FINC6010 Derivative Securities

UNIVERSITY OF SYDNEY · FINANCE · POSTGRADUATE

Full guide + ask Sia about FINC6010

SIDE 1 · EXAM NOTE PAGE Contract → cash flows → formula → units → reconciliation → interpretation **ONE-SIDE A4 NOTE SHEET** S2 2026 · v2

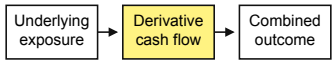
0 · Exam Map

COURSE.JSON + BRIEF

Assignment | Test 25% | Final 50%

"This is a restricted exam, with only one A4 single-sided page of printed or handwritten notes permitted." *(FINC6010 Assessment Information, Semester 2 2026)*

COMPONENT	WEIGHT	FORMAT
Assignment	25%	Group case study
In-Semester Test	25%	Restricted multiple choice
Final exam	50%	Restricted short answer



Explain risk reduced, retained or transferred

Start with the exposure; purpose comes from the combined position, not the contract label.

1 · Contract Classifier

CH 1 · METHOD

CONTRACT	COMMITMENT	MECHANICS
Forward	Mutual obligation	OTC; tailored; contract settlement
Futures	Mutual obligation	Exchange; standardised; daily margin
Swap	Exchange payment rules	Keep original financing visible
Option	Buyer right; writer obligation	Premium creates asymmetry

Hedge offsets a separately identified exposure; ***speculation*** creates or retains a view; ***arbitrage*** compares complete equivalent strategies. Long/short says *position direction*, not purpose.

EXAM ORDER ***Name what each party must or may do, timing, settlement and underlying. Only then label hedge, speculation or arbitrage.***

1b · Unknown Contract Drill

CH 1 · CLASSIFY

ASK	WHAT IT RESOLVES
What is the underlying?	Asset, rate or event creating value
Must both sides perform?	Obligation versus option right
When does cash move?	Daily margin, periodic leg or maturity
Where is it arranged?	Exchange standardisation versus OTC tailoring
What other exposure exists?	Hedge versus speculation

A producer and a speculator can hold the same short futures position; only the producer may be offsetting an expected sale. Likewise, an importer can choose a long forward to fix the domestic-currency cost or a call to cap adverse movement while retaining favourable movement after premium.

2 · Futures Settlement

CH 2 · LEDGER

Initial margin is collateral, **not a down payment**. ***Maintenance margin*** is the trigger threshold. The stated restoration rule sets the deposit after a breach.

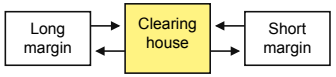
DAILY VARIATION MARGIN

Long: $VM_t = n \times Q \times (F_t - F_{t-1})$

Short: $VM_t = -n \times Q \times (F_t - F_{t-1})$

$Balance_t = Balance_{t-1} + VM_t + deposit_t$

LEDGER STEP	CHECK
Write previous and new settlement prices	Use daily ΔF, not entry-to-date ΔF
Multiply by contracts × contract size	Long rises = gain; short rises = loss
Update closing balance	Compare with maintenance threshold
Apply stated restoration rule	Do not assume deposit target
Sum all VM	= sign × nQ(Fcurrent−Fentry)



Every transfer has an equal opposite entry

Daily settlement reduces accumulated credit exposure but creates interim liquidity needs.

MARKET MECHANICS

Novation: the clearing house becomes counterparty to both sides. It manages default resources; market and liquidity risks remain. ***Settlement price*** is the exchange reference for daily gains and losses, not every trader's execution price.

Convergence: near delivery, spot and futures must meet closely enough to remove an executable buy-cheap/sell-dear package. ***Open interest*** counts outstanding positions; volume counts trades.

Orders are separate from valuation: a limit protects price but may not execute; a market order prioritises execution, not price. A stop-limit has both an activation trigger and a worst acceptable price.

2b · Futures Specification

CH 2 · MECHANICS

SPECIFICATION	WHY IT BITES
Deliverable / grade	Defines what quoted price refers to
Contract size	Scales every daily transfer
Delivery month	Controls hedge timing and convergence
Location	Can create mismatch with physical exposure
Settlement rule	Determines daily account cash flow

3 · Hedge Direction & Basis

CH 3 · CORE

PHYSICAL EXPOSURE	ADVERSE MOVE	FUTURES
Will **buy**	Price rises	Long hedge
Will **sell**	Price falls	Short hedge

BASIS AND EFFECTIVE PRICE

$b_t = S_t - F_t$

Long purchase: $S_2 - (F_2 - F_1) = F_1 + b_2$

Short sale: $S_2 + (F_1 - F_2) = F_1 + b_2$

The hedge locks an approximate result because closing basis is uncertain. ***Basis risk*** comes from spot and futures moving differently; timing, location, grade and use of a related asset can all matter.



Match contract month to hedge end date and liquidity; close the derivative when the physical transaction occurs.

3b · Minimum-Variance Size

CH 3 · CALCULATION

CROSS-HEDGE RATIO

$h^* = \rho \times \sigma S / \sigma F$

$N^* = h^* \times QA / QF$

SYMBOL	MEANING
ρ	Correlation of spot and futures changes
σS, σF	Volatility of spot and futures changes
QA	Exposure quantity
QF	Quantity per futures contract

Report continuous N* before whole-contract rounding. High positive correlation supports a larger risk-reducing hedge; weak correlation limits attainable variance reduction. Minimum variance is an objective, not a promised price.

RESIDUAL RISKS ***Forecast quantity, changing correlations, timing mismatch, rounding, margin liquidity and policy controls remain. Judge performance on the combined position.***

3c · Contract Choice & Governance

CH 3 · LIMITS

CHOICE	DECISION TEST
Underlying	How closely do price changes co-move?
Month	Is it after the hedge end and sufficiently liquid?
Quantity	Forecast exposure, h* and whole contracts
Close / roll	Does timing mismatch remain?
Liquidity	Can adverse margin be funded before physical cash?

4 · Forward Pricing

CH 4 · REPLICATION

A forward price is a no-arbitrage benchmark, not a forecast. For an investment asset that can be bought and stored, compare forward delivery with borrowing, buying and carrying the asset to T.

CONTINUOUS COMPOUNDING

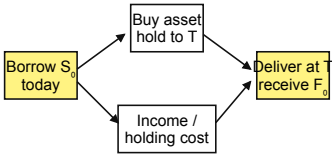
No income: $F_0 = S_0 e^{rT}$

Known cash income: $F_0 = (S_0 - I)e^{rT}$

Known proportional yield: $F_0 = S_0 e^{(r-q)T}$

Currency: domestic financing; foreign rate acts as yield

INPUT	EFFECT ON CARRY
Financing rate	Raises forward price
Known cash income	Subtract present value before carrying
Proportional yield	Subtract q from carry rate
Storage cost	Raises carry
Convenience yield	Works opposite to holding cost



List every initiation, intermediate and maturity cash flow; the unknown terminal spot price must cancel.

ARBITRAGE DECISION

If market forward is above replicating cost: borrow, buy and carry the asset, and short the dear forward. If it is below, reverse cash-and-carry only when borrowing the asset and short selling are feasible.

Check bid–ask spreads, financing, storage, asset borrowing, quantity, timing and contract specifications. Frictions create a no-arbitrage band. For consumption assets, convenience benefits can weaken simple equality.

Delivery price is fixed in an existing contract. Its later ***forward value*** is the discounted advantage or disadvantage versus current market terms—do not overwrite the fixed K with today's new forward quote.

4b · Replication Proof

CH 4 · FULL-CREDIT FORM

DATE	WRITE EVERY LEG
Today	Borrow/lend; buy/short asset; enter forward
Before T	Receive income or pay holding costs
T	Repay financing; deliver/receive asset; settle K

A complete arbitrage answer shows a non-negative package and why the unknown S_t cancels. "Cash-and-carry" alone is not the trade. Keep the same quotation, compounding convention, maturity and quantity across the market forward and replicating package.

5 · Swap Cash-Flow Ledger

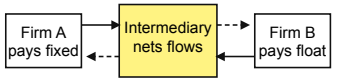
CH 5 · METHOD

DESIRED RESULT	SWAP DIRECTION
Floating debt → fixed	Pay fixed; receive matching floating
Fixed debt → floating	Pay floating; receive matching fixed

WRITE BEFORE CANCELLING

Net cost = original financing + swap payment - swap receipt

Cancel floating terms only when benchmark, notional, reset date and day-count basis match. The original borrowing stays outstanding. Notional normally sets payment size and is not exchanged in a single-currency rate swap.



solid = fixed · dashed = floating

A proposed structure is proved by each party's ledger, not by matching labels alone.

5b · Comparative Advantage

CH 5 · QSD

QUALITY-SPREAD DIFFERENTIAL

QSD = fixed-rate spread - floating-rate spread

QSD is the total potential gain ceiling. Benefits assigned to both firms plus any intermediary spread cannot exceed it. Compute both market spreads, subtract, design directions, then rebuild both complete cash-flow ledgers.

CURRENCY SWAP DATE	CASH-FLOW JOB
Inception	Exchange principals at agreed spot relation
Through life	Exchange interest in stated currencies
Maturity	Re-exchange principals

Value each currency leg with its own yield curve, then convert into one reporting currency at current spot. Attach a currency unit to every arrow. Replacement value creates counterparty risk after market rates or exchange rates move.

5c · Prove the Transformation

CH 5 · CHECKS

For each party, keep **original financing**, **swap payment** and **swap receipt** separate until the signs are visible.

COMMON FAILURE	CORRECTION
Cancel "floating" labels	Match benchmark, dates, basis and notional
Treat QSD as created value	It is a ceiling before costs

6 · Option Position Map

CH 6 · RIGHTS

POSITION	RIGHT / OBLIGATION	PREMIUM
Long call	Right to buy	Pay
Short call	Obligation to sell	Receive
Long put	Right to sell	Pay
Short put	Obligation to buy	Receive

LONG CALL right to buy pay premium

SHORT CALL obligation to sell receive premium

LONG PUT right to sell pay premium

SHORT PUT obligation to buy receive premium

European/American describes exercise timing, not trading venue.

6b · Payoff → Profit

CH 6 · FORMULAS

TERMINAL PAYOFF

Long call = max(S_t - K, 0)

Long put = max(K - S_t, 0)

Short payoff = - corresponding long payoff

SIMPLIFIED TERMINAL PROFIT

Long call = max(S_t-K,0) - c

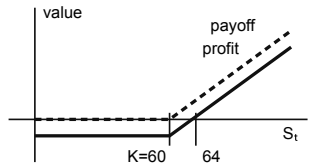
Short call = c - max(S_t-K,0)

Long put = max(K-S_t,0) - p

Short put = p - max(K-S_t,0)

LONG POSITION	BREAK-EVEN	LOSS BOUND
Call	K + c	Premium c
Put	K − p	Premium p

Strike controls exercise; premium controls profit break-even. An in-the-money option can still lose after premium. Long-call loss is limited to premium; short-call loss can keep expanding as S_t rises.



Long call with K=$60 and premium=$4: payoff kinks at 60; profit crosses zero at 64.

6c · Graph & Exercise Audit

CH 6 · GEOMETRY

FEATURE	MEANING
Horizontal axis	Terminal underlying price S_t
Vertical axis	State payoff or profit explicitly
Kink at K	Exercise region changes here
Zero crossing	Profit break-even after premium
Slope / bound	Exposure and maximum loss/gain logic

Your exam allows one A4 page of notes, single-sided, printed or handwritten. Print side 1 only.
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V2 · 2026-10-16

Semester 2 formal examination period, from 16 November 2026 (the Exams Office publishes the exact date).

FINC6010 Worked Drills · Reconcile Every Route

DERIVATIVE SECURITIES · PRACTICE BEFORE THE EXAM

Full guide + ask Sia about FINC6010

SIDE 2 · PRACTICE Supplied numbers · complete working · sign checks · common traps · fast recall **DO BEFORE EXAM** S2 2026 · v2

7 · Worked: Daily Margin

CH 2 · SUPPLIED NUMBERS

Given: long 3 contracts; 100 units each; entry F=$52.40; initial margin $2,400/contract; maintenance $1,800/contract. Settlements: $51.90, $53.10, $50.80.

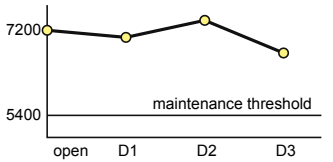
OPENING BALANCES

```
Initial = 3×$2,400 = $7,200
Maintenance = 3×$1,800 = $5,400
```

DAY	ΔF	VM = 3×100×ΔF	BALANCE
1	−0.50	−$150	$7,050
2	+1.20	+$360	$7,410
3	−2.30	−$690	$6,720

Threshold: all balances exceed $5,400, so no margin call under these data. **Reconcile:** cumulative VM = −150+360−690 = **−$480**.

```
3×100×($50.80-$52.40) = 300×(-$1.60)
= -$480 ✓
```



Path matters for liquidity; cumulative transfers still reconcile to the total price move.

MARGIN TRAPS

Use price change only	Wrong: omits n×Q
Use entry-to-date each day	Wrong: double counts prior VM
Call when below initial	Wrong: compare with maintenance
Initial margin = purchase cost	Wrong: it is collateral

AUDIT *Reverse every VM sign for the short. The two accounts must be equal and opposite.*

7b · Ledger Under Pressure

CH 2 · DRILL

Build columns in this order: date; previous settlement; new settlement; ΔF; position sign; n×Q; variation transfer; pre-deposit balance; maintenance test; deposit; closing balance. Keeping the pre- and post-deposit balances separate prevents an untraceable call amount.

INDEPENDENT TEST	WHAT FAILURE REVEALS
Long VM = − short VM	Direction or sign error
ΣVM = nQ(Fcurrent−Fentry)	Daily arithmetic / double counting
Every balance tested in date order	Missed liquidity event
Deposit follows stated target	Trigger confused with restoration rule

8 · Worked: Cross-Hedge

COURSE EXAMPLE

Given: processor will buy 900 tonnes; futures contract covers 50 tonnes; σS=1.8%, σF=2.0%, ρ=0.80.

1. Future purchase → price rise is adverse → long futures.
2. Compute the minimum-variance ratio.
3. Scale the exposure by contract quantity.
4. Report the continuous count before rounding.

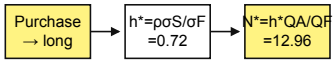
RATIO

```
h* = 0.80 × 0.018 / 0.020 = 0.72
```

CONTRACT COUNT

```
N* = 0.72 × 900 / 50 = 12.96
```

Answer: 13 long contracts is a defensible whole-contract hedge. State that rounding leaves a small mismatch. Long futures fit because gains when the input price rises can offset the higher physical purchase cost.



13 long contracts

then monitor quantity, timing, basis and margin liquidity

Direction comes from the physical transaction before volatility enters the sizing calculation.

8b · Hedge Answer Audit

CH 3 · MARKS

LINE TO SHOW	WHY
Exposure + feared move	Fixes long/short sign
ρ, σS, σF with consistent units	Builds h*
QA/QF	Converts exposure to contracts
Unrounded N*	Makes rounding visible
Combined outcome	Explains risk reduction

Do not call a losing futures leg a failed hedge. If a long hedge loses after the input price falls, the physical purchase becomes cheaper. Evaluate against the protected effective price or variance objective.

8c · Basis Reconciliation Drill

CH 3 · NO NEW DATA

For a purchase hedge, lay out **spot paid** and subtract a futures gain (or add a futures loss). For a sale hedge, lay out **spot proceeds** and add a futures gain (or subtract a loss). Only then compress to F_1+b_2.

CHANGE	CONSEQUENCE
Closing S rises more than F	Closing basis changes; effective price shifts
Correlation weakens	Futures removes less variance
Spot volatility rises, other inputs fixed	h* rises

9 · Worked: Cash-and-Carry

CH 4 · SUPPLIED NUMBERS

Given: asset spot price $100; no income; one year; 5% effective financing.

DISCRETE ONE-YEAR CARRY

```
Theoretical delivery price =
$100×(1.05) = $105
```

TIME 0	TIME 1
Borrow $100	Repay $105
Buy asset for $100	Own asset
Short forward if market K>$105	Deliver asset; receive K
Net initiation cash = 0	Riskless net = K−$105

If the market delivery price exceeds $105 by more than executable frictions, buy the replicating package and short the dear forward. If market K is below $105, reverse cash-and-carry requires an executable short sale.



Replication works only when every leg, quantity and date is executable under the same convention.

9b · Carry Variant Chooser

CH 4 · ASSUMPTIONS

QUESTION GIVES	WRITE FIRST
No income	$F_0=S_0e^{rT}$ or stated discrete equivalent
Known cash income	PV income I; then $(S_0-I)e^{rT}$
Known proportional yield	$S_0e^{(r-q)T}$
Foreign currency	Check quote; domestic financing, foreign yield
Existing forward	Keep fixed delivery price separate from current forward quote

Compounding must match the question. Label T in years. Known cash income enters as present value; proportional yield enters the exponent. Explain practical no-arbitrage bands when spreads, storage, funding or short-sale restrictions are supplied.

FAST CHECK *Rebuild the time line whenever the sign of income, yield or currency rates feels uncertain.*

9c · Arbitrage Answer Template

CH 4 · DRILL

1. Compute the theoretical delivery price using the stated compounding and carry inputs.
2. Compare it with the market delivery price in the same units and maturity.
3. Buy the cheaper complete route; sell the dearer complete route.

10 · Worked: QSD

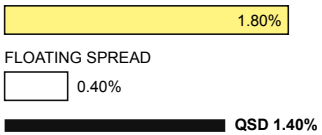
CH 5 · SUPPLIED QUOTES

BORROWER	FIXED	FLOATING
Firm North	5.2%	Reference + 0.35%
Firm South	7.0%	Reference + 0.75%

SPREADS

```
Fixed spread = 7.0% - 5.2% = 1.8%
Floating spread = 0.75% - 0.35% =
0.40%
QSD = 1.8% - 0.40% = 1.40%
```

Interpretation: 1.40% is the total potential gain ceiling before transaction costs. Savings allocated to North + South + intermediary cannot exceed 1.40%. A complete answer must still give each firm its desired exposure and prove its claimed cost from a ledger.



Compare market spreads; QSD measures available advantage, not a guaranteed saving.

10b · Swap Ledger Check

CH 5 · METHOD

Given: debt costs Reference + 1.1%; swap pays 4.4% fixed and receives matching Reference.

THREE-LINE LEDGER

```
Original debt: + Reference + 1.1%
Swap payment: + 4.4% fixed
Swap receipt: - Reference
Net synthetic fixed cost = 5.5%
```

Cancellation is valid only because the reference terms match. If notional, benchmark, reset date or day-count differs, a basis exposure remains.

CURRENCY SWAP AUDIT	QUESTION
Initial principal	Which currency is paid/received?
Interest dates	What rate and notional govern each leg?
Maturity	Are principals re-exchanged?
Valuation	Which curve discounts each currency?
Conversion	What spot quote produces reporting value?

TRAP *Net settlement reduces cash movement; it does not erase the gross contractual calculations beneath it.*

10c · Structure Verification

CH 5 · DRILL

PASS	REQUIRED EVIDENCE
Exposure	Each firm ends fixed or floating as requested
Cancellation	Only identical benchmark terms are netted

11 · Worked: Call Payoff

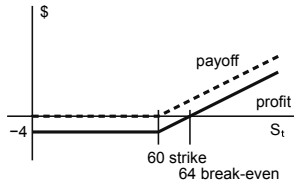
CH 6 · SUPPLIED FIGURE

Given: long call, strike K=$60, premium c=$4.

S_t	PAYOFF MAX(S_t−60,0)	PROFIT PAYOFF−4
$60	$0	−$4
$64	$4	$0

Break-even: K+c=$64. At S_t=$60 the option has no intrinsic value and expires worthless; the holder loses the premium. At S_t=$64 the $4 payoff exactly recovers the $4 premium.

Holder/writer paired profits sum to zero when financing and transaction costs are ignored. Writer profit is $4−max($S_t$−$60,0).



Premium shifts the profit line down without moving the strike kink.

11b · Option Fast Table

CH 6 · RECALL

POSITION	EXERCISE REGION	PROFIT BREAK-EVEN	SHAPE
Long call	S_t>K	K+c	Flat then +1 slope
Short call	Holder: S_t>K	K+c	Flat then −1 slope
Long put	S_t<K	K−p	−1 slope then flat
Short put	Holder: S_t<K	K−p	+1 slope then flat

Label the vertical axis payoff or profit before drawing. Then mark K, break-even, slopes and bounds. Short positions are negatives of long payoffs, with premium sign reversed for profit.

REPRESENTATION DRILL *Move sentence → max function → value table → graph. If they disagree, return to right versus obligation.*

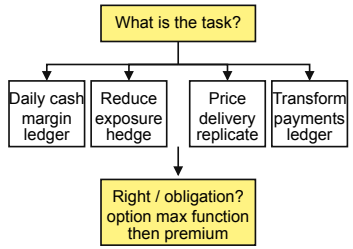
11c · Option Trap Bank

CH 6 · DRILL

TRAP	REPAIR
Payoff labelled as profit	Subtract/add premium with correct sign
Break-even placed at K	Call K+c; put K−p
Short graph copied from long	Reflect payoff; reverse premium sign
ITM called profitable	Compare intrinsic value with premium
American called exchange-traded	It describes exercise timing

12 · Method Chooser

ALL CHAPTERS



Choose the representation that exposes the cash flows before choosing the formula.

CLUE	METHOD
Settlement-price path	Variation-margin ledger
Future purchase/sale	Long/short hedge + basis
Correlation and volatilities	h* and N*
Spot, rate, income/yield	Cash-and-carry
Borrowing quotes	QSD + party ledgers
Strike, premium, S_t	Max payoff, then profit

13 · Error Sweep

LAST 90 SECONDS

AUDIT	QUESTION
Direction	Did the physical exposure determine long/short?
Timing	Are cash flows on correct dates?
Units	Contracts, tonnes, currency, years attached?
Convention	Discrete/continuous and FX quote consistent?
Reconcile	Can a second route reproduce the answer?
Interpret	Which risk changed in the combined position?

Cash-flow map before formula. Show continuous quantities before rounding. Separate payoff from profit, delivery price from current value, margin trigger from restoration target, and position direction from economic purpose.

14 · Fast Recall Terms

GLOSSARY

Basis	S−F for the relevant asset and date
Variation margin	Daily cash from settlement-price change
Cross hedge	Related, non-identical futures underlying
Cost of carry	Net financing and holding effect
Notional	Reference amount for swap payments
Intrinsic value	Immediate exercise value, floored at zero for holder

Attach every term to the requested calculation or decision.

classify ▸ map ▸ select ▸ calc ▸ check ▸ explain

A complete answer is numerical + economic.

Use the same six-step sequence across futures, hedges, forwards, swaps and options.

Practice side, not for the exam room.
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V2 · 2026-10-16

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