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BUILDING WEALTH, CAREERS AND COMPANIES

INTERVIEW GUIDE 09

The Excel Modelling Test

How modelling tests are graded, the layout conventions reviewers expect, a full practice LBO, and the errors that cost candidates the pass.

How to use this guide

The other guides teach the logic. This one teaches the three-hour Excel test: structure, speed, and a complete practice model you should rebuild until it takes under an hour.

Most questions have two layers. **What to say** is a short answer you could give in an interview. The notes underneath explain why it is right, so you can handle the follow-up.

Do not memorise answers word for word. Learn the logic, then practise saying it out loud.

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A note on conventions

Worked examples use a 25% tax rate unless the question states otherwise. Where U.S. GAAP and IFRS differ in a way interviewers ask about, the guide says so. Most African markets report under IFRS; U.S. firms will expect U.S. GAAP. Say which you are assuming.

What the test is really checking

The modelling test is not a maths exam. Reviewers open your file, look at the layout for ten seconds, check three or four numbers, and decide whether they would trust you with their model. This guide is about earning that trust.

Format	Typical brief	What earns the pass
One-hour paper-to-Excel LBO	A one-page prompt: EBITDA, multiples, leverage, growth. Build sources and uses, a simple cash flow, a debt schedule and returns	Finishing, with returns that are correct and a clean layout
Three-hour LBO	A short CIM extract. Full operating model, debt tranches, returns, sensitivities, a few bullet points of recommendation	A working model, sensible assumptions you can defend, and a view
Take-home case	A CIM and data pack; two to four days. Model plus memo or slides	Judgement about what matters, not model complexity
Model review / fix	Find the errors in a broken model	Systematic checking: balance, flows, hard-codes, sign errors

1.1 How do reviewers grade?

- **Does it work?** Balance sheet balances, cash never goes negative without a revolver draw, debt pays down correctly, no #REF! or circular warnings.
- **Are the returns right?** They will recompute IRR and MOIC from your exit equity. Get those right even if nothing else is finished.

- **Can they follow it?** Assumptions in one place, consistent colour coding, one formula per row copied across, no hidden hard-codes.
- **Did you finish?** A simple, complete model beats an elaborate, half-built one every time.
- **Do you have a view?** Two sentences on whether you would do the deal, and at what price.

1.2 How should you spend three hours?

Time	Task
0:00 to 0:15	Read the whole prompt twice. List the outputs required. Write down every given assumption before touching Excel.
0:15 to 0:45	Set up the sheet: assumptions block, timeline, sources and uses, and the returns section with placeholders, so the structure exists before it is filled.
0:45 to 1:45	Operating model and free cash flow. Debt schedule with mandatory and optional repayment. Link interest back.
1:45 to 2:15	Returns, then a sensitivity table on entry and exit multiple. Check the balance sheet if one is required.
2:15 to 2:45	Audit: checks, signs, hard-codes, formatting. Fix what is broken; do not add features.
2:45 to 3:00	Write the recommendation. Save with a sensible file name. Stop early rather than break something at the end.

Layout and conventions

THE RULES

Ten conventions reviewers expect

1. Blue font for hard-coded inputs, black for formulas, green for links to other sheets. Never type a number inside a formula.
2. Every assumption lives in one block at the top or on one sheet, and is referenced everywhere else.
3. Time runs left to right, one column per period, the same column for the same year on every sheet.
4. One formula per row, written once in the first period and copied across without changes.
5. Sign convention stated and consistent: usually inflows positive, outflows negative, and subtotals that sum the column.
6. Units in the row label: \$m, %, x. Percentages as percentages, not 0.05 in a row labelled "growth".
7. No merged cells, no hidden rows, no external links.
8. Checks visible: balance sheet check, sources equals uses, cash never negative, debt never below zero. Sum them into one master check cell.
9. Short, clear labels. "EBITDA" not "Earnings before interest tax dep and amort (adj.)".
10. Print-ready: outputs fit on one screen, key numbers bolded, sensitivity tables labelled with what varies.

A standard LBO sheet structure

Block

Contents

Transaction assumptions	Entry EBITDA, entry multiple, fees, minimum cash, debt tranches with amounts or multiples, rates, amortisation, exit year, exit multiple
Sources and uses	Uses: purchase equity, refinanced debt, fees, cash to balance sheet. Sources: each tranche, rollover, sponsor equity as the plug. Check they match.
Operating model	Revenue, growth, EBITDA margin, D&A, EBIT, interest (from schedule), tax, net income; then capex, working capital change, free cash flow before debt repayment
Debt schedule	For each tranche: opening balance, mandatory repayment, optional repayment from cash sweep, closing balance, interest. Revolver draws if cash falls below minimum.
Returns	Exit EBITDA × exit multiple = exit EV; less net debt = exit equity; MOIC; IRR; returns attribution to EBITDA growth, debt paydown and multiple change
Sensitivities	Data tables: IRR by entry versus exit multiple; IRR by leverage versus EBITDA growth
Balance sheet (if required)	Opening pro forma with goodwill; roll forward each year; check assets = liabilities + equity

2.1 How do you handle the interest circularity?

What to say

Interest depends on the average debt balance, the balance depends on cash flow, and cash flow depends on interest. Two ways to handle it: calculate interest on the opening balance, which removes the circularity and is accurate enough for a test, or use the average balance with iterative calculation switched on and a circuit-breaker switch cell so you can set the interest to zero if the model blows up. In a timed test, use opening balances and say so.

2.2 How does a cash sweep work?

What to say

Cash available for optional repayment is free cash flow after mandatory amortisation and after topping up minimum cash. It repays the most senior prepayable tranche first, capped at the tranche's remaining balance, using $\text{MIN}(\text{cash available}, \text{opening balance} - \text{mandatory repayment})$. Anything left flows to the next tranche or builds cash. Term loans are prepayable; bonds usually are not without a penalty, so the sweep skips them.

2.3 Which formulas and shortcuts should you know?

Need	Tool
Returns	IRR over the equity cash flow row; XIRR when dates are irregular; $\text{MOIC} = \text{exit equity} \div \text{equity invested}$
Caps and floors	MIN and MAX for repayments, revolver draws, tax at zero when pre-tax income is negative
Sensitivity tables	Data > What-If Analysis > Data Table; row and column inputs must be on the same sheet as the table
Scenarios	CHOOSE or INDEX driven by a scenario cell to switch between base, upside and downside cases
Periods and dates	EDATE, EOMONTH, YEARFRAC for partial first periods
Lookups	INDEX/MATCH or XLOOKUP; avoid nested IFs beyond two levels
Error handling	IFERROR sparingly; it hides problems in a test
Speed	Ctrl+arrow, Ctrl+Shift+arrow, F2, F4, Alt+= for sums, Ctrl+[to trace precedents, Ctrl+Page Up/Down between sheets

Practise without a mouse for a week. Speed is the difference between finishing and not.

Building the model

A test prompt, then how each block should look. Reproduce this in a blank workbook until it takes under an hour.

PRACTICE PROMPT

Build an LBO of the following company

LTM EBITDA \$100m, revenue \$500m. Purchase at 10.0x. Fees of \$30m. Financing: term loan of 4.0x EBITDA at 8% with 1% annual amortisation and a full cash sweep; senior notes of 1.5x at 10%, bullet. Minimum cash \$20m funded at close. Revenue grows 5% a year, EBITDA margin expands from 20% to 22% by year 5. D&A 3% of revenue, capex 3% of revenue, working capital 10% of the change in revenue, tax 25%. Exit at the end of year 5 at 10.0x. Compute IRR and MOIC, and a sensitivity on entry and exit multiples.

Sources and uses

Uses	\$m	Sources	\$m
Enterprise value (10.0x × \$100m)	1,000	Term loan (4.0x)	400
Fees	30	Senior notes (1.5x)	150
Cash to balance sheet	20	Sponsor equity (plug)	500
Total	1,050	Total	1,050

Assumes the company is bought debt-free and cash-free, so enterprise value equals the equity purchase price.

Operating model and cash flow

\$m	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Revenue (+5%)	525.0	551.2	578.8	607.8	638.1
EBITDA margin	20.4%	20.8%	21.2%	21.6%	22.0%
EBITDA	107.1	114.7	122.7	131.3	140.4
Less: D&A (3% of revenue)	(15.8)	(16.5)	(17.4)	(18.2)	(19.1)
Less: interest (opening balances)	(47.0)	(44.5)	(41.5)	(37.9)	(33.7)
Pre-tax income	44.4	53.6	63.8	75.1	87.6
Less: tax (25%)	(11.1)	(13.4)	(16.0)	(18.8)	(21.9)
Net income	33.3	40.2	47.9	56.3	65.7
Plus: D&A	15.8	16.5	17.4	18.2	19.1
Less: capex (3% of revenue)	(15.8)	(16.5)	(17.4)	(18.2)	(19.1)
Less: increase in NWC (10% of Δ revenue)	(2.5)	(2.6)	(2.8)	(2.9)	(3.0)
Free cash flow for debt repayment	30.8	37.6	45.1	53.4	62.7

Debt schedule

\$m	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Term loan, opening	400.0	369.2	331.7	286.6	233.1
Mandatory (1% of original)	(4.0)	(4.0)	(4.0)	(4.0)	(4.0)
Cash sweep (FCF less mandatory)	(26.8)	(33.6)	(41.1)	(49.4)	(58.7)
Term loan, closing	369.2	331.7	286.6	233.1	170.5
Senior notes (bullet)	150.0	150.0	150.0	150.0	150.0
Interest: TL 8% + notes 10% on opening	47.0	44.5	41.5	37.9	33.7
Total debt, closing	519.2	481.7	436.6	383.1	320.5

Minimum cash of \$20m stays constant, so all free cash flow is swept. Figures rounded to one decimal.

Returns

Exit EBITDA × 10.0x	1,403.9	IRR: entry (rows) vs exit (cols)	9.0x	10.0x	11.0x
Less: debt	(320.5)				
Plus: cash	20.0				
Exit equity	1,103.4				
MOIC (÷ \$500m)	2.2x	9.0x	19%	23%	25%
		10.0x	14%	17%	20%
		11.0x	10%	13%	16%
IRR	~17%				

Sensitivity holds the debt quantum fixed at \$550m, so a lower entry price means a smaller equity cheque. Figures rounded; recompute in your own build.

The recommendation, in two sentences. "At 10x the deal returns about 17% in the base case, below a 20% target; at 9x it clears 20% with the same debt, so I would bid around 9x unless diligence supports margins beyond 22%. Debt paydown of about \$230m and EBITDA growth worth about \$400m at exit drive the return, so cash conversion and margin delivery are the key diligence items."

Common errors and how to check

Error	How to catch it
Balance sheet does not balance	Check row = assets – liabilities – equity, every period. Usual causes: fees not flowed to equity, D&A not reducing PP&E, debt repayment not linked to cash.
Debt goes negative	Wrap the sweep in MIN(cash available, balance after mandatory).
Cash goes negative	Add a revolver draw = MAX(0, minimum cash – cash before revolver).
Tax on a loss	Tax = MAX(0, pre-tax income) × rate, or model an NOL.
Working capital sign	An increase in NWC is a cash outflow. Check the sign against a growth year.
Interest on the wrong balance	Decide opening or average, state it, and apply it to every tranche.
Hard-coded number in a formula	Ctrl+F for numbers inside formulas; or use Formulas > Show Formulas and scan.
Formula inconsistent across a row	Excel flags these with a green triangle; or copy the first-period formula across again.

Exit equity ignores cash	Exit equity = EV - debt + cash. Forgetting cash understates returns.
IRR on wrong cash flows	Equity out as negative in year 0, exit equity positive in the exit year, zeros between (plus any dividends). Nothing else.
Fees double-counted	Fees are a use of funds at close, not an operating cost in year 1.
Sensitivity table returns the same number everywhere	The input cells the table points at are not the ones the model uses. Fix the references.

4.1 Which checks should you build before anything else?

What to say

Sources equal uses. Balance sheet balances every period. Cash never below minimum. Debt never below zero. Sum of returns attribution equals total equity gain. Put them in one visible block, sum the absolute values into a master check that should read zero, and colour it red if it does not.

4.2 What if you run out of time?

What to say

Get to a number. If the debt schedule is unfinished, simplify to a single tranche. If the balance sheet does not balance, leave the check visible and note the likely cause in a comment. Reviewers respect a candidate who knows where the problem is far more than one who hides it.

4.3 How should you prepare in the weeks before?

- Build the practice model in this guide from scratch three times, timed. Aim for under 60 minutes.
- Build it once with a full three-statement balance sheet.

- Learn the shortcuts and turn off your mouse for a week.
- Practise reading a prompt and listing assumptions in five minutes.
- Write your two-sentence recommendation for each build. The view matters as much as the numbers.

The three-statement build

Longer tests, and most banking tests, ask for a full operating model with a balance sheet that balances. The mechanics are fixed; learn the order and it becomes routine.

THE ORDER

Build in this sequence, every time

1. Historical financials entered and checked against the source. Calculate historical ratios: growth, margins, days, capex as a share of revenue.
2. Revenue build, driven by volume and price or by segment, not a single growth rate if the data allows better.
3. Costs and EBITDA, split fixed and variable where you can support it.
4. Depreciation from a PP&E schedule: opening, plus capex, less depreciation, equals closing.
5. Working capital schedule using days assumptions, which produces the balance sheet lines and the cash flow movements.
6. Debt schedule and interest, then tax, then net income.
7. Cash flow statement: operating, investing, financing, ending cash.
8. Balance sheet, with ending cash from the cash flow statement and retained earnings rolled forward. Then the check row.

5.1 How do you roll forward each balance sheet line?

Line	Roll-forward
Cash	Opening cash + net change in cash from the cash flow statement
Receivables	$\text{DSO} \div 365 \times \text{revenue}$

Inventory	$\text{DIO} \div 365 \times \text{COGS}$
PP&E	Opening + capex – depreciation
Goodwill and intangibles	Opening + acquisitions – amortisation – impairment
Payables and accruals	$\text{DPO} \div 365 \times \text{COGS}$, or a percentage of operating costs
Debt	Opening + drawdowns – repayments, per tranche from the debt schedule
Retained earnings	Opening + net income – dividends
Share capital	Opening + issuance – buybacks

If the balance sheet does not balance, the difference is almost always a cash flow line that is not mirrored on the balance sheet, or a balance sheet line that moves without a cash flow entry. Work down the check row period by period and find the first year it breaks.

5.2 How do you build the opening pro forma balance sheet in an LBO?

What to say

Start with the target's last balance sheet, then apply adjustments in columns: eliminate existing debt and the target's equity, write assets up to fair value, recognise new intangibles, calculate goodwill as the plug, add the new debt net of financing fees, add the sponsor's equity, and expense transaction fees against equity. The adjusted column is the opening balance sheet, and it must balance before you project anything.

Goodwill calculation	\$m
Equity purchase price	1,000
Less: target book equity eliminated	(300)
Less: write-up of PP&E and new intangibles	(250)
Plus: deferred tax liability on write-ups at 25%	63
Goodwill	513

5.3 What about a stub period or a mid-year close?

What to say

If the deal closes part-way through a year, model a stub: pro-rate the income statement and cash flows for the remaining months, using a fraction based on days or months, and be careful that interest, depreciation and covenant tests use the same fraction. In a DCF, the equivalent adjustment is the mid-year convention, discounting each year's cash flow by half a period less because cash arrives through the year rather than at the end.

DCF and merger model builds

6.1 How do you lay out a DCF in Excel?

Block	Contents and pitfalls
Free cash flow	$\text{EBIT} \times (1 - \text{tax})$, plus D&A, less capex, less increase in working capital. Keep the tax rate as an input, not typed into the formula
Discount periods	Period 1, 2, 3 in a row of their own; use 0.5, 1.5, 2.5 for the mid-year convention. Never hard-code the exponent
Discount factors	$1 \div (1 + \text{WACC})^{\text{period}}$, in a separate row so you can see them
WACC	Its own small block: risk-free rate, beta (unlevered then relevered), equity risk premium, cost of debt, tax, target weights
Terminal value	Both methods side by side: exit multiple and perpetuity growth. Show the implied multiple of the growth method and the implied growth of the multiple method
Bridge to equity	Enterprise value, less debt, plus cash, less other claims, divided by diluted shares
Sensitivities	Two data tables: value per share by WACC versus terminal growth, and by WACC versus exit multiple

The most common DCF errors in tests: discounting the terminal value by one period too few or too many, using levered cash flow with WACC, and letting the terminal growth rate exceed the discount rate.

6.2 How do you build a merger model quickly?

What to say

Five blocks. Assumptions: offer price, premium, consideration mix, financing rates, synergies, tax rate. Purchase price and sources and uses. Purchase accounting: goodwill, write-ups and new amortisation. Pro forma income statement: combine, add synergies, subtract financing costs and new amortisation, recalculate tax. Then EPS: pro forma net income over the new share count, compared with standalone, with a sensitivity on the premium and the consideration mix.

Two checks a reviewer will run: does your share issuance equal the stock portion divided by the acquirer's share price, and does the accretion flip to dilution at roughly the premium the shortcut in Guide 03 predicts.

6.3 How should you handle a paper LBO with no spreadsheet?

What to say

Round aggressively and say so. Use whole numbers: entry EBITDA times the multiple for enterprise value, leverage times EBITDA for debt, the difference is equity. Estimate annual free cash flow as roughly EBITDA less interest, tax and capex, take a simple average over the period rather than year by year, and multiply by the number of years for cumulative debt paydown. Exit EBITDA times the exit multiple, less remaining debt, gives exit equity. Convert to a multiple, then read the IRR off the reference points: 2x over five years is about 15%, 2.5x about 20%, 3x about 25%.

Say your assumptions out loud as you go. Interviewers are grading the structure and whether you catch your own errors, not the second decimal place.

Advanced LBO features

Longer tests add layers. Each one is mechanical once you have built it once.

Feature	How to model it
Revolver	Draw = MAX(0, minimum cash – cash before revolver). Repay from surplus cash before other tranches. Interest on the average drawn balance plus a commitment fee on the undrawn portion
Multiple tranches with a waterfall	Sweep cash in order of seniority, each capped by its remaining balance. Bonds and other non-prepayable debt are excluded from the sweep
PIK toggle	A switch that routes interest to principal instead of cash. Add accrued interest to the closing balance and add it back as non-cash in the cash flow
Cash sweep percentage	Credit agreements often sweep 50% or 75% of excess cash flow, stepping down as leverage falls. Model the percentage as an input driven by a leverage lookup
Management options and rollover	Options dilute the sponsor's exit proceeds: calculate exit equity, then allocate a percentage to the option pool above a strike. Rollover equity is a source of funds at close and shares in exit proceeds pro rata
Preferred equity with a coupon	Accrues at a fixed rate and is paid before common at exit. Model it as a separate instrument with its own roll-forward
Add-on acquisitions	A schedule of acquisitions by year: purchase price at an assumed multiple, funded by debt or cash, adding EBITDA and often synergies. Watch that you add both the EBITDA and the debt

Dividend recapitalisation	New debt raised mid-hold, paid to the sponsor as a dividend. It becomes a positive cash flow in the IRR row in that year
Monitoring and transaction fees	Sponsor fees are a cost to the company and a return to the fund. Include them in EBITDA adjustments and, if the test asks, in the returns
Quarterly model	Used for covenant testing and seasonal businesses. Convert annual assumptions carefully: interest and amortisation are divided by four, covenant tests use last-twelve-month EBITDA

7.1 How do you model the sponsor's promote or a management incentive plan?

What to say

An incentive plan is usually a percentage of equity value above a threshold, sometimes with tiers tied to multiple of money or IRR. Calculate total exit equity, subtract the threshold, apply the percentage to the excess, and reduce the sponsor's proceeds by that amount. Then recompute the sponsor's IRR, which is the number that matters to the investment committee.

7.2 Show me the fund-level waterfall.

Investors commit \$100m, the fund exits for \$250m after five years, with an 8% preferred return and 20% carried interest on a whole-fund basis with a full catch-up.

Step	\$m
Return of capital to investors	100.0
Preferred return: \$100m compounded at 8% for five years, less capital	46.9
GP catch-up, until the GP has 20% of total profit	30.0
Remaining split 80/20	73.1
Investors receive in total (capital + 80% of \$150m profit)	220.0
GP carried interest (20% of \$150m profit)	30.0

With a full catch-up, the GP ends with exactly 20% of the profit once the fund clears the hurdle comfortably. Without a catch-up, a "hard hurdle" structure, the GP earns 20% only of profits above the preferred return, which here would be \$24.6m.

7.3 Which sensitivities should every LBO include?

- Entry multiple versus exit multiple, on IRR and on MOIC.
- Leverage versus EBITDA growth, to show whether returns come from the business or the balance sheet.
- Revenue growth versus margin, the two operating drivers.
- A downside case with a covenant check, to show when the structure breaks rather than just when returns fall.
- Maximum price: the entry multiple at which the base case still hits the target IRR.

Shortcuts and a practice plan

Shortcut	What it does
Ctrl + arrow / Ctrl + Shift + arrow	Move and select to the edge of a data region
F2	Edit the active cell
F4	Cycle absolute and relative references while editing; repeat the last action otherwise
Alt + =	Insert a SUM over the adjacent range
Ctrl + [and Ctrl +]	Jump to precedents and dependents; Ctrl + Shift + [selects all precedents
Ctrl + Page Up / Page Down	Move between worksheets
Alt + ; then Ctrl + Enter	Select visible cells only, then fill the selection
Ctrl + 1	Format cells; learn the custom number format for thousands and for negatives in brackets
Ctrl + Shift + { }	Trace and select all precedents or dependents for auditing
Alt + W then F then F	Freeze panes, so labels stay visible
Ctrl + ` (grave)	Show formulas across the sheet: the fastest way to spot hard-codes
Ctrl + G then Alt + S	Go To Special: select constants, formulas or blanks to audit a sheet quickly

8.1 What should a four-week practice plan look like?

Week	Focus
Week 1	Build the Section 03 LBO three times from a blank sheet, untimed, then timed. Learn the shortcut list without a mouse.
Week 2	Add a full three-statement build and an opening pro forma balance sheet. Make the balance sheet balance without help.
Week 3	Add a revolver, a second tranche with a proper sweep, a management option pool and a dividend recap. Build a DCF and a merger model from scratch.
Week 4	Timed full mocks under real conditions, including writing the two-sentence recommendation. Then practise paper LBOs verbally with a friend.

8.2 What do you do if the test uses a template you have not seen?

What to say

Spend the first five minutes mapping it: find the assumptions, the outputs and any checks, and trace one formula end to end. Then work inside its conventions rather than imposing your own, because a reviewer comparing your file with the answer key wants to see their structure filled in correctly.

8.3 What do you say when you hand it in?

What to say

Three sentences: the answer, the two assumptions that matter most, and what you would do with more time. "Base case gives 2.2x and about 17%. It is most sensitive to the exit multiple and to margin expansion, which I assumed reaches 22%. With more time I would build a quarterly covenant test and a downside case with a revolver draw."

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