

Decision log

Decision	Chose	Alternatives	Why	Materiality
Dividend yield q	$q = \text{avg}(w_{eq} \text{ over whole file}) \times 1\% = 0.4070 \times 1\% = 0.4070\%$	Use current/daily w_{eq} ; ignore dividends ($q=0$)	Methodology & instructions: price using long-term average equity allocation x 1% expected market div yield, since equity sleeve is price-return.	High
Avg w_{eq} window	Average over the ENTIRE file (2015-2026), not per-term	Average only up to each issue date; trailing window	Instruction says 'the average w_{eq} over the file'. Single fixed value keeps pricing comparable across terms.	Med
Implied vol scope	6.5% used for premium AND every daily delta	Use 6.5% only for premium; reprice/deltas at realized or rolling vol	Only one vol is given; consistent hedging at the pricing vol is the standard convention and isolates implied-vs-realized P&L.	High
Rate r	Fixed at the issue-date 3m T-bill for pricing, daily deltas, and hedge funding	Roll r daily with $tbill_3m_pct$; use a curve	Instruction fixes r at issue for pricing; reusing it for deltas and funding is BS-consistent.	Med
tau (time)	$\tau = (\text{expiry} - \text{date})/365.25$ actual calendar; τ_0 used as-is for premium (~1.0)	Force T exactly 1.0; use trading-day count/252	Instruction defines $\tau = (\text{expiry} - \text{date})/365.25$. Actual τ_0 is within ~0.003 of 1.	Low
Term boundaries	Issue = first trading day on/after Jan 1 of Y; expiry = first trading day on/after Jan 1 of Y+1	Calendar Jan 1; last trading day of Dec	Matches instruction wording exactly.	Low
Hedge granularity	Component level: delta x prior-day weights applied to eq & bond sleeves; cash return included	Treat index level as one tradable instrument	Instruction requires component-level hedging via weights; cash riskless but its return counts.	High
No look-ahead	Day t position uses $\Delta(t-1)$ and $w(t-1)$; r_{hedge} applies them to day-t returns	Use same-day delta/weights	Instruction: use prior day's delta and weights. Avoids look-ahead bias.	High
Cash sleeve return	$\text{cash_ret}(t) = \text{tbill}(t-1)/100 \times \text{days}/365$ (actual/365), prior-day rate & weight	Annual/252; actual/360; same-day rate	Cash accrues over calendar days incl. weekends; prior-day rate avoids look-ahead. Small effect (~8% weight).	Low
Hedge funding day-count	Cash account in replication accrues at $r \times \text{days}/365$ (actual/365)	Actual/360; 252; no funding at all	Self-financing portfolio must finance the delta position; actual/365 matches cash sleeve convention.	Med
Self-financing replication	Net P&L = $V_T - \text{payoff}$, with V_0 = premium and funded delta position	Simple sum: premium - payoff + $\sum(\Delta \times dS)$ with no financing	Including funding & premium growth is the rigorous, BS-consistent backtest an actuary can trace.	Med
Payoff	$100 \times \max(x_T - 1, 0)$; 100% participation, uncapped, ATM	Apply cap; different participation	Product is uncapped 100%-participation ATM call.	High
Sign convention	Positive net P&L = gain to carrier (short option + hedge)	Holder's perspective	We backtest the carrier's hedging programme.	Low
Raw data hardcoded	date, index_level, returns, weights, tbill pasted as values from index_history.csv	Live import / external link	These are source observations, not derived; all derived cells remain live formulas.	Low
BS dividend treatment	Continuous dividend yield q via $\text{EXP}(-q \times \tau)$ on spot & in d1	Discrete dividends; q in carry only	Standard continuous-yield BS, matches the q convention given.	Low