MGT 816 · The Private Firm CFO

Session 12 — Final Exam Review

Everything the exam draws on, S00 through S11 and PS2, in one pass.

Wed Oct 14, 2026 · Prof. John Barrios · Yale SOM

Final exam: Friday, October 16, 5:30–8:30 pm, Evans 4400 and 4410.

Friday's exam: format and rules

When and where	Friday, October 16, 5:30–8:30 pm · Evans 4400 and 4410 · all sections
Structure	Five problems (170 points) and short-answer questions (30 points) = 200 points
Time	Three hours. A well-prepared student finishes the work in about 90 minutes.
You may bring	One 8.5 × 11 cheat sheet, both sides, and your own simple calculator
Not allowed	Notes beyond the cheat sheet, phones, laptops, or AI tools
Coverage	S00–S11, including Monday's peg and step-up, and the PS2 solutions

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The two practice finals on Canvas match Friday's exam in structure and points; Friday's last 30 are five short answers, not one bonus question.

How to earn the points

Show your work. Method earns credit even when a number is off.

A mistake costs you once. If part (a) is wrong and you use it correctly in part (b), part (b) earns full credit. Never leave a later part blank because you doubt an earlier answer.

Label everything: units, thousands vs. dollars, and which date or scenario a number belongs to.

Journal entries: account names, Dr and Cr, and amounts that balance.

When a question asks for a recommendation, give one, and give the reason in a sentence. "It depends" with no answer earns little.

Write your answers on the exam pages, in the space under each part.

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Build the cheat sheet by working the practice finals. Writing it is most of the studying.

The whole course: what you compute, what you explain

Compute (the arithmetic)

Burn, runway, and a one-month forecast (S00/S01)

Cap-table rounds, the option-pool shuffle, journal entries (S02/PS1)

Entity after-tax comparison; QSBS rules (S03)

83(b), ISO vs. NQSO, AMT, 409A (S05, Case 2)

CAC, churn, NRR, LTV, payback (S06)

PS2: drivers, deferred revenue, sensitivity (S07)

Bookings, billings, revenue; ASC 606 allocation; margins (S09)

Preferred payoffs; warrant dilution; the peg; the step-up (S11)

Explain (short answers)

Controls and the monthly close (S01)

Founder splits, vesting, and the three Rs (S04, Case 1)

Worker classification (S03)

KPI choice and the AOP (S06)

Checking AI output: the five manual checks (S07)

Board composition, board packages and their red flags (S10)

Audit timing and the PBC list (S10)

Economic vs. control terms (S11)

Case 2: the employee's view vs. the company's view

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Soo · Accounting mechanics ★

A = L + SE after every transaction. Every entry touches at least two accounts.

Equity raises are booked at the cash received: Dr Cash, Cr Common or Preferred Stock. Pre-money and post-money valuations never appear on the books.

Revenue is recognized when earned, not when collected. Cash received in advance is deferred revenue, a liability.

Expenses follow the work. Wages earned but unpaid are accrued.

Net income and operating cash flow can have opposite signs. Indirect method: start from net income, add back non-cash expenses, subtract increases in current assets, add increases in current liabilities.

The statements connect: net income flows to retained earnings; the change in cash ties to balance-sheet cash.

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Forecasting a month: build the income statement, then the balance sheet, then cash. If the balance sheet does not balance, find the error before you move on.

S01 · Burn, runway, and the CFO's job ★

Compute

Gross burn = total cash out per month

Net burn = cash out − cash in

Runway (months) = cash ÷ net burn

Out-of-cash date = today + runway

Three runway levers: raise capital, cut burn, or work the working capital. A recurring cut is worth more than one-time cash.

Negative working capital (collect before you pay) is free financing.

Explain

The private CFO's four goals: cash, capital, the basics, the metrics.

The controls triad: separate authorization, custody and recording; approval thresholds; record retention. All doable with ten employees.

The monthly close, in six steps: readiness, sub-ledgers, general ledger, reconciliations, statements, management review.

Switch from cash to accrual at the first institutional money or the first counterparty that demands GAAP.

About 60% of large private firms have no audited GAAP statements; audits come with outside capital.

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S02 · Cap tables: the formulas ★

Pre-money + investment = post-money

New investor % = investment ÷ post-money

Fully diluted shares after the round:

Z = existing shares ÷ (1 − new % − pool %)

New investor shares = new % × Z

Price per share = investment ÷ new investor shares

Ownership % = shares ÷ fully diluted shares

Fully diluted counts common, preferred, granted options, and the unissued pool.

Authorized ≥ issued ≥ outstanding. Fully diluted adds the options and pool.

Track value as well as percentage. Owning a smaller share of a bigger company can leave you richer.

The CFO's levers: pre-money, round size, pool size.

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Expect a round like PS1 and the Cap Table Lab: share counts, price per share, ownership after the round, and the journal entries.

S02 · The option-pool shuffle and the entries ★

A pool created in the pre-money dilutes only the existing holders. The new investor's percentage is untouched.

Effective pre-money = stated pre-money − pool % × post-money. That is the price the founders actually got.

A higher headline valuation with a bigger pool can leave founders worse off. Compare ownership and value, not the headline.

Journal entries

Issue preferred for cash

Dr Cash Cr Preferred Stock (and APIC)

Create the option pool

No entry

Options vest (expense)

Dr Compensation Expense Cr APIC

Valuations

Never booked

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Common mistake: putting the pre-money or post-money valuation into a journal entry.

S03 · Entity choice and QSBS ★

Pass-through vs. C-corp

Pass-through wins if $(1 - t_{ord}) > (1 - t_c)(1 - t_s)$

Run it on $100 with the rates you are given.

VCs want a C-corp: exit equity, QSBS, no K-1s, standard preferred.

PE buyers like LLCs: pass-through cash flow and a basis step-up at sale.

Charter vs. bylaws; SPA vs. IRA; the cap table is a legal record and the first diligence exhibit.

QSBS (§1202): two regimes

	Issued before 7/4/2025	Issued after
Holding period	5 years, all or nothing	3 / 4 / 5 years → 50 / 75 / 100%
Gross assets at issuance	≤ $50M	≤ $75M
Cap	$10M or 10× basis	$15M or 10× basis

Both require original issuance by a C-corp. **Option stock is issued at exercise,** so the asset test and the clock start then.

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S04 · Founders: splits, vesting, and the 83(b) ★

Why founding teams fail, the three Rs: relationships, roles, rewards. Hire specialists after product-market fit, not before.

Ways to split equity: equal; contribution-weighted (score each founder on weighted factors, then normalize); dynamic (each founder's share of at-risk contributions, frozen at funding). First decide who is a founder, and whether to split now or later.

Founder vesting: four years with a one-year cliff is the norm.

Accounting (ASC 718): no entry at grant. As shares vest: Dr Compensation Expense, Cr APIC, at grant-date fair value minus the price paid. Never remeasured. A founder who pays fair value has no expense.

83(b) election: pay tax on all the shares now, at grant-date value, so later growth is capital gain. File within **30 days**, no extensions. No refund if the shares are forfeited.

Rich vs. King: founders trade control for wealth. Exit choices look different to the founder, the VC fund, and employees.

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S05 · Restricted stock and option accounting ★

Restricted stock: tax

Without an 83(b): ordinary income at each vest date, on the value then. The company deducts the same amount.

With an 83(b) (within 30 days): ordinary income at grant, on the value then (often near zero). Everything after is capital gain.

RSUs cannot use an 83(b).

Options: ASC 718 entries

Grant

No entry. Fair value set by an option-pricing model.

Each vesting year

Dr Compensation Expense Cr APIC–Stock Options

Exercise

Dr Cash + Dr APIC–Stock Options

  Cr Common Stock (and APIC)

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Books use grant-date fair value and never remeasure. Tax uses the value at exercise or vesting. Keep the two apart.

S05 · ISO vs. NQSO ★

	NQSO	ISO
Who can get it	Anyone, including consultants and directors	Employees only
At exercise	Spread is ordinary income; tax is withheld	No regular tax; the spread is an AMT adjustment if you hold past year-end
At sale	Gain after exercise is capital gain	Qualifying (> 2 years from grant and > 1 year from exercise): all long-term capital gain
Disqualifying sale	—	Spread is ordinary income, with no withholding
Company deduction	Yes, the spread at exercise	Only on a disqualifying sale
After leaving	Per the plan	Exercised more than 3 months after leaving → taxed as NQSO

The company's deduction comes from the employee's ordinary income. The employee's best outcome gives the company nothing.

S05 / Case 2 · The AMT ★

The five-line worksheet

1. Bargain element = (FMV − strike) × shares
2. AMTI = regular taxable income + bargain element
3. Exemption, reduced by $0.50 per $1 of AMTI over the threshold
4. Tentative tax: 26% on the first band, 28% above
5. AMT = tentative tax − regular tax (if positive)

From class (S05 rate card)

Bargain element: $300,000

AMTI: $180,000 + $300,000 = $480,000

Exemption $90,000 → base $390,000

Tentative: 26% × $240,000 + 28% × $150,000

= $62,400 + $42,000 = $104,400

AMT = $104,400 − $35,000 = **$69,400**

dents only

First decide whether the AMT applies. Exercise and hold past December 31: yes. Exercise and sell in the same year: no; the spread is ordinary income instead.

AMT is mostly a prepayment; it comes back as a credit in later years. **If a question gives you a simpler AMT rule, use the one it gives.**

S05 / Case 2 · 409A, withholding, and the company's side ★

409A: an independent value of common stock, set at least annually and after material events. Strike prices must be at or above it. Common is worth less than preferred because preferred gets paid first and has more rights.

A secondary or tender price is evidence, not the answer. A one-time, capped sale pushes the next 409A up, which raises future strike prices.

Withholding is not the tax. Supplemental withholding (22% + 2.35% + 5% = 29.35% in the case) is less than the true rate (42.35%); the rest is due at filing. ISO events have no withholding at all.

Exercising illiquid options creates tax with no cash. The employee has to fund the strike and the tax.

The company's side: NQSO spreads and disqualifying ISO sales are deductible; an NOL company stores the deduction for later. Unvested options forfeited: reverse the expense. Vested options that expire: no reversal. Extending the window is a modification.

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S06 · Budgets, drivers, and KPIs ★

The annual operating plan (AOP) is the 12-month benchmark and the bonus contract. It does not change mid-year; the monthly forecast does.

Driver-based planning: budget the activities you control and let the line items follow. Be able to walk a chain such as impressions × click rate × conversion → customers → revenue → contribution margin.

Variance analysis finds the cause. A revenue beat can hide a margin miss. Re-forecast by changing drivers, with a reason, never by plugging outputs.

Classify every metric: a driver (an input to the model, such as churn), an output (it comes out of the model, such as CAC), or outside the model (NPS).

KPIs are incentive contracts. Pick few, mix leading and lagging, and ask what behavior the metric will buy. (Remember the CSM-efficiency trap.)

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S06 · Unit economics: the formulas ★

CAC = sales and marketing spend ÷ new customers (by channel; cost per acquisition ≠ CAC)

NRR = (beginning MRR − churned − contraction + expansion) ÷ beginning MRR (new customers excluded)

NRR above 100% means expansion outruns churn: negative net churn

LTV ≈ revenue per customer per month × gross margin % × expected lifetime in months

(lifetime ≈ 1 ÷ monthly churn)

LTV : CAC ≥ 3× is the SaaS rule of thumb

CAC payback (months) = CAC ÷ monthly gross profit per customer

Burn multiple = net burn ÷ net new ARR (lower is better)

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Logo retention is not revenue retention. A healthy LTV:CAC can still run you out of cash if payback is slow.

S07 / PS2 · The model and how to check it ★

The PS2 model

pipeline → bookings → billings → deferred revenue → revenue → cash

Deferred revenue roll-forward: beginning + billings − revenue recognized = ending. Annual prepayments raise cash long before revenue.

Scenarios run through drivers, never through outputs.

The three errors from grading: hardcoded growth where drivers belonged; billings booked straight to revenue; sensitivity on a low-impact driver or run one way only.

The five manual checks on AI output

1. **Extraction:** do the inputs match the source?
2. **Roll-forwards:** beginning + adds − churn = ending; cash ties to net income adjusted for working capital.
3. **Benchmarks:** sourced, or marked unverified.
4. **Sensitivity:** rerun it yourself with a data table.
5. **Recompute one column** (December) by hand.

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The PS2 solutions are on Canvas and on the exam. AI is not allowed Friday; the checks are.

S09 · Bookings, billings, revenue, cash ★

Term	What it is	When it moves
Bookings	A signed commitment	Contract signed
Billings	Amounts invoiced	Invoice sent
Revenue (GAAP)	Earned by delivering	As the obligation is satisfied
Deferred revenue	A liability: billed or paid, not yet earned	Up when billed, down when earned
Cash	Collected	Customer pays

Billings = revenue + change in deferred revenue

Prepayment: Dr Cash, Cr Deferred Revenue. As earned: Dr Deferred Revenue, Cr Revenue.

MRR and ARR exclude one-time fees; ACV and TCV include them. GMV is a volume metric, never revenue.

S09 · ASC 606, gross vs. net, and margins ★

The five steps

1. **Contract:** collection is probable.

2. **Performance obligations:** distinct if useful on its own and separately identifiable.

3. **Transaction price:** exclude amounts collected for others; estimate variable amounts.

4. **Allocate by standalone selling price:** each piece gets price × its SSP ÷ total SSP.

5. **Recognize** at a point in time or over time, as each obligation is met.

Gross vs. net; margins

Principal (gross) if you control the good: inventory risk, pricing latitude, primary obligation. **Agent (net)** otherwise.

Gross vs. net changes revenue and margin percentages, **not gross-profit dollars.**

Gross margin = (revenue − cost of revenue) ÷ revenue. Software runs near 80%.

Contribution margin subtracts only variable costs.

Sales commissions are capitalized and amortized under ASC 606.

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Bundle with distinct pieces: allocate and recognize each on its own clock. Not distinct: one obligation, recognized when all of it is delivered.

S10 · Boards and audit readiness ★

Boards

Composition follows the money. VC-backed: the CEO, one or two common seats, one or two independents, investor seats. PE-owned: the CEO plus sponsor seats.

Directors owe care, candor, and loyalty to all shareholders, whoever appointed them.

A good package: CEO update; KPIs against plan; financials with scenarios; cash, burn, runway; hiring plan; the asks; admin items.

Red flags: vanity or cumulative metrics, bookings called revenue, no cash or runway, shifting KPI definitions, no comparison to plan, truncated charts.

The first audit

Why companies get audited: investors require it in the term sheet, lenders price it, an exit needs it. The norm is around $10M in revenue.

Start early: the first audit takes months of preparation.

The PBC list: trial balance, general ledger and sub-ledgers, bank reconciliations, AR and AP agings, the fixed-asset schedule, and accounting policies. Know what each one lets the auditor test.

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S11 · Instruments, SAFEs, and warrants ★

SAFE: converts at the next priced round; no interest, no maturity. Shown in the equity section (Dr Cash, Cr Paid-in Capital–SAFEs), reclassified to preferred at conversion. Many auditors record it as a liability under ASC 480. Either way it is not debt.

Convertible note: debt, accruing interest, until it converts.

Venture debt: a term loan alongside an equity round. Costs interest plus warrants.

Warrant dilution (from class)

$2M loan × 12% coverage = $240,000

÷ $1.00 strike = 240,000 shares

240,000 ÷ 24,240,000 ≈ **1.0%**

Denominator: existing shares plus the new warrant shares.

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S11 · Preferred payoffs at any exit ★

Non-participating: investor gets max(preference, ownership × exit)
Participating: investor gets preference + ownership × (exit − preference)
Conversion point (non-participating) = preference ÷ ownership

NovaGrid: $5M at $20M post (25%), 1×	Non-part.: investor	Non-part.: common	Part.: investor	Part.: common
Exit $10M	$5.0M	$5.0M	$6.25M	$3.75M
Exit $40M	$10.0M (converts)	$30.0M	$13.75M	$26.25M

Non-participating means preference or conversion, never both. Here it converts above $5M ÷ 25% = $20M.

Participation is paid for by common. Its cost rises with the exit up to the conversion point, then stays at (1 − ownership) × preference. A 2× preference doubles the floor; it is not participation.

S11 · Economic terms vs. control terms ★

Economics: who gets paid

Valuation (say pre or post)

Amount raised

Option-pool size and timing

Liquidation preference: multiple, and senior vs. equal rank

Participation

Anti-dilution: weighted average (standard) vs. full ratchet (harsh)

Control: who decides

Board composition

Protective provisions (investor vetoes)

Information rights

Pro-rata rights in later rounds

Drag-along

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Read both columns before you sign. A good price with bad control terms can still cost the founders the company.

S11 · The working-capital peg and the step-up ★

The peg

Price is set **cash-free, debt-free.**

Adjusted NWC = (current assets − excess cash) − (current liabilities − debt the seller repays)

True-up, dollar for dollar: above the peg, the seller gets more; below it, the price falls.

Peg basis and closing basis must use the same policies.

SurgeonWare: ($8.0M − $0.25M) − ($6.0M − $0.50M) = $2.25M

vs. a $1.5M peg → seller receives **$750K more**

Stock vs. asset sale

Stock sale: one layer of capital-gains tax; the buyer keeps the old basis.

Asset sale by a C-corp: two layers of tax for the seller; the buyer gets a step-up.

Step-up = price − tax basis = $40M − $10M = $30M

Tax shield = $30M × 25% = $7.5M, over 15 years

That is why buyers pay more for asset and LLC deals.

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The mistakes that cost the most points

Mistake	The fix
New investor % computed on pre-money	Investment ÷ post-money
Pool left out of fully diluted shares	Fully diluted includes the whole pool
Valuations booked in a journal entry	Book the cash received
Billings or bookings called revenue	Revenue when earned; the rest is deferred
Withholding treated as the full tax	Compare to the true marginal rate
Non-participating preferred paid twice	Preference or conversion, whichever is larger
Excess cash or repaid debt left in NWC	Remove both before comparing to the peg
Strike price left out of net cash	Proceeds − strike − tax
A later part left blank	Use your earlier answer and keep going

Before Friday

Work both practice finals under exam conditions, 90 minutes each, before you open the keys.

Finish your cheat sheet: the formulas from today, the journal entries, the AMT worksheet, the payoff algebra, the peg formula.

Reread the PS2 solutions on Canvas.

Bring: your cheat sheet, a simple calculator, and a pen.

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Questions about the material: ask now, or come to office hours.