Valuing Ordinary Annuities

- Present value of an ordinary annuity:

$$PV = \frac{CF}{i}\left[1 - \frac{1}{(1+i)^n}\right]$$

Where:
CF = annuity cash flow
i = interest rate per compound period
n = number of annuity cash flows

Ordinary Annuities: Present Value

Find the present value of an ordinary annuity of $3,000 p.a. for 5 years if the interest rate is 8% p.a. by:
(a) Discounting each individual cash flow.

$$\begin{aligned} PV &= \frac{CF_1}{1+i} + \frac{CF_2}{(1+i)^2} + \frac{CF_3}{(1+i)^3} + \frac{CF_4}{(1+i)^4} + \frac{CF_5}{(1+i)^5} \\ &= \frac{3{,}000}{1.08} + \frac{3{,}000}{(1.08)^2} + \frac{3{,}000}{(1.08)^3} + \frac{3{,}000}{(1.08)^4} + \frac{3{,}000}{(1.08)^5} \\ &= \$11{,}978.13 \end{aligned}$$

(b) Using the annuity formula

$$\begin{aligned} PV &= \frac{CF}{i}\left[1 - \frac{1}{(1+i)^n}\right] = \frac{3{,}000}{0.08}\left[1 - \frac{1}{(1.08)^5}\right] \\ &= 3{,}000 \times 3.992710 = \$11{,}978.13 \end{aligned}$$

Ordinary Annuities: Future Value

- Future value of an ordinary annuity:

$$FV = \frac{CF}{i}\left[(1+i)^n - 1\right]$$

Where:
CF = annuity cash flow
i = interest rate per compound period
n = number of annuity cash flows

Ordinary Annuities: Future Value

Mandy intends to save $100 each month starting with her next monthly salary. The current interest rate on her savings account is 3% p.a., payable monthly. How much will Mandy have saved after 3 years?

- Monthly interest rate is 0.03/12 = 0.0025=0.25%.
- After 3 years, Mandy will have saved:

$$\begin{aligned} FV &= \frac{100}{0.0025}\left[(1.0025)^{36} - 1\right] \\ &= 100 \times 37.62056 = \$3{,}762.06 \end{aligned}$$

Constant Dividend Growth Valuation

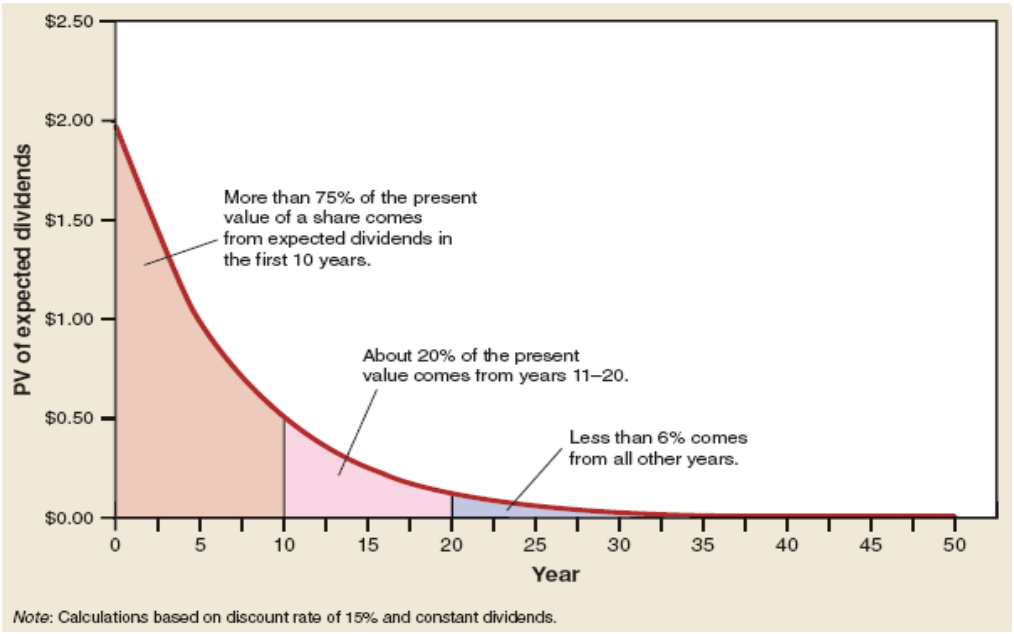
- More realistic to assume that dividend will grow.

Constant Growth Valuation Model:

- If dividends are expected to grow at a constant rate

$$P_0 = \frac{D_0(1+g)}{(R-g)}$$ where $g =$ expected growth rate in dividend per share

Impact on Share Prices



Coco Ltd has just paid an annual dividend of $0.30 per share, which is expected to grow at 5% indefinitely. If the required rate of return is 8%, how much would you be willing to pay for the share?

$$P_0 = \frac{D_0(1+g)}{(R-g)} = \frac{0.30(1+0.05)}{(0.08-0.05)} = \$10.50$$

Variable Dividend Growth Model

- Allow for different growth rates.
- It is possible for dividends to grow at a high rate for a number of years but not indefinitely.
- Assume dividend will grow at a constant rate some time in the future.

$$P_0 = \frac{D_1}{1+R} + \frac{D_2}{(1+R)^2} + \cdots + \frac{D_T}{(1+R)^T} + \frac{P_T}{(1+R)^T}$$

Topic 4: Project Evaluation

Capital Budgeting Questions

- Managers of firms are often confronted with major capital budgeting decisions.

Examples of capital budgeting decisions are:

- To proceed or not to proceed with a proposed project?
- Among the proposed projects, which project to invest in?

The importance of capital budgeting

- Capital budgeting decisions are the most important investment decisions made by management.
- The goal of these decisions is to select capital projects that will maximise shareholders' wealth.
- Capital investments are important because they involve substantial cash outlays and, once made, are not easily reversed.
- Help management to systematically analyse potential business opportunities in order to decide which are worth undertaking.

Capital Budgeting Process

Capital Budgeting (Investment):

Cash outlay(s) now in the expectation of benefits (net cash inflows) later.

Sources of information

- Most of the information needed is generated internally,
    a. Beginning with the sales force
    b. Then the production team is involved
    c. Followed by the accountants
- All this information is then reviewed by the financial managers who evaluate the feasibility of the project

Classification of Investment Projects

Capital budgeting projects can be broadly classified into **three types**:

- Independent projects
- Mutually exclusive projects
- Contingent projects

Independent Projects

- Projects are independent when their cash flows are unrelated
- If two projects are independent, accepting or rejecting one project has no bearing on the decision on the other

Mutually Exclusive Projects

When two projects are mutually exclusive, accepting one automatically precludes the other