CHARTA LEARNING · LESSON NOTES

Financial analysis techniques and ratios

CFA Level I · Financial Statement Analysis

You will learn: Calculate and interpret liquidity, activity, solvency and DuPont return ratios, and recognise the limits of ratios and the industry specific measures used for forecasting.

Running example: Worked examples follow one made-up clothing retailer, Marlow Outfitters ($ millions). Revenue 2,000, cost of goods sold 1,460, EBIT 200, interest 50, tax 30%, net income 105. Year end (start): current assets 550 (470), current liabilities 290 (260), total debt 710 (600), equity 560 (500), total assets 1,500 (1,300).

1. Ratios and liquidity

- A ratio divides one figure by another so firms and years can be compared fairly. No single ratio is a diagnosis, and a ratio alone means nothing: compare it with the firm's history, rivals or an industry norm. Ratios work the same under IFRS and US GAAP.
- Liquidity asks whether bills due this year can be paid. The quick ratio leaves out inventory, the least certain asset to turn into cash. The cash ratio is strictest. Each asks how many dollars of readiness stand behind each dollar due.
- A high or rising current ratio is not automatically good: it may mean unsold inventory or idle cash.

Current ratio = current assets ÷ current liabilities; quick = (cash + securities + receivables) ÷ current liabilities; cash ratio = (cash + securities) ÷ current liabilities

MARLOW (CASH 100, RECEIVABLES 210, INVENTORY 240)		
Current ratio	550 ÷ 290	**1.90**
Quick ratio	(100 + 210) ÷ 290	**1.07**
Cash ratio	100 ÷ 290	**0.34**
Net working capital	550 − 290	**$260m**

Watch out: Putting inventory into the quick ratio.

2. Activity and the cash conversion cycle

- Activity ratios measure speed, on average balances and 365 days. Inventory turnover = COGS ÷ average inventory; days of inventory on hand (DIO) = 365 ÷ turnover. Days sales outstanding (DSO) uses revenue; days payables outstanding (DPO) uses COGS. Be consistent: year end inventory alone would give 60 days.
- The operating cycle is DIO + DSO. Subtract DPO, because the supplier funds part of that time, to get the cash conversion cycle (CCC): days between paying for inputs and collecting from customers. A negative CCC means suppliers finance the business, a structural advantage.

DSO = avg receivables ÷ revenue × 365; DPO = avg payables ÷ COGS × 365; CCC = DIO + DSO − DPO

MARLOW (AVERAGE INVENTORY 220, RECEIVABLES 200, PAYABLES 160)		
Inventory turnover	1,460 ÷ 220	**6.64 times**
DIO	220 ÷ 1,460 × 365	**55 days**
DSO	200 ÷ 2,000 × 365	**36.5 days**
DPO	160 ÷ 1,460 × 365	**40 days**
Operating cycle	55 + 36.5	**91.5 days**
Cash conversion cycle	91.5 − 40	**51.5 days**

Watch out: Wrong base for days (DSO uses revenue; DIO and DPO use COGS); adding days of payables instead of subtracting.

3. Solvency: structure and coverage

- Solvency is the ability to meet long-term obligations. Structure asks how much is debt (all interest-bearing borrowing, short and long term, plus lease liabilities shown as borrowing). Coverage asks whether earnings pay the interest. Structure is a photo of the balance sheet; coverage tests the income statement.
- Debt to capital is always between zero and one. Financial leverage = average total assets ÷ average equity. Interest coverage uses EBIT, not net income, since interest is paid before tax. Fixed charge coverage adds lease payments to both top and bottom.
- Coverage is usually more useful: it links the obligation to the profit that meets it. Debt to equity compares two book values. Both show only reported debt, so read the notes. IFRS shows nearly every lease as depreciation and interest; US GAAP shows an operating lease as one rent cost.

Debt-to-equity = debt ÷ equity; debt-to-capital = debt ÷ (debt + equity); interest coverage = EBIT ÷ interest; fixed charge coverage = (EBIT + lease payments) ÷ (interest + lease payments)

MARLOW (DEBT 710, EQUITY 560, ASSETS 1,500, LEASE PAYMENTS 40)		
Debt-to-equity	710 ÷ 560	**1.27**
Debt-to-capital	710 ÷ (710 + 560)	**55.9%**
Debt-to-assets	710 ÷ 1,500	**47.3%**
Interest coverage	200 ÷ 50	**4.0 times**
Fixed charge coverage	(200 + 40) ÷ (50 + 40)	**2.67 times**
EBIT where coverage hits 1	50 (a fall of 75%)	**if EBIT is 120, 2.4 times**

Watch out: Forgetting leases and guarantees when judging how much debt there is.

4. DuPont analysis of return on equity

- Return on equity (ROE) = net income ÷ average equity. DuPont splits it into net profit margin (profit kept per sale), asset turnover (sales per dollar of average assets) and financial leverage (average assets per dollar of average equity). Profitability, efficiency and leverage drive the return.
- The five part version splits the margin: tax burden (net income ÷ profit before tax), interest burden (profit before tax ÷ EBIT) and EBIT margin, with asset turnover and leverage. It shows whether a rising return comes from operations, or from lower tax or more debt.
- Equal returns can hide opposite models: one firm competes on margin, another on volume. Margin × turnover gives return on assets. Leverage lifts the return only while assets earn more than the debt costs, and it cuts both ways in a bad year.

ROE = net profit margin × asset turnover × financial leverage = tax burden × interest burden × EBIT margin × asset turnover × financial leverage

MARLOW (NET INCOME 105, AVERAGE ASSETS 1,400, AVERAGE EQUITY 530)		
Margin × turnover × leverage	5.25% × 1.43 × 2.64	**19.8%**
Direct check	105 ÷ 530	**19.8%**
Return on assets	margin × turnover	**7.5%**
Tax burden / interest burden	105 ÷ 150; 150 ÷ 200	**0.70 / 0.75**
EBIT margin	200 ÷ 2,000	**10.0%**
Five parts	0.70 × 0.75 × 10% × 3.77	**19.8%**
Rival Stoneridge, same ROE	margin 3.0% × turnover 2.50 × leverage 2.64	**19.8% by volume**

5. Limits of ratios and segment data

- Ratios have three limits. They need a yardstick (history, peers or an industry norm, each with difficulties). Accounting choices differ, so adjust before comparing. A diversified company's average describes neither business, like a person with one foot in an oven and one in a freezer.
- Adjustment is the remedy for the second limit; segment data for the third. Segments are reported as management runs the business, and are reportable at 10% of revenue, profit or assets, but management defines them and may redefine them. The rules are the same under IFRS and US GAAP.
- LIFO, allowed under US GAAP and banned under IFRS, makes identical businesses show different ratios until adjusted with the LIFO reserve.

MARLOW: LIFO TWIN AND SEGMENTS

Twin COGS (reserve 60 end, 40 start)	1,460 + (60 − 40)	**1,480**
Twin current ratio	(550 − 60) ÷ 290	**1.69**
Twin DIO vs Marlow	170 ÷ 1,480 × 365	**41.9 vs 55 days**
Stores / online margin	120 ÷ 1,500; 80 ÷ 500	**8.0% / 16.0%**
Whole company margin	200 ÷ 2,000	**10.0%**
Return on segment assets	120 ÷ 1,100; 80 ÷ 300	**10.9% / 26.7%**

6. Industry ratios and forecasting

- General ratios travel badly between sectors. Retail: same-store sales growth (strips out new shops). Hotels: occupancy and revenue per available room (RevPAR = occupancy × average daily rate). Airlines: load factor = passenger miles ÷ seat miles. Banks: net interest margin and core capital (CET1) ratio.
- Once stable, these ratios become tools to forecast earnings: work down from the operating driver to revenue, EBIT, interest, tax and net income.

ILLUSTRATIONS AND THE MARLOW FORECAST

Hotel RevPAR (200 rooms, 150 sold, rate $120)	75% × 120	**$90**
Load factor	800 ÷ 1,000	**80%**
Net interest margin	(150 − 90) ÷ 3,000	**2%**
CET1 ratio	108 ÷ 1,200	**9%**
Marlow revenue (105 stores at 15.6; online 500 × 1.2)	105 × 15.6 + 600	**2,238**
Net income at 10% EBIT margin	(223.8 − 50) × (1 − 30%)	**121.7**

Key takeaways

- Liquidity: current, quick (no inventory) and cash ratios. A ratio alone means nothing.
- Days of inventory and payables use COGS; days of receivables use revenue; CCC = DIO + DSO − DPO.
- Solvency has two lenses: structure (debt to equity, debt to capital) and coverage (EBIT ÷ interest).
- ROE = margin × asset turnover × financial leverage; the five part version adds tax and interest burdens.
- Equal ratios can hide different routes, so adjust for accounting choices and use segment data.
- Use sector ratios such as RevPAR and same-store sales to forecast earnings.

Quick check

1. Average inventory 100, COGS 730. Days of inventory (365 days)?
   Answer: 100 ÷ 730 × 365 = 50 days.
2. Net margin 4%, asset turnover 2.5, financial leverage 2. ROE?
   Answer: 4% × 2.5 × 2 = 20%.
3. EBIT 90, interest expense 30. Interest coverage?
   Answer: 90 ÷ 30 = 3.0 times.

Summary notes for the Charta whiteboard lesson. Examples use made-up figures. Watch the full lesson at charta-learning.com.