Lecture 6

Cash Flow Projection

Chapter 9/268

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Topics Covered

- Identifying Cash Flows
  - Discounted Cash Flows, Not Profits
  - Incremental Cash Flows
  - Treatment of Inflation
  - Separate Investment & Financing Decisions
- Calculating Cash Flows
- Example: *Blooper Industries*

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9.1.Cash Flow vs. Accounting Income

- To calculate NPV, we discount cash flows, not profit
- Using accounting income, rather than cash flow, could lead to erroneous decisions.
- *Example*

  A project costs $2,000 and is expected to last 2 years, producing cash income of $1,500 and $500 respectively. The cost of the project can be depreciated at $1,000 per year. Given a 10% required return, compare the NPV using cash flow to the NPV using accounting income.

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Cash Flow vs. Accounting Income (Contd)

	Year 1	Year 2
Cash Income	$1500	$ 500
Depreciation	-$1000	-$1000
Accounting Income	+ 500	- 500

$$\text{Apparent NPV} = \frac{500}{1.10} + \frac{-500}{(1.10)^2} = \$41.32$$

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Cash Flow vs. Accounting Income (Contd)

	Today	Year 1	Year 2
Cash Income		$1500	$ 500
Project Cost	-2000	_____	_____
Free Cash Flow	-2000	+1500	+ 500

$$\text{Cash NPV} = -2000 + \frac{1500}{1.10} + \frac{500}{(1.10)^2} = -\$223.14$$

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Incremental Cash Flows (Contd)

Incremental Cash Flow	=	Cash flow with project	-	Cash flow without project

Ask yourself this question:

Would the cash flow still exist if the project does not exist?

➲If yes, do not include it in your analysis.
➲If no, include it.

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Incremental Cash Flows

- Discount incremental cash flows.
- Include All Indirect Effects of Project, such as its impact on sales of firm's other products.
- Recognize the Investment in Working Capital.
- Beware of Allocated Overhead Costs for rent, heat, light, etc. These may not reflect incremental effects of project on these costs.

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- Opportunity Costs: Benefit or cash flow forgone as a result of an action.
- Include Opportunity Costs, such as value of the land that you could otherwise sell.

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Sunk Costs

- Sunk costs are past and irreversible outflows.
- Sunk costs remain the same whether or not you accept the project -> do not affect NPV of project.

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Net working capital (Working Capital)

- Net working capital=Current assets–Current liabilities
= (Cash + Accounts receivable + Inventories) – (Accounts payable + Accruals)
- Investments in working capital, just like investments in plant and equipment, result in cash outflows.
- We focus on **change in working capital** (WC_{t+1} – WC_t) during life of project.
- Working capital may be recovered at the end of the project (cash inflows).

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Inflation

INFLATION RULE

- Be consistent in how you handle inflation!!
- Use nominal interest rates to discount nominal cash flows.
- Use real interest rates to discount real cash flows.
- You will get the same results, whether you use nominal or real figures.

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Inflation (Contd)

Example

You own a lease that will cost you $8,000 this year, increasing at 3% a year (the forecasted inflation rate) for 3 additional years. If discount rates are 10%, what is the present value cost of the lease?

$$1 + \text{real interest rate} = \frac{1+\text{nominal interest rate}}{1+\text{inflation rate}}$$

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Inflation (Contd)

Example – nominal figures

Year	Cash Flow	PV @10%
0	8000	8,000.00
1	$8000 \times 1.03 = 8{,}240$	$\frac{8240}{1.10} = 7{,}490.91$
2	$8000 \times 1.03^2 = 8{,}487.20$	$\frac{8487.20}{1.10^2} = 7{,}014.22$
3	$8000 \times 1.03^3 = 8{,}741.82$	$\frac{8741.82}{1.10^3} = 6{,}567.86$
		$29,072.98

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Inflation (Contd)

Example – real figures

Year	Cash Flow	PV@6.7961%
0	8,000	8,000
1	8,000	$\frac{8,000}{1.068} = 7{,}490.91$
2	8,000	$\frac{8,000}{1.068^2} = 7{,}014.22$
3	8,000	$\frac{8,000}{1.068^3} = 6{,}567.86$
		$= \$29{,}072.98$

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Separation of Investment & Financing Decisions

- When valuing a project, ignore how the project is financed. We should view project as if it were all equity-financed.
- Ignore proceeds from debt issue, and interest and principal payments on the debt.
- Separate analysis of investment decision from that of financing decision.

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9.2.Calculating Cash flows

- Total CF = CF from investment in fixed assets
  + CF from investment in working capital
  + CF from operations

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Calculating Cash flows (Contd)

- **CF from investment in fixed assets** =
  − Cash to acquire fixed assets + Cash when disinvest/sell these assets
- Cash when disinvest/sell these assets (Salvage value) = Proceeds of selling assets − (Proceeds − Book value at time of selling) x Tax rate

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Ex 1

- The taxi firm forecasts revenues of 160,000 a year. Variable costs will be $50,000, and rental costs for the shop are $32,000 a year. Depreciation on the repair tools will be $10,000. Prepare an income statement. The tax rate is 20%.

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Calculating Cash flows (Contd)

- **CF from investment in working capital**

= – Change in working capital

= – (Working capital $_{t+1}$ – Working capital $_{t}$)

= cash + accounts receivable + inventory – Accounts payable

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Ex 1

- Praha Company showed the following components of working capital last year

	Begining	End of year
Accounts receivable	$ 25,000	$ 23,000
Inventory	13,000	12,500
Accounts payable	14,000	16,500

a./ What is net working capital during the year?
b./ If sales were $35,000 and costs were $24,000, what was cash flow for the year? Ignore Taxes

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Calculating Cash flows (Contd)

CF from operations:

- Direct Method:

CF from operations = Cash Revenues – Cash Expenses – Taxes paid

- Indirect Method:

CF from operations = Profit after tax + Depreciation

CF from operations = (Revenues – Cash expenses) x (1 – Tax rate) + (Depreciation x Tax rate)

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Ex 1

- A new project will generate sales of $50 million, costs of $30 million, and depreciation expense of $10 million in the coming year. The firm's tax rate is 35%. Calculate cash flow for the year by using all three methods..

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Depreciation

- Straight-line.

  Reducing balance.

  Accelerated depreciation (MACRS).
- Depreciation is not a cash flow.
- Depreciation reduces taxes -> depreciation tax shield.
- MACRS increases present value of tax shield

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Ex 1

- Project Evaluetion: 21 / 290

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Ex2

year	0	1	2	3
Revenues		1000	1000	1000
Expenses		500	500	500
Cap.invest	-900			
Pretax profit				
Tax 20%				
Net profit				
CF				

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EX 3

Year	0	1	2	3
Revenues		1000	1000	1000
Expenses		500	500	500
Depreciation		300	300	300
Pretax profit				
Tax 20%				
Net profit				
Cash flow				

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9.3.Example: Blooper Industries

- In year 6, mining equipment may be sold for $2million, this equipment has book value of 0. Tax rate is 35%.

	Year 0	1	2	3	4	5	6
Cap Invest	10,000						
WC	1,500	4,075	4,279	4,493	4,717	3,039	0
Change in WC	1,500	2,575	204	214	225	−1,678	−3,039
Revenues		15,000	15,750	16,538	17,364	18,233	
Expenses		10,000	10,500	11,025	11,576	12,155	
Depreciation		2,000	2,000	2,000	2,000	2,000	
Pretax Profit		3,000	3,250	3,513	3,788	4,078	
Tax (35%)		1,050	1,137	1,230	1,326	1,427	
Profit		1,950	2,113	2,283	2,462	2,651	

Unit: (,000s)

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Example: Blooper Industries (Contd)

Cash Flow From Operations Year 1 (,000s) :

Revenues	15,000	
– Expenses	10,000	
– Depreciation	2,000	
= Profit before tax	3,000	
– Tax @ 35 %	1,050	
= Net profit	1,950	
+ Depreciation	2,000	
= CF from operations	3,950	or $3,950,000

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Example: Blooper Industries (Contd)

Net Cash Flow (entire project) (,000s)

	Year 0	1	2	3	4	5	6
Cap Invest	-10,000						
Salvage value							1,300
Invest in WC	-1,500	-2,575	-204	-214	-225	1,678	3,039
CF from Op		3,950	4,113	4,283	4,462	4,651	
Net Cash Flow	-11,500	1,375	3,909	4,069	4,237	6,329	4,339

NPV @ 12% = $4,222,350

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Thanks for your attention

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