FIN2704/X
Week 9

Recall NPV from Week 8

To find the value of a project, you need to calculate the PV of the project for the corporation

1. Projected cash flows generated by the project
2. Required rate of return for the project

1. Projected cash flows

- Relevant cash flows: operating cash flows generated by the project
- But not cash flows from financing decision
  - Interest expense
  - Dividend

Recall NPV from Week 8

2. Required rate of return:

- Reflects financing effect

$$r = WACC = r_D * (1 - T_C) * \frac{D}{V} + r_E \frac{E}{V}$$

Revenues	$4,335,491
Cost of Goods Sold	1,762,721
Operating Expenses	1,390,262
Depreciation	362,325
EBIT	$820,183
Interest Expense	52,841
Taxable Income	$767,342
Taxes	295,426
Net Income	$471,916

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OCF

Bottom-Up Approach

OCF = NI + depreciation

= Sales – Costs – Depreciation – Interest – Taxes + Depreciation

Top-Down Approach

OCF = Sales – Costs – Taxes

When there is interest expense, both are affected by financing decisions

- You should not use these approaches to calculate OCF
- Use this approach instead:

OCF = EBIT*(1-Tax Rate) + Depreciation

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OCF – No Interest Expense

Bottom-Up Approach

OCF = NI + depreciation

= Sales – Costs – Depreciation – Taxes + Depreciation

Top-Down Approach

OCF = Sales – Costs – Taxes

Both approaches are usable when there is no interest expense

Taxes = Tax Rate * (Sales – Costs – Depreciation)

= EBIT

OCF = EBIT*(1-Tax Rate) + Depreciation

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Depreciation expense

- In this module, our focus is not about the specific depreciation method
- What is important in this module is the fact that depreciation is a NON-CASH expense

Net salvage value

- Net salvage value is the after-tax salvage value

  Net salvage value =

  ACTUAL salvage value - tax rate*(**ACTUAL** salvage value - book value)

- **ACTUAL** salvage value is how much you can sell the used machine

- **ESTIMATED** salvage value is used to calculate the annual depreciation if we include the salvage value in the depreciation calculation

- After-tax salvage value
  - Firms must pay taxes on the gain (relative to the book value) when they sell the fixed assets at the end of the project.
  - If firms incur a loss when they sell the fixed assets (relative to book value), then they receive tax savings on the loss incurred.

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NOWC

Is NOWC always recoverable at the end of the project?

Unequal lives projects

- EAC = Equal Annual **Cost**
  - Negative of EAA
- EAA or EAC?

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Inflation

real return ≈ nominal return - expected inflation

nominal return ≈ real return + expected inflation

Week 9 slide 72

- Inflation is incorporated into the discount rate (nominal return)

  …then…

- Inflation should also be incorporated into the cash flows projection

Additional notes

Replacement projects

- You should do the calculation using the appropriate horizon for the new machine
  - In example on slide 41:
    - The lifetime of the new machine is 5 years
    - The remaining lifetime of the old machine is 6 years
- Use the horizon of the new machine for both the old and new machines, so that you can compare them
  - In example on slide 41:
    - The lifetime of the new machine is 5 years
    - The remaining lifetime of the old machine is assumed to be 5 years
      - Old machine is sold after 5 years for $10,000

FIN2704/X
Week 8

Week 8 materials

- How to plot the NPV profile?
  - Calculate the NPV for the cash flows in Slide 58 using each discount rate: 1%, 2%, … , 15%, …, 20%, …
- Discounted payback period vs. NPV:
  - Positive NPV means Discounted Payback Period exists
  - However, the Discounted Payback Period may be longer than the “arbitrary” cutoff the management decide to impose on the project
    - In this case, the project may get rejected
    - NPV rule will consider this a mistake

Week 9
List of topics

Note:

You are responsible for all materials covered in the pre-recorded videos posted on LumiNUS, unless they are marked "not examinable". This list only serves to help you in your revisions.

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Week 9 topics

Relevant cash flows

- Start-up
- On-going
- Shutdown

- Depreciation expense – not cash flows
- Taxes – all cash flows must be on an after-tax basis
- Changes in NOWC
- Incremental cash flows

Week 9 topics (cont.)

- Cash flow effects
  - Sunk costs
  - Opportunity costs
  - Externalities
  - Financing costs

- Weighted Average Cost of Capital:

$$WACC = r_D * (1 - T_C) * \frac{D}{V} + r_E \frac{E}{V}$$

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Week 9 topics (cont.)

Pro Forma statements

- Projected accounting statements

Depreciation expenses

- Depreciation tax shield
- Full depreciation vs. with salvage value
- Accumulated depreciation
- Book value
- After-tax salvage value

Capital spending

- Net capital spending
- Incremental cash flows

Week 9 topics (cont.)

<u>Unequal lives project</u>

- Equivalent Annual Annuities (EAA)
  1. Calculate the NPV of the project
  2. Calculate the EAA
  3. Compare the periodic payments
- Equal Annual cost (EAC)

- Stand-alone principle