

Boone's Finance Boot Camp

Series 2 Companion Notes: Financial Statements to Free Cash Flow

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1 How To Use These Notes

Series 2 turns accounting numbers into valuation inputs. The videos move fast, the MiniCo workbook gives you spreadsheet practice, and these notes give you a clean written path through the same ideas.

Think of the videos as the short guided tour and these notes as the fuller explanation. The videos keep

the pace up. The notes slow down enough to define the words, show the steps, and explain why the steps matter.

Use these notes beside the Series 2 videos:

1. Watch the video.
2. Read the matching section.
3. Work the quick checks.
4. Use the MiniCo workbook to follow the numbers.
5. Use the quizzes for feedback.

The big picture is:

statements → ratios → FCF → present value → NPV

Series 2 Throughline

Accounting tells us what happened. Finance asks what those numbers mean for future cash flow, risk, and value.

For self-study, work the quick checks and practice questions before looking at the answers. The answers are collected in an answer key near the back so the solution is not sitting directly under the question.

1.1 Series Map

Videos	Main job	Practice checkpoint
S2-01 to S2-03	Statements, ratios, and DuPont	Quiz S2-A
S2-04 to S2-05	FCF formula and historical FCF	Quiz S2-B
S2-06	Pro forma FCF to NPV	Quiz S2-C

MiniCo is the running example. The point is not to memorize MiniCo. The point is to practice the workflow on a company that stays familiar.

1.2 How MiniCo Fits Together

MiniCo is intentionally small. The numbers are clean so the finance logic is visible.

MiniCo item	Value	Why it matters
Sales	\$1,000	base for margins and turnover
EBIT	\$150	operating profit before financing
Tax rate	30%	turns EBIT into NOPAT
NOPAT	\$105	starting point for FCF
Total assets	\$800	used in turnover, ROA, and DuPont

MiniCo item	Value	Why it matters
Equity	\$500	used in ROE and equity multiplier
Δ NWC	\$15	working-capital reinvestment
Change in Net PP&E	\$60	fixed-asset reinvestment

The MiniCo workbook follows the same path as the videos: statements first, ratios next, FCF after that, and then NPV at the end.

1.2.1 What not to worry about yet

Series 2 is not trying to cover every accounting detail. We are using a clean version of the statements so you can see the valuation workflow. Later finance courses can add more detail around leases, deferred taxes, excess cash, debt schedules, and more complex forecasts.

2 Statements And Operating Focus

Learning goal. Understand what the income statement and balance sheet measure, and why they matter for free cash flow.

Relevant video. S2-01.

The income statement is a performance statement over a period of time. The balance sheet is a financial position statement at a point in time.

Series 2 does not try to turn you into an accountant. The goal is more practical: learn where the operating numbers live, learn which balance sheet changes matter for cash flow, and then use those pieces for valuation.

2.1 Plain-English Principle

The income statement helps us find operating profit. The balance sheet helps us find investment in assets and working capital.

Two Statements, Two Jobs

Income statement:

$$\text{Sales} - \text{Costs} = \text{Profit}$$

Balance sheet:

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

2.2 MiniCo Example

MiniCo has:

- Sales = \$1,000
- COGS = \$600
- cash SG&A = \$200
- D&A = \$50
- EBIT = \$150
- tax rate = 30%

NOPAT is net operating profit after taxes:

$$NOPAT = EBIT(1 - T) = 150(1 - 0.30) = 105$$

MiniCo working capital:

$$NWC_0 = 100 + 150 - 80 - 20 = 150$$

$$NWC_1 = 120 + 160 - 90 - 25 = 165$$

$$\Delta NWC = 165 - 150 = 15$$

2.3 Statement-To-Finance Bridge

Statement item	Why finance cares
Sales	starting point for margins and forecasts
EBIT	operating profit before financing
Taxes	converts EBIT into NOPAT
Net PP&E	fixed-asset investment
AR and inventory	operating assets tied up in working capital
AP and accrued expenses	operating liabilities that partly finance working capital

2.3.1 Common Mistake

Profit is not the same thing as cash flow. A company can be profitable and still need cash for inventory, receivables, equipment, or growth.

2.3.2 Realistic Example

A growing coffee shop may show good operating profit but still feel cash tight because it buys more inventory, lets customers pay later, and opens a second location. The income statement says the business is profitable. The balance sheet helps explain where the cash went.

2.3.3 Go a little further

For valuation, we usually care about operating performance before financing choices. That is why Series 2 focuses on EBIT and NOPAT rather than starting with net income. Financing matters, but it should not blur the operating cash flow picture.

2.4 Quick Checks

1. What does the income statement measure?
2. What does the balance sheet equation say?
3. MiniCo EBIT is \$150 and the tax rate is 30%. What is NOPAT?

Answers are in the answer key at the back.

2.4.1 Operating versus financing

Operating decisions are about selling, producing, collecting, paying suppliers, and investing in assets. Financing decisions are about debt and equity. Series 2 keeps those ideas separate so FCF can focus on the business itself.

3 Ratios And DuPont

Learning goal. Compute a few useful ratios and use DuPont to turn ROE into a business story.

Relevant videos. S2-02 and S2-03.

Ratios are not magic answers. They are compact ways to ask better questions.

A ratio is useful because it puts one number in relation to another number. Sales by itself is interesting. Profit by itself is interesting. Profit relative to sales tells us something more specific about margin. The goal is not to calculate ratios and stop. The goal is to use ratios as a doorway into interpretation.

One note before the formulas: different textbooks, classes, and companies sometimes define ratios a little differently. For example, some use average assets instead of ending assets, or use slightly different profit measures depending on the question. That is not something to lose sleep over here. In this Boot Camp, we are using simple, common definitions so the basic intuition is clear.

3.1 Core Ratios

Ratios We Use	
Profit margin:	$\frac{\text{Net income}}{\text{Sales}}$
Asset turnover:	$\frac{\text{Sales}}{\text{Total assets}}$

Return on assets:

$$\frac{\text{Net income}}{\text{Total assets}}$$

Return on equity:

$$\frac{\text{Net income}}{\text{Equity}}$$

Equity multiplier:

$$\frac{\text{Total assets}}{\text{Equity}}$$

3.2 MiniCo Ratio Example

MiniCo has sales of \$1,000, net income of \$105, total assets of \$800, and equity of \$500.

$$\text{Profit margin} = \frac{105}{1,000} = 10.5\%$$

$$\text{Asset turnover} = \frac{1,000}{800} = 1.25$$

$$\text{ROA} = \frac{105}{800} = 13.1\%$$

$$\text{ROE} = \frac{105}{500} = 21.0\%$$

$$\text{Equity multiplier} = \frac{800}{500} = 1.60$$

3.3 Ratio Interpretation Guide

Ratio	Plain-English question
Profit margin	How much profit per dollar of sales?
Asset turnover	How efficiently are assets producing sales?
ROA	How much profit per dollar of assets?
ROE	How much profit per dollar of equity?
Equity multiplier	How much asset base per dollar of equity?

Ratios are useful because they compress a business story. They are dangerous when we forget to unpack

that story.

3.4 DuPont

DuPont Identity

DuPont breaks ROE into three drivers:

$$ROE = \frac{NI}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Equity}$$

In words:

$$ROE = \text{margin} \times \text{turnover} \times \text{leverage}$$

For MiniCo:

$$ROE = 10.5\% \times 1.25 \times 1.60 = 21.0\%$$

The story is: MiniCo earns 10.5 cents per dollar of sales, generates \$1.25 of sales per dollar of assets, and uses \$1.60 of assets per dollar of equity.

3.4.1 Common Mistake

Do not stop at "ROE is high." Ask why. Is it high because of strong margins, efficient asset use, or more leverage?

3.4.2 Realistic Example

Two food businesses can have the same ROE for different reasons. A sit-down restaurant might have stronger margins but more assets tied up in space and equipment. A grab-and-go stand might have lower margins but faster asset turnover.

3.4.3 Go a little further

Higher leverage can raise ROE, but it can also raise risk. DuPont is useful because it helps you separate operating performance from financing intensity. A careful analyst does not treat all ROE increases as equally good.

3.5 Quick Checks

1. If net income is \$80 and sales are \$1,000, what is profit margin?
2. If sales are \$1,200 and assets are \$600, what is asset turnover?
3. If margin rises and the other DuPont drivers stay constant, what happens to ROE?

Answers are in the answer key at the back.

3.5.1 One ratio is rarely enough

A company can improve ROE by improving margins, using assets more efficiently, or using more leverage. Those are very different stories. A good analyst asks which driver changed and whether that change is sustainable.

4 Free Cash Flow

Learning goal. Define FCF and understand what each part of the formula is doing.

Relevant video. S2-04.

Free Cash Flow is cash generated by operations after the company reinvests in the assets and working capital needed to keep going.

That last phrase matters: after reinvestment. FCF is not just “profit” and it is not just “cash from customers.” It is the cash-flow measure we use after recognizing that businesses usually need inventory, receivables, equipment, and other operating assets to support sales.

4.1 Plain-English Principle

Start with after-tax operating profit. Then adjust for investment.

NOPAT

NOPAT means net operating profit after taxes.

$$NOPAT = EBIT(1 - T)$$

NOPAT focuses on operating profit after taxes, before financing choices.

4.2 Two FCF Formulas

Series 2 uses two versions depending on the data available.

Historical FCF From Balance Sheets

When using adjacent historical balance sheets:

$$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$$

This version uses the observed change in net fixed assets directly.

Pro Forma FCF

When forecasting and D&A and CapEx are given separately:

$$FCF = NOPAT + D\&A - CapEx - \Delta NWC$$

4.3 Why The Signs Make Sense

- NOPAT is operating profit after tax.
- D&A is added back in the pro forma version because it is a non-cash expense.
- CapEx is subtracted because buying long-term assets uses cash.
- Increases in NWC are subtracted because more cash is tied up in operations.

4.4 Formula Choice

Situation	Use this version
You have adjacent historical balance sheets	$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$
You are forecasting D&A and CapEx separately	$FCF = NOPAT + D\&A - CapEx - \Delta NWC$

The formula should match the information in front of you.

4.4.1 Common Mistake

Do not subtract Change in Net PP&E and also subtract CapEx in the same historical build. That double-counts fixed-asset reinvestment.

4.4.2 Realistic Example

A small manufacturer might report healthy operating profit, but if it buys new equipment and carries more inventory, free cash flow can be much lower than profit. That is not automatically bad. It may be the cash cost of growth.

4.4.3 Go a little further

The historical and pro forma formulas are closely related, but they are not the same presentation. Historical balance sheets show the net change in Net PP&E. Forecasts often separate D&A and CapEx because we are explicitly projecting the spending and depreciation assumptions.

4.5 Quick Checks

1. EBIT is \$200 and the tax rate is 25%. What is NOPAT?
2. If NWC rises by \$10, does that increase or decrease FCF?
3. In a pro forma FCF build, why do we add back D&A?

Answers are in the answer key at the back.

4.5.1 Why FCF is a valuation input

Investors ultimately care about cash flows they can value. Accounting profit is useful, but FCF gets closer to the cash generated by the business after the reinvestment required to keep that business running.

5 Historical FCF From Statements

Learning goal. Compute historical FCF from MiniCo's income statement and balance sheet changes.

Relevant video. S2-05.

Historical FCF is a bridge from what the company reported to how much cash the business generated after reinvestment.

The key phrase here is historical. We are looking at what changed from one balance sheet date to the next. Because we can observe the change in Net PP&E and the change in NWC, we can use those changes directly.

5.1 MiniCo Historical Build

MiniCo:

- NOPAT = \$105
- Net PP&E increases from \$420 to \$480
- NWC increases from \$150 to \$165

Change in Net PP&E:

$$480 - 420 = 60$$

Change in NWC:

$$165 - 150 = 15$$

Historical FCF:

$$FCF = 105 - 60 - 15 = 30$$

MiniCo generated \$30 of FCF after reinvesting in fixed assets and working capital.

Working Capital
For this Boot Camp, operating NWC is:
$NWC = AR + Inventory - AP - Accrued\ expenses$
Cash and debt are not part of this simplified operating NWC setup.

5.2 NWC Sign Guide

Change	Effect on NWC	Effect on FCF
AR increases	NWC increases	FCF decreases
Inventory increases	NWC increases	FCF decreases
AP increases	NWC decreases	FCF increases
Accrued expenses increase	NWC decreases	FCF increases

This is one of those places where a table can save you a lot of grief.

5.2.1 Common Mistake

Accounts payable works in the opposite direction from inventory and accounts receivable. If AP rises, suppliers are effectively financing more of the operation, so NWC falls relative to what it otherwise would have been.

5.2.2 Realistic Example

A growing retailer may need more inventory before the busy season. Even if sales look great, the inventory build can use cash. That is why an increase in NWC reduces FCF.

5.2.3 Go a little further

Positive FCF is useful, but the interpretation depends on context. A young company may have low or negative FCF because it is investing heavily. A mature company with strong profits and persistently weak FCF deserves a closer look.

5.3 Quick Checks

1. NOPAT is \$90, Change in Net PP&E is \$20, and Δ NWC is \$5. What is historical FCF?
2. AR rises by \$10 and AP rises by \$4, with other NWC accounts unchanged. What is Δ NWC?
3. If Net PP&E rises from \$300 to \$340, what Change in Net PP&E is subtracted?

Answers are in the answer key at the back.

5.3.1 Negative FCF is not always failure

Negative FCF can be bad if it comes from weak operations. It can also happen because a company is investing heavily in growth. The question is whether the reinvestment is likely to produce future cash flows worth more than the cash spent today.

6 Pro Forma FCF To NPV

Learning goal. Forecast FCF, discount it to today, and interpret NPV.

Relevant video. S2-06.

This is the capstone. It is how companies often think about investment decisions: project future FCF, discount it, and ask whether the investment creates value.

Notice the shift from historical to forecast. Earlier, we measured what happened. Here, we are making disciplined assumptions about what might happen. That is what capital budgeting and valuation often look like in practice.

6.1 Forecast FCF

Pro Forma FCF

For forecast years:

$$FCF = NOPAT + D\&A - CapEx - \Delta NWC$$

MiniCo project forecast:

Time	FCF
0	-110
1	41
2	48
3	55

At time 0, the project invests \$100 in CapEx and \$10 in working capital:

$$FCF_0 = -100 - 10 = -110$$

6.2 Discount And Interpret

NPV

NPV is the value today of all project cash flows, including the time-zero cash flow.

$$NPV = FCF_0 + \sum_{t=1}^N \frac{FCF_t}{(1+r)^t}$$

At a 10% required return:

$$NPV = -110 + \frac{41}{1.10} + \frac{48}{1.10^2} + \frac{55}{1.10^3}$$

$$NPV = 8.26$$

The project is expected to create \$8.26 of value today, after earning the required return.

6.3 NPV Decision Guide

NPV result	Plain-English interpretation
Positive	expected to create value at the required return
Zero	expected to exactly earn the required return
Negative	expected to fall short of the required return

NPV is not just “future cash flows are positive.” It is future cash flows after timing, risk, and the upfront investment are all considered.

6.3.1 Common Mistake

Do not call the present value of future FCFs “NPV” until you include the time-zero investment. The N in NPV means net of all the cash flows, including today.

6.3.2 Realistic Example

A company considering a new machine estimates the machine's future operating cash flows, the upfront investment, and the required return for the project's risk. If NPV is positive, the project is expected to create value. If NPV is negative, the return is not enough for that risk.

6.3.3 Go a little further

NPV is sensitive to assumptions. A small change in sales growth, margins, CapEx, or the required return can change the answer. That does not make NPV useless. It makes the model a disciplined place to test what has to go right.

6.4 Quick Checks

1. A project has $FCF_0 = -100$, $FCF_1 = 60$, and $FCF_2 = 60$. At 10%, what is NPV?
2. If forecast Δ NWC increases by \$5 each year, what happens to FCF each year?
3. If NPV is positive, what does that mean in plain English?

Answers are in the answer key at the back.

6.4.1 Sensitivity thinking

The point of a model is not to pretend the future is certain. The point is to make the assumptions visible. If NPV changes a lot when sales growth moves slightly, then sales growth is a key assumption to discuss.

7 How Statements Become Value

Relevant videos. S2-01 through S2-06.

This section slows down the full Series 2 story. The videos break the work into pieces. Here, we connect those pieces into one finance workflow.

The workflow starts with accounting statements, but the goal is not accounting for its own sake. The goal is to use accounting information to estimate cash flow. Then we use time value of money to value that cash flow.

That is why Series 2 is the natural sequel to Series 1:

$$\text{Financial statements} \rightarrow \text{FCF} \rightarrow \text{NPV}$$

Series 1 teaches the discounting habit. Series 2 teaches where the cash flows often come from.

7.1 Why We Start With Operations

When valuing a business or project, we usually want to understand the performance of the business itself before focusing on how it is financed.

That is why we use EBIT and NOPAT:

$$NOPAT = EBIT(1 - T)$$

EBIT is operating profit before interest. NOPAT is after-tax operating profit. This gives us a clean operating starting point.

Net income is still important, but it is affected by financing choices such as interest expense. If two companies have the same operations but different debt levels, their net income may differ. FCF tries to focus first on the cash generated by the operations and the reinvestment required by those operations.

7.2 Profit Is A Starting Point, Not The Finish Line

Accounting profit and cash flow are related, but they are not the same.

A company can record sales before collecting cash. That creates accounts receivable. A company can buy inventory before selling it. That uses cash. A company can earn operating profit while also buying equipment. That uses cash too.

That is why FCF asks: after the company earns operating profit, how much cash is left after supporting the assets and working capital needed by the business?

In plain English:

$$\text{FCF} = \text{operating profit after tax} - \text{reinvestment}$$

The formulas make that idea precise.

7.3 Why Working Capital Matters

Working capital is often where students first feel the cash-flow logic click.

If accounts receivable increases, customers owe the company more money. Sales may look good, but the cash has not arrived yet. That increase uses cash.

If inventory increases, the company has more cash tied up in products or materials. That also uses cash.

If accounts payable increases, suppliers are effectively financing more of the company's operations. That can help cash flow, at least temporarily.

This is why the operating NWC formula subtracts operating liabilities:

$$NWC = AR + Inventory - AP - Accrued\ expenses$$

And this is why an increase in NWC reduces FCF:

$$FCF = \dots - \Delta NWC$$

The sign is not arbitrary. It reflects cash tied up in the operating cycle.

7.4 Why Fixed-Asset Reinvestment Matters

Companies also need long-term assets: equipment, buildings, systems, vehicles, technology, and other productive capacity.

In the historical formula, we use the change in Net PP&E:

$$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$$

That version is useful when adjacent balance sheets show the net change in fixed assets.

In the pro forma formula, we usually forecast D&A and CapEx separately:

$$FCF = NOPAT + D\&A - CapEx - \Delta NWC$$

This version is useful because forecasts often explicitly say how much the company expects to spend on CapEx and how much D&A will be recorded.

The key is consistency. Do not mix the formulas into one monster formula. Use the version that fits the information.

7.5 Why Ratios Still Matter

If FCF is the valuation input, why spend time on ratios?

Ratios help us understand the business before we forecast it. A forecast is not just a spreadsheet exercise. It is a set of claims about margins, asset efficiency, reinvestment, and growth.

If profit margin has been stable, a forecast with a huge margin jump needs a good reason. If asset turnover is falling, the company may need more assets to generate each dollar of sales. If leverage is rising, ROE may improve even if operations are not improving.

DuPont helps connect those ideas:

$$ROE = \text{margin} \times \text{turnover} \times \text{leverage}$$

That is not just a formula. It is a way to ask better questions.

7.6 Why NPV Is The Decision Tool

Once we forecast FCF, we still need to value it. Future cash flow is not the same as cash today. Series 1 gave us the tool for that.

NPV discounts future FCFs to today and includes the time-zero investment:

$$NPV = FCF_0 + \sum_{t=1}^N \frac{FCF_t}{(1+r)^t}$$

That is why NPV is more informative than saying, "The future cash flows are positive." Positive future cash flows may still be too small, too late, or too risky to justify the upfront investment.

In practical decision language:

- positive NPV means expected value creation;
- zero NPV means the project exactly earns the required return;
- negative NPV means the project falls short of the required return.

7.7 The Full Story In One Example

Suppose a project has:

- EBIT = \$100,
- tax rate = 25%,
- D&A = \$20,
- CapEx = \$35,
- $\Delta NWC = \$10$.

First compute NOPAT:

$$NOPAT = 100(1 - 0.25) = 75$$

Then compute FCF:

$$FCF = 75 + 20 - 35 - 10 = 50$$

That \$50 is not sales. It is not net income. It is not EBIT. It is the forecast free cash flow after operating profit, taxes, non-cash add-back, fixed-asset investment, and working-capital investment.

If that \$50 arrives one year from now and the required return is 10%, its present value is:

$$PV = \frac{50}{1.10} = 45.45$$

That is the Series 2 bridge: statements become FCF, and FCF becomes value.

8 Extended MiniCo Practice Lab

This practice lab gives the Series 2 ideas more room. The videos show the moves quickly. Here, we can slow down and connect the statements, ratios, FCF, and NPV.

Relevant videos. S2-01 through S2-06.

The throughline is:

operating results → reinvestment → FCF → value

8.1 Lab 1: Read The Statements Like A Finance Student

MiniCo's simplified income statement:

Item	Amount
Sales	\$1,000
COGS	600
Cash SG&A	200
D&A	50
EBIT	\$150
Taxes at 30%	45
NOPAT	\$105

MiniCo's simplified year-end balance sheet:

Assets	Amount	Liabilities and equity	Amount
Cash	\$40	Accounts payable	\$90
Accounts receivable	120	Accrued expenses	25
Inventory	160	Debt	185
Total current assets	\$320	Total liabilities	\$300
Net PP&E	480	Equity	500
Total assets	\$800	Total liabilities and equity	\$800

The balance sheet balances:

$$Assets = Liabilities + Equity$$

$$800 = 300 + 500$$

For this Boot Camp, we do not need every accounting detail. We need to know where operating profit comes from, where operating working capital sits, and how fixed-asset investment shows up.

8.1.1 What To Notice

EBIT is operating profit before financing. NOPAT turns EBIT into after-tax operating profit:

$$NOPAT = EBIT(1 - T) = 150(1 - 0.30) = 105$$

Operating NWC uses operating current assets and operating current liabilities:

$$NWC = AR + Inventory - AP - Accrued\ expenses$$

For MiniCo:

$$NWC = 120 + 160 - 90 - 25 = 165$$

Cash and debt are real balance sheet items, but they are not part of this simplified operating NWC calculation.

8.1.2 Go a little further

Accounting statements are built for many users: managers, lenders, auditors, investors, and regulators. In finance, we are often using those statements for a narrower question: what does this business generate in operating cash flow after the reinvestment required to keep it going?

8.2 Lab 2: Working Capital Is A Cash Story

Suppose MiniCo's operating working capital accounts moved like this:

Account	Year 0	Year 1	Effect on NWC
Accounts receivable	\$100	\$120	increases NWC
Inventory	150	160	increases NWC
Accounts payable	80	90	decreases NWC
Accrued expenses	20	25	decreases NWC

Year 0 NWC:

$$100 + 150 - 80 - 20 = 150$$

Year 1 NWC:

$$120 + 160 - 90 - 25 = 165$$

Change in NWC:

$$\Delta NWC = 165 - 150 = 15$$

An increase in NWC reduces FCF because more cash is tied up in operations.

8.2.1 Plain-English Version

If customers owe you more money, you have sales that have not yet turned into cash. If inventory rises, cash is sitting on shelves. If accounts payable rises, suppliers are financing more of the operation for now.

That is why AR and inventory increases usually reduce FCF, while AP increases usually help FCF.

8.2.2 Common Mistake

Do not treat every balance sheet increase the same way. Inventory up and AP up do not have the same effect on NWC. Inventory is an operating asset. AP is an operating liability.

8.3 Lab 3: Ratios Tell A Business Story

Consider two simple companies:

Item	Company A	Company B
Sales	\$1,000	\$1,600
Net income	120	80
Total assets	900	800
Equity	600	400

Company A:

$$\text{Margin} = \frac{120}{1,000} = 12.0\%$$

$$\text{Asset turnover} = \frac{1,000}{900} = 1.11$$

$$\text{Equity multiplier} = \frac{900}{600} = 1.50$$

$$\text{ROE} = \frac{120}{600} = 20.0\%$$

Company B:

$$\text{Margin} = \frac{80}{1,600} = 5.0\%$$

$$\text{Asset turnover} = \frac{1,600}{800} = 2.00$$

$$\text{Equity multiplier} = \frac{800}{400} = 2.00$$

$$\text{ROE} = \frac{80}{400} = 20.0\%$$

Both companies have 20% ROE, but the stories are different.

Driver	Company A	Company B
Margin	higher	lower
Asset turnover	lower	higher
Leverage	lower	higher
ROE	same	same

Company A earns more per dollar of sales. Company B turns assets faster and uses more leverage. Same ROE, different business.

8.3.1 Go a little further

This is why ratio analysis is not just arithmetic. The arithmetic opens the door. The analysis starts when you ask why the ratio looks the way it does and whether that driver is likely to continue.

8.4 Lab 4: DuPont As A Conversation Tool

DuPont is useful because it slows down a vague statement like "ROE is good" and turns it into a more precise statement.

For Company A:

$$\text{ROE} = 12.0\% \times 1.11 \times 1.50 = 20.0\%$$

For Company B:

$$\text{ROE} = 5.0\% \times 2.00 \times 2.00 = 20.0\%$$

The conclusion is not “these companies are identical.” They are not. The conclusion is that ROE alone hides the path.

8.4.1 Questions To Ask

If this driver changes	Ask this question
Margin	Did pricing power, cost control, or product mix change?
Asset turnover	Is the company using assets more efficiently?
Equity multiplier	Is ROE improving because the company is taking more financial risk?

8.4.2 Common Mistake

Do not automatically celebrate higher leverage. Leverage can raise ROE when things go well, but it can also make bad years more painful.

8.5 Lab 5: Historical FCF, Step By Step

Use the historical formula when adjacent balance sheets show the change in Net PP&E and operating NWC:

$$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$$

MiniCo:

Input	Amount
EBIT	\$150
Tax rate	30%
NOPAT	\$105
Net PP&E, Year 0	\$420
Net PP&E, Year 1	\$480
NWC, Year 0	\$150
NWC, Year 1	\$165

Change in Net PP&E:

$$480 - 420 = 60$$

Change in NWC:

$$165 - 150 = 15$$

Historical FCF:

$$FCF = 105 - 60 - 15 = 30$$

MiniCo earned \$105 of after-tax operating profit, but \$75 was tied up in fixed assets and working capital. FCF is the \$30 left after that reinvestment.

8.5.1 Why This Is Not A Bad Result

Low FCF is not automatically bad. If MiniCo is investing in productive assets and supporting growth, the low FCF may be part of a good story. But it is still important to see the cash cost of growth.

8.5.2 Go a little further

Historical FCF is backward-looking. It tells you what happened. Valuation is forward-looking. A good analyst uses historical FCF to understand the business model, then builds a forecast for what the business may generate next.

8.6 Lab 6: Pro Forma FCF With Forecast Assumptions

Use the pro forma version when the forecast gives D&A and CapEx separately:

$$FCF = NOPAT + D\&A - CapEx - \Delta NWC$$

Suppose a MiniCo project has this forecast:

Year	EBIT	NOPAT	D&A	CapEx	ΔNWC	FCF
1	\$170	\$119.0	\$55	\$90	\$20	\$64.0
2	190	133.0	60	95	22	76.0
3	215	150.5	65	100	24	91.5

For year 1:

$$FCF_1 = 119 + 55 - 90 - 20 = 64$$

For year 2:

$$FCF_2 = 133 + 60 - 95 - 22 = 76$$

For year 3:

$$FCF_3 = 150.5 + 65 - 100 - 24 = 91.5$$

8.6.1 Why D&A Comes Back

D&A reduced EBIT, which reduced NOPAT. But D&A was not a cash payment in that forecast year. So in the pro forma version, we add it back and subtract the actual cash investment, CapEx.

8.6.2 Common Mistake

Do not add back D&A and forget CapEx. The add-back is not free money. It is part of moving from accounting profit to cash flow, and CapEx is the cash investment side of the story.

8.7 Lab 7: NPV Turns FCF Into A Decision

Suppose the project requires \$150 today and then produces the forecast FCFs from Lab 6.

Time	FCF
0	-\$150.0
1	64.0
2	76.0
3	91.5

At an 11% required return:

$$NPV = -150 + \frac{64}{1.11} + \frac{76}{1.11^2} + \frac{91.5}{1.11^3}$$

$$NPV = 36.24$$

This project is expected to create \$36.24 of value today after earning the 11% required return.

8.7.1 Sensitivity

If the required return rises to 14%:

$$NPV = -150 + \frac{64}{1.14} + \frac{76}{1.14^2} + \frac{91.5}{1.14^3}$$

$$NPV = 26.38$$

The project is still positive, but less valuable. A higher required return makes future FCFs worth less today.

8.7.2 Go a little further

Managers rarely make a decision from one NPV number alone. They ask what happens if sales are lower, margins are thinner, CapEx is higher, or the required return changes. The point is not to make the model complicated. The point is to see which assumptions matter most.

8.8 Lab 8: Profit, FCF, And Value Are Related But Not The Same

Here is a simple way to keep the ideas separate:

Idea	What it tells you
Profit	accounting performance over a period
FCF	cash generated after reinvestment
Present value	what future cash flows are worth today
NPV	value created after including the upfront investment

A project can have positive profit and negative FCF if it requires heavy reinvestment. A project can have positive future FCFs and negative NPV if those FCFs are too small, too late, or too risky relative to the upfront investment.

8.8.1 Decision Language

In finance, “creates value” means more than “makes money someday.” It means the present value of the expected future FCFs is greater than the cash invested today, after adjusting for the required return.

8.9 Mixed Practice Set

Try these before reading the answers.

1. EBIT is \$180 and the tax rate is 25%. What is NOPAT?
2. AR rises from \$90 to \$110, inventory rises from \$110 to \$130, AP rises from \$70 to \$75, and accrued expenses rise from \$15 to \$25. What is ΔNWC ?
3. NOPAT is \$135, Change in Net PP&E is \$30, and ΔNWC is \$25. What is historical FCF?
4. If AP increases, all else equal, does that raise or lower FCF?
5. Net income is \$75, sales are \$600, assets are \$400, and equity is \$250. What are margin, asset turnover, and ROE?
6. Using the same numbers, what is the equity multiplier?
7. Forecast NOPAT is \$140, D&A is \$30, CapEx is \$50, and ΔNWC is \$10. What is pro forma FCF?
8. A project has $FCF_0 = -100$, $FCF_1 = 55$, and $FCF_2 = 65$. At 10%, what is NPV?
9. If NPV is positive, what does that mean in plain English?
10. If CapEx is \$5 higher than expected, what happens to FCF, all else equal?
11. If the required return increases, what usually happens to NPV?
12. In a historical FCF build from adjacent balance sheets, do we usually subtract Change in Net PP&E or separately subtract CapEx?

Answers are in the answer key at the back.

9 Interpretation Practice

The formulas matter, but finance students also need to explain what the formulas mean. This section gives you more practice turning numbers into business language.

Relevant videos. S2-01 through S2-06.

9.1 Case 1: Growth Can Use Cash

Suppose a company increases sales from \$1,000 to \$1,200. That sounds good, and it might be good. But the company also needs more receivables and inventory to support the growth.

Account	Year 0	Year 1
AR	\$100	\$140
Inventory	150	190
AP	80	100
Accrued expenses	20	25

Year 0 NWC:

$$100 + 150 - 80 - 20 = 150$$

Year 1 NWC:

$$140 + 190 - 100 - 25 = 205$$

Change in NWC:

$$\Delta NWC = 205 - 150 = 55$$

Even if operating profit rises, the company has \$55 more tied up in operating working capital.

9.1.1 Interpretation

Growth is not free. Receivables and inventory often grow before cash shows up. That is why fast-growing businesses can be profitable and still need financing.

9.1.2 Go a little further

This is one reason analysts watch working-capital efficiency. If sales grow but receivables grow much faster, the company may be collecting slowly. If inventory grows much faster than sales, the company may be building inventory that could become hard to sell.

9.2 Case 2: Same FCF, Different Quality

Two projects both report \$80 of FCF this year.

Item	Project A	Project B
NOPAT	\$120	\$220
Reinvestment	40	140
FCF	\$80	\$80

Same FCF, different story. Project A produces \$80 of FCF with modest reinvestment. Project B produces the same FCF but requires much more reinvestment.

That does not automatically make Project B bad. It may be growing faster. But it does mean we should ask whether the reinvestment is likely to pay off.

9.2.1 Question To Ask

Is the reinvestment maintenance spending, growth spending, or a little of both?

Maintenance spending keeps the business running. Growth spending aims to create larger future cash flows. The distinction is not always perfectly visible, but it is an important analytical question.

9.3 Case 3: Historical Formula Or Pro Forma Formula?

Choose the formula based on the information provided.

Information provided	Better FCF setup
EBIT, tax rate, beginning and ending Net PP&E, beginning and ending NWC	historical formula
NOPAT, D&A, CapEx, and forecast ΔNWC	pro forma formula
Adjacent balance sheets only	use changes in balance sheet accounts
Forecast assumptions by year	use the pro forma schedule

9.3.1 Historical Setup

If the problem gives:

- NOPAT = \$90,
- Net PP&E rises from \$300 to \$330,
- NWC rises from \$120 to \$128,

then:

$$FCF = 90 - 30 - 8 = 52$$

9.3.2 Pro Forma Setup

If the problem gives:

- NOPAT = \$90,
- D&A = \$20,
- CapEx = \$45,
- $\Delta NWC = 8$,

then:

$$FCF = 90 + 20 - 45 - 8 = 57$$

These are different setups because the information is different. Do not mix the two formulas into one giant formula.

9.3.3 Common Mistake

Do not define CapEx as Change in Net PP&E inside this Boot Camp's historical build. When we have adjacent balance sheets, we use Change in Net PP&E directly. When we forecast, we usually work with D&A and CapEx separately.

9.4 Case 4: NPV Is About Value Creation

Suppose two projects have the same total future FCF, but different timing.

Time	Project Early	Project Late
0	-\$100	-\$100
1	70	20
2	40	40
3	20	70

Both projects produce \$130 of future FCF. At a 10% required return:

$$NPV_{Early} = -100 + \frac{70}{1.10} + \frac{40}{1.10^2} + \frac{20}{1.10^3} = 11.72$$

$$NPV_{Late} = -100 + \frac{20}{1.10} + \frac{40}{1.10^2} + \frac{70}{1.10^3} = 3.83$$

Same total future FCF. Different NPV. Earlier cash flows are more valuable because they arrive sooner.

9.4.1 Go a little further

This timing idea is one reason payback period can feel intuitive but still be incomplete. Getting money back sooner is good, but NPV gives a fuller answer because it discounts every cash flow and includes the required return.

9.5 Case 5: What To Stress-Test

When you build an FCF-to-NPV model, test the assumptions that have the biggest effect.

Assumption	Why it matters
Sales growth	drives operating scale
EBIT margin	drives NOPAT
CapEx	drives fixed-asset reinvestment
ΔNWC	drives operating cash tied up in growth
Required return	controls how heavily future FCF is discounted

9.5.1 Simple Sensitivity Language

Instead of saying “the model says yes,” say something like:

“In the base case, NPV is positive. The project still looks good if sales are a little lower, but it becomes unattractive if CapEx is 20% higher or if the required return rises above 13%.”

That is much better finance language. It treats the model as a structured argument, not a fortune-telling machine.

9.6 Short Interpretation Prompts

Try answering these in words.

1. Why can a growing company have positive profit but low FCF?
2. Why does DuPont help us interpret ROE?
3. Why do we separate operating performance from financing choices?
4. Why is Change in Net PP&E useful in a historical FCF build?
5. Why might a positive-NOPAT project still have negative NPV?

Answers are in the answer key at the back.

10 Formula Review

Idea	Formula
NOPAT	$NOPAT = EBIT(1 - T)$
Operating NWC	$NWC = AR + Inventory - AP - Accrued\ expenses$
Historical FCF	$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$
Pro forma FCF	$FCF = NOPAT + D\&A - CapEx - \Delta NWC$
NPV	$NPV = FCF_0 + \sum FCF_t / (1 + r)^t$

10.0.1 Formula-sheet warning

The formula does not choose the inputs for you. Make sure you know whether you are building historical FCF from balance sheets or forecast FCF from pro forma assumptions.

11 Final Review

Series 2 is not trying to make you an accountant. It is trying to help you use accounting numbers for finance.

Series 2 Checklist

Before valuing a project or company:

- | |
|---|
| - What operating profit are we using? - What tax rate applies? - What reinvestment is required in Net PP&E, CapEx, and working capital? - Are we using the historical formula or the pro forma formula? - Are the forecast FCFs discounted to today? - Did we include the time-zero investment? |
|---|

11.1 Short Written Prompts

1. Why do we use NOPAT instead of starting directly with net income?
2. Why does an increase in NWC reduce FCF?
3. Why is a positive NPV more informative than simply saying future cash flows are positive?

Answers are in the answer key at the back.

12 Answer Key

Use this section after you have made a real attempt. If an answer feels surprising, go back to the section and trace the logic from the statements to FCF or from FCF to value.

12.1 Statements And Operating Focus

1. The income statement measures performance over a period of time.
2. Assets equal liabilities plus equity.
3. $NOPAT = 150(1 - 0.30) = \105 .

12.2 Ratios And DuPont

1. Profit margin is $80/1,000 = 8\%$.
2. Asset turnover is $1,200/600 = 2.0$ times.
3. ROE rises, assuming the other DuPont drivers stay constant.

12.3 Free Cash Flow

1. $NOPAT = 200(1 - 0.25) = \150 .
2. It decreases FCF because more cash is tied up in operations.
3. D&A reduced accounting profit, but it is not a cash outflow in that period.

12.4 Historical FCF From Statements

1. $FCF = 90 - 20 - 5 = \$65$.
2. $\Delta NWC = 10 - 4 = \$6$.
3. Change in Net PP&E is $\$340 - \$300 = \$40$.

12.5 Pro Forma FCF To NPV

1. $NPV = -100 + 60/1.10 + 60/(1.10)^2 = \4.13 .
2. FCF decreases by \$5 each year, all else equal.
3. The project is expected to create value at the required return.

12.6 Mixed Practice Set

1. $NOPAT = 180(1 - 0.25) = \135 .
2. Year 0 NWC is $\$90 + \$110 - \$70 - \$15 = \$115$; year 1 NWC is $\$110 + \$130 - \$75 - \$25 = \$140$; ΔNWC is \$25.
3. $FCF = 135 - 30 - 25 = \$80$.
4. It raises FCF because it reduces operating NWC relative to what it otherwise would be.
5. Margin is $75/600 = 12.5\%$; asset turnover is $600/400 = 1.5$; ROE is $75/250 = 30\%$.
6. Equity multiplier is $400/250 = 1.6$.
7. $FCF = 140 + 30 - 50 - 10 = \110 .
8. $NPV = -100 + 55/1.10 + 65/(1.10)^2 = \3.72 .
9. The project is expected to create value at the required return.

10. FCF falls by \$5.
11. NPV usually falls because future FCFs are discounted more heavily.
12. Subtract Change in Net PP&E. Do not also subtract CapEx in that same historical build.

12.7 Short Interpretation Prompts

1. Growth can require more receivables, inventory, equipment, and other reinvestment.
2. DuPont breaks ROE into margin, turnover, and leverage, which are different business stories.
3. FCF focuses on the business's operating cash flow before capital structure choices.
4. It captures the net fixed-asset reinvestment visible across adjacent balance sheets.
5. The future FCFs may be too small, too late, too risky, or not enough to cover the upfront investment.

12.8 Final Written Prompts

1. NOPAT focuses on after-tax operating profit before financing choices.
2. More cash is tied up in receivables or inventory, net of spontaneous operating liabilities.
3. NPV includes timing, risk through the discount rate, and the upfront investment.

13 Glossary And Index Of Key Ideas

This glossary is meant for review. If a word feels familiar but not quite clear, that is exactly when a glossary helps.

Accounts payable. Money the company owes suppliers. In the simplified operating NWC setup, higher AP reduces NWC and can increase FCF, all else equal.

Accounts receivable. Money customers owe the company. Higher AR usually increases NWC and reduces FCF because sales have not yet turned into cash.

Accrued expenses. Operating expenses the company has incurred but not yet paid. In the simplified NWC setup, higher accrued expenses reduce NWC.

Asset turnover. Sales divided by total assets. It measures how efficiently assets generate sales.

$$\text{Asset turnover} = \frac{\text{Sales}}{\text{Assets}}$$

Balance sheet. A statement of financial position at a point in time. The basic equation is:

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

CapEx. Capital expenditures. Cash spent on long-term assets such as equipment, facilities, and systems. In the pro forma FCF formula, CapEx is subtracted because it uses cash.

Change in Net PP&E. The change in net fixed assets from one balance sheet date to the next. In this Boot Camp's historical FCF build, we subtract Change in Net PP&E directly.

D&A. Depreciation and amortization. D&A reduces accounting profit, but it is not a cash payment in the period. In pro forma FCF, we add it back and subtract CapEx separately.

DuPont identity. A breakdown of ROE into margin, asset turnover, and leverage:

$$\text{ROE} = \frac{\text{NI}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}}$$

EBIT. Earnings before interest and taxes. EBIT is operating profit before financing costs and taxes.

Equity multiplier. Total assets divided by equity. It is a measure of financial leverage:

$$\text{Equity multiplier} = \frac{\text{Assets}}{\text{Equity}}$$

FCF. Free Cash Flow. Cash generated by operations after reinvestment in fixed assets and operating working capital.

Historical FCF. FCF built from reported historical statements. In this Boot Camp:

$$FCF = NOPAT - \text{Change in Net PP\&E} - \Delta NWC$$

Income statement. A statement of performance over a period of time. It shows sales, costs, profit, and other income statement items.

Inventory. Goods or materials held for sale or production. Higher inventory usually increases NWC and reduces FCF.

Net PP&E. Property, plant, and equipment after accumulated depreciation. It is a common measure of net fixed assets on the balance sheet.

NOPAT. Net operating profit after taxes:

$$NOPAT = EBIT(1 - T)$$

NOPAT focuses on after-tax operating profit before financing choices.

NPV. Net present value. The value today of all project FCFs, including the time-zero investment:

$$NPV = FCF_0 + \sum_{t=1}^N \frac{FCF_t}{(1+r)^t}$$

Operating NWC. Operating net working capital. In this Boot Camp:

$$NWC = AR + Inventory - AP - Accrued\ expenses$$

Profit margin. Net income divided by sales. It measures profit per dollar of sales.

Pro forma FCF. Forecast FCF. In this Boot Camp:

$$FCF = NOPAT + D\&A - CapEx - \Delta NWC$$

Required return. The return required for the risk of the project or investment. It is used as the discount rate in NPV.

Return on assets. Net income divided by total assets.

Return on equity. Net income divided by equity. ROE measures profit per dollar of equity, but it should be interpreted through margin, turnover, and leverage.

Sensitivity analysis. Testing how the answer changes when an assumption changes. In FCF-to-NPV work, common sensitivity checks include sales growth, margin, CapEx, ΔNWC , and the required return.