

Financial Accounting I

BUSI 721: Data-Driven Finance I

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Statements

- Income statement
 - Revenues
 - Costs
 - Net income = revenues - costs
- Balance sheet
 - Assets
 - Liabilities
 - Equity = assets - liabilities
- Statement of Cash Flows



Example: Property, Plant & Equipment (PP&E)

- Investment in PP&E is not an immediate cost in calculating income
- It goes on the balance sheet as an asset.
- It is gradually depreciated over time.
- The depreciation is a cost in calculating income.
- The balance sheet amount is written down by the amount of the depreciation.



Depreciation

- Depreciation is straight-line for financial reporting (same amount each year = investment/num of years).
- Depreciation is accelerated for tax purposes: double declining balance with a switch to straight line when that is optimal and a half-year in the first and last years.
- Congress passed accelerated depreciation to encourage investment. Accelerating depreciation improves near-term cash flows (more later).
- Tax schedule is called [MACRS \(Modified Accelerated Cost Recovery System\)](#).



Example

- Invest \$100 in five-year equipment
- Straight-line is 20% per year.
- Double-declining balance is 40% of the remaining balance each year.
- But first year of service is only a half year, so 20%.
- Switching to straight-line means computing $\text{balance} / (\text{num years left})$ and switching to that when higher.



- 20— >80 balance
- 32— >48 balance (SL would be $80/4.5 = 17.78$)
- 19.20— >28.80 balance (SL would be $48/3.5 = 13.71$)
- 11.52— >17.28 balance (SL would be $28.80/2.5 = 11.52$)
- 11.52— >5.76 balance (DDB would be $0.4 \times 17.38 = 6.95$)
- 5.76— >0.00 balance



Balance Sheet in Example

Year	0	1	2	3	4	5
Gross PP&E	100	100	100	100	100	100
Accum Depr	20	52	71.20	82.72	94.24	100
Net PP&E	80	48	28.80	17.28	5.76	0



Income Statement in Example

- Assume revenue \$50 per year beginning in year 1 and there are no costs other than depreciation.
- Assume the tax rate is 30%.

Year	0	1	2	3	4	5
Revenue	0	50	50	50	50	50
Less Depreciation	-20	-32	-19.20	-11.52	-11.52	-5.76
Pre-Tax Income	- 20	18	30.80	38.48	38.48	44.24
Less Taxes	6	- 5.40	- 9.24	- 11.54	- 11.54	- 13.27
Net Income	- 14	12.60	21.56	26.94	26.94	30.97



Income is not Cash

- Depreciation is not an actual cash expense.
- Cash inflow in this example, excluding the initial \$100 outlay for equipment, is revenue - taxes.
- We can also calculate cash inflow as net income + depreciation (depreciation add back).
 - $\text{Net income} = 0.7 \times (\text{revenue} - \text{depreciation})$
 - $\text{Net income} + \text{depreciation} = 0.7 \times \text{revenue} + 0.3 \times \text{depreciation}$
 - $0.3 \times \text{depreciation} = \text{depreciation tax shield}$



Statement of Cash Flows

- The statement of cash flows starts with net income and makes adjustments to get to cash flow (cash flow = cash inflow).
- Like adding back depreciation
- The cash inflow goes on the company's balance sheet as an increase in the cash account (or a decrease if the cash flow is negative).



Statement of Cash Flows in Example

Year	0	1	2	3	4	5
Net Income	- 14	12.60	21.56	26.94	26.94	30.97
Less Cap Ex	- 100	0	0	0	0	0
Plus Depr Add-Back	20	32	19.20	11.52	11.52	5.76
Cash Flow	- 94	44.60	40.76	38.46	38.46	36.73



Accelerated Depreciation and Cash Flows

- The effect of depreciation is to increase cash flow by the depreciation tax shield = $0.3 \times \text{depreciation}$.
- If we increase depreciation in early years (and therefore reduce it in later years) then we move some of the depreciation tax shields from late years to early years.
- Accelerating depreciation accelerates cash flows.
- How would cash flows change if the cap ex could be fully depreciated in year 0?
 - And how would the balance sheet change?
 - This would be called expensing as opposed to capitalizing.



Why are there Assets and Liabilities?

- Revenues \neq cash inflows
- Costs \neq cash outflows
- Difference between revenue/cost and cash inflow/outflow is always manifested in a change in a balance sheet item.
- To calculate cash inflow/outflow from revenue/cost, the adjustment we make is to always add/subtract the change in a balance sheet item.
- Cash flow = net income - Δ (assets-liabilities)



Balance Sheet Changes in the Example

Year	0	1	2	3	4	5
Net PP&E	80	48	28.80	17.28	5.76	0
Δ Net PP&E	80	-32	-19.20	- 11.52	- 11.52	- 5.76

- Cash Flow = Net Income - Cap Ex + Depreciation
- Cash Flow = Net Income - Δ Net PP&E



Another Example

- Invest \$500,000 in five-year MACRS equipment
- Revenues =
 - 0 in year 0
 - \$100,000 in year 1
 - \$200,000 in year 2
 - \$200,000 in year 3
 - \$100,000 in year 4
 - \$50,000 in year 5
- No costs other than depreciation. Calculate cash flows.



Working Capital

- Short-term assets minus short-term liabilities
- Main categories:
 - $\text{Assets} = \text{inventory} + \text{accounts receivable}$
 - $\text{Liabilities} = \text{accounts payable}$



Matching Principle

- Record costs and revenues at time of sale
- If cash outflows/inflows occur at other times,
 - cash outflow before recording \mapsto asset (inventory)
 - cash outflow after recording \mapsto liability (accounts payable)
 - cash inflow before recording \mapsto liability (pre-paid sales)
 - cash inflow after recording \mapsto asset (accounts receivable)



Example

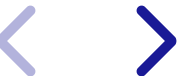
Year	0	1	2	3	4	5
Inventory	5	10	10	10	10	0
Receivables	0	8	8	8	8	0
Payables	3	6	6	6	6	0
Net Working Capital	2	12	12	12	12	0
Δ NWC	2	10	0	0	0	- 12



Invested Capital (using previous example for net pp&e)

Year	0	1	2	3	4	5
Net PP&E	80	48	28.80	17.28	5.76	0
Net Working Capital	2	12	12	12	12	0
Invested Capital	82	60	40.80	29.28	17.76	0
ΔIC	82	- 22	- 19.20	- 11.52	- 11.52	- 17.76

$$\text{Cash Flow} = \text{Net Income} - \Delta IC$$



COGS and SG&A

- Direct costs of production (materials + labor) are costs of goods sold or costs of revenue
 - COGS or COR
- Other costs are selling, general, and administrative
 - SG&A



Previous Example

- Invest \$500,000 in five-year MACRS equipment
- Revenues =
 - 0 in year 0
 - \$100,000 in year 1
 - \$200,000 in year 2
 - \$200,000 in year 3
 - \$100,000 in year 4
 - \$50,000 in year 5



- Assume COGS = 40% of revenue
- Assume SG&A = \$50,000 each year
- Assume inventory = 10% of subsequent year sales (0 at end)
- Assume receivables = 8% of prior year sales (0 at end)
- Assume payables = 50% of inventory (0 at end)
- Calculate Net Income, Invested Capital, and Cash Flows.

