CORPORATE FINANCE – LECTURE 1

CASH FLOWS, NPV AND COST OF CAPITAL OF A PROJECT

DETERMINE WHEN TO START AN INVESTMENT

INVESTMENT TIMING

- If the timing decision does not affect other future decisions that you might wish to make, you should choose the timing with the highest NPV
- You maximise the NPV of your investment if you commence the project as soon as the rate of increase in value drops below the cost of capital

CHOOSE BETWEEN PROJECTS WITH DIFFERENT LIVES USING EQUIVALENT ANNUAL CASH FLOWS (EAC)

- For mutually exclusive projects, we should compare the assets on their equivalent annual cash flow (EAC) if the choice made today will affect future decisions

LONG VS SHORT LIVED EQUIPMENT

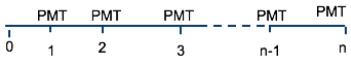
- This is simply finding the PMT of an ordinary annuity where you use the NPV as the PV

$$Pmt = \frac{NPV}{[(1 - [1 + i]^{-n})/i]}$$

PROJECT REPLACEMENT DECISION

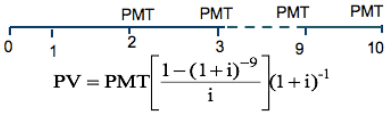
CRITICAL ASSUMPTIONS OF ANNUITY/PERPETUITY

$$PV = PMT\frac{1-(1+i)^n}{i} \text{ or } PV = \frac{PMT}{i}$$

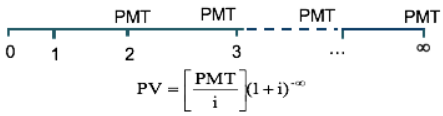


1. The first annuity payment is at the <u>end</u> of the first period
2. There are **n** payments in the annuity series or infinite number of payments in the perpetuity
3. PV is calculated at year 0

- If the first annuity payment is at the end of year 2 and there are 9 payments in the series, the PV calculated as at year 0:



- If the first payment is at the end of year 2 and there are infinite number of payments in the series, the PV calculated as at year 0:



DEFINE PROJECT COST OF CAPITAL

WHY DO WE NEED A COST OF CAPITAL?

- The cost of capital is used to discount the expected cash flows of a project to their present values:

$$PV = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}$$

- The cost of capital, *r*, is also referred to as the discount rate, hurdle rate, required rate of return or opportunity cost of capital

PROJECT COST OF CAPITAL

- In principle, each project should be evaluated at its own opportunity cost of capital which depends on project risk, not on the company undertaking the project
- The opportunity cost of capital is the expected return that is forgone by investing in a project rather than in financial securities with the same risk
- If the project is high-risk, a firm should use a higher cost of capital than if the project is low-risk
- The CAPM/ SML is used to estimate the project cost of capital if a firm can figure out the project beta (asset beta) that reflects the project risk:

$$r_{project} = r_f + \beta_{project} (r_m - r_f)$$

- Project betas are not available in most cases, so most companies start with the company cost of capital as a benchmark discount rate for new investments

SHOW WHEN TO USE COMPANY COST OF CAPITAL

COMPANY COST OF CAPITAL

- Is the opportunity cost of capital for investment in the firm as a whole
- Is defined as the expected return on a portfolio of the firm's existing debt and equity securities
- Is usually calculated as a weighted average cost of capital:

$$\text{Company cost of capital} = r_{assets} = \frac{D}{D+E} r_{debt} + \frac{E}{D+E} r_{equity}$$

- It is a useful starting point for setting discount rates for safer or riskier projects
- It is easier to add to, or subtract from, the company cost of capital than to estimate each project's cost of capital from scratch
- Many firms, however, use the company cost of capital to discount the forecasted cash flows on all new projects and this results in good low-risk projects with truly positive NPVs being rejected and poor high-risk projects accepted

DEBT AND THE COMPANY COST OF CAPITAL

- If no debt is outstanding, the company cost of capital is just the cost of equity r_{equity}
- With debt and company taxes existing, the company cost of capital is typically called the weighted-average cost of capital or WACC:

$$WACC = r_{debt} (1\text{-}T) \frac{D}{D+E} r_{debt} + \frac{E}{D+E} r_{equity}$$

- $r_{debt}(1 - T)$ reflects interest being a tax-deductible expense