) cannot let the margin fall near zero.

Calculation. C52 is *out* of the money: $S = 48 < K = 52$, so the out-of-the-money amount $= 52 - 48 = \$4.00$.

(1) Method (A): $0.20 \times 48 + 1.80 - 4.00 = 9.60 + 1.80 - 4.00 = \$\mathbf{7.40}$ per share.

(2) Method (B), the floor: $0.10 \times 48 + 1.80 = 4.80 + 1.80 = \$\mathbf{6.60}$ per share.

(3) Margin $= \max(7.40, 6.60) \times 100 = 7.40 \times 100 = \$\mathbf{740}$ per contract.

Check: (A) \$7.40 > (B) \$6.60, so the floor does not bind here. The client collected only \$180 in premium but must post \$740. The premium does not cover the obligation. This is the same rule the lecture applied to an AAPL call: margin per share = premium $+ \max(0.20S -$ OTM amount, $0.10S)$; only the numbers differ.

(c) Exercise and assignment at expiry

Intuition. An option is zero-sum between holder and writer. The holder (or the OCC's assignment process) decides whether the option is exercised; the writer has no say. Whatever one side gains, the other loses. The lecture's phrase: buyers and writers sum to zero.

Calculation.

(1) $S_T = \$55$, C45 call (premium \$4.50):

- Holder payoff $= \max(55 - 45, 0) = \$10.00$; profit $= 10.00 - 4.50 = \$\mathbf{5.50}$ per share $= +\$\mathbf{550}$ per contract.
- Writer profit $= -10.00 + 4.50 = -\$\mathbf{5.50}$ per share $= -\$\mathbf{550}$ per contract.

(2) $S_T = \$44$, P50 put (premium \$3.80):

- Holder payoff $= \max(50 - 44, 0) = \$6.00$; profit $= 6.00 - 3.80 = \$\mathbf{2.20}$ per share $= +\$\mathbf{220}$ per contract.
- Writer profit $= -6.00 + 3.80 = -\$\mathbf{2.20}$ per share $= -\$\mathbf{220}$ per contract.

(3) Check: $+550/-550$ and $+220/-220$. Each is zero-sum: holder profit = minus writer profit.

(d) A corporate-action adjustment

Intuition. A split is a mechanical change in how the shares are counted, not a change in the value of the company you have a claim on. The OCC adjusts the strike and the contract size together, so the option is worth the same before and after.

Calculation.

(1) New strike $= 45/2 = \$\mathbf{22.50}$; new contract size $= 100 \times 2 = \mathbf{200}$ shares.

(2) Intrinsic value before: $100 \times (48 - 45) = 100 \times 3.00 = \$\mathbf{300}$.

(3) Intrinsic value after: $200 \times (24 - 22.50) = 200 \times 1.50 = \$\mathbf{300}$.

Check: \$300 = \$300. The option is not destroyed. Value before = value after.

(e) The written naked call, and its unlimited tail

Intuition. The writer's gain is fixed at the premium and arrives only if the option expires worthless. The loss has no ceiling: every dollar the stock climbs above the strike is a dollar the writer owes. This is the exact shape the Phase 3 case makes real.

Calculation. Writer profit per contract $= (1.80 - \max(S_T - 52, 0)) \times 100$.

S_T	$\max(S_T - 52, 0)$	writer profit per contract
\$50	0	$(1.80 - 0) \times 100 =$ **+\$180**
\$52	0	$(1.80 - 0) \times 100 =$ **+\$180**
\$60	8.00	$(1.80 - 8.00) \times 100 =$ **−\$620**
\$80	28.00	$(1.80 - 28.00) \times 100 =$ **−\$2,620**

Breakeven: $S_T = 52 + 1.80 =$ **\$53.80**. Check: $1.80 - 8 = -6.20 \Rightarrow -\$620$; $1.80 - 28 = -26.20 \Rightarrow -\$2{,}620$. The maximum gain is fixed at +\$180; the maximum loss is unbounded.

Extension

(E1) Board vocabulary. The *last-trade* price is the price of the most recent fill, which may be stale. The *bid-ask* quote (here \$1.70 / \$1.90) shows where you can sell and buy right now; the realistic fill is near the midpoint, \$1.80, not necessarily the last trade. *Open interest* of 4,000 means 4,000 contracts are still live and not yet closed or exercised; *volume* (today's trades) can exceed open interest because the same contract can change hands many times in one day. Those 4,000 contracts are live obligations in the market. Volume is a flow and open interest is a stock: every trade adds to volume, but only an opening trade adds to open interest, and a closing trade removes it. Heavy volume with falling open interest means positions are being closed, not opened: a crowd leaving, not arriving.

(E2) Offset before exercising. Selling at the bid collects $4.50 \times 100 =$ \$450 per contract. Exercising collects intrinsic value only: $(48 - 45) \times 100 =$ \$300. The difference, \$150, is the option's *time value* (1.50×100), which exercise destroys and a sale keeps. The standing rule: sell to close while time value is positive, and exercise only if you want the shares themselves. Fees and the bid-ask spread only strengthen the rule.

The one idea behind every part: buying an option caps your loss at the premium, but writing a naked option opens an obligation with no ceiling on the call side, and the clearing house enforces it in cash.

Phase 3: Case, what happened

You were stopped in early November 2018, with the firm short naked calls on natural gas into a low-storage winter. The firm is **OptionSellers.com**, run by James Cordier. Here is what happened next.

Between about 8 and 14 November 2018, US natural gas spiked hard. On Wednesday 14 November, the December futures contract **settled up about 18 per cent** at about \$4.837 per million BTU, after trading up as much as 20 per cent intraday, the biggest one-day jump in years. It was driven by record-low storage and a cold-weather forecast, with a clear short squeeze. (The Henry Hub spot price reached about \$4.70 on 23 November, the highest since early 2018.) The next day, 15 November, gas then **plunged about 14 per cent**, a second wild day.

For a firm short naked *calls* on gas, the spike was the worst possible event. The short calls exploded in value and blew through the margin the accounts had posted. On 13 November the clearing broker, INTL FCStone, began liquidating the firm's positions, at the worst prices. Because losses on naked writes are unbounded, the accounts did not just go to zero. Many of the roughly

290 clients lost their **entire accounts and ended up owing a debit balance** to the broker, a margin bill larger than the money they had invested. The brokerage said the clients owed a collective figure reported at around $35 million.

The firm sent clients an email titled *Catastrophic Loss Event.* On 16 November 2018, Cordier posted a roughly ten-minute apology video, visibly close to tears, saying "a rogue wave that I was unable to navigate has likely cost me my hedge fund". The video was viewed more than half a million times. The firm shut down.

The lesson, stated plainly. The unlimited-loss tail you computed at $80 (−$2,620 on one tiny contract) was not a textbook abstraction. Scaled across hundreds of accounts on the widow-maker, it became a real debit balance owed to a clearing house. "Picking up pennies in front of a steamroller" describes selling naked options exactly: many small wins, then one move that owes you money. This is Concept Check 1 and desk part (e), made real.

Most options expiring worthless tells you the win-rate, not the risk. On a naked write the rare loss can exceed every premium ever collected and leave you owing the clearing house.

Two alternate cases (one line each).

- **Selling naked puts for income (UK).** A UK income fund writes naked puts on a FTSE name to harvest premium. When the share gaps down on a profit warning, the puts are assigned and the fund must buy the stock at the high strike. The loss is large but *floored* (the stock can only fall to zero), unlike the call case. Contrast the two tails.
- **A special dividend, not a split (EU).** When a European company pays a large special cash dividend, the option strikes are adjusted down so holders are not wiped out by the price drop. Same preservation principle as desk part (d), different corporate action.

End of solutions.