Session 04 & 05

Capital Structure

Programme : Postgraduate Diploma in Business, Finance & Strategy (PGDBFS 2017)

Course : Corporate Valuation (PGDBFS 203)

Lecturer : Mr. Asanka Ranasinghe

MBA (Colombo), BBA (Finance), ACMA, CGMA

Contact : asanka.ranasinghe11@yahoo.com

Lecture Outline

- Discuss the effect of gearing, and differentiate business and financial risk
- Describe the underlying assumptions, rationale and conclusions of Modigliani and Miller's models, in worlds with and without tax
- Explain the relevance of some important, but often non-quantifiable, influences on the optimal gearing level question
- Calculate adjusted present value (APV) and adjusted cost of capital
- Calculate beta for ungeared firm and geared firm
- Calculate cost of equity for a ungeared firm and geared firm

Reference : Valuation : Measuring and Managing the Value of Companies, Tim Koller, Marc Goedhart and David Wessels : 06th Edition, Chapter 13

Assumptions in the use of WACC

- The capital structure is reasonably constant
- The new investment does not carry a significantly different risk profile from that of the existing entity
- The new investment is marginal to the entity

Marginal Cost of Capital

The difference between the total cost with the existing capital structure and the total cost with the new capital structure once the investment has been undertaken

If a large project is under consideration, and it would fundamentally affect the capital structure of an entity

Consider a company with the following cost of capital:

	After-tax cost, %	*Market value, £m*
Source	*A*	*B*
Equity	20	5
Preference	10	1
Loan stock	8	4
		10

Calculate WACC :

Marginal Cost of Capital

It has a large investment project under consideration, to be financed by a major issue of funds which will alter the capital structure. The estimated project cost is £1,000,000, to be financed in equal proportions by a new share issue and a new issue of loan stock.

The new capital structure :

	After-tax cost, %	*Market value, £m*
Source	*A*	*B*
Equity	22	5.5
Preference	10	1.0
Loan stock	8	4.0
New loan stock	10	0.5
		11.0

Calculate WACC and Marginal Cost of Capital :

Firm Value and Cost of Capital

$$V = \frac{C_1}{\text{WACC}}$$

where:

V = value of the firm;
C_1 = cash flows to be received one year hence;
WACC = the weighted average cost of capital.

Future cash flows are constant and perpetual

If the cash flows are assumed to be at a set level then the value of the firm depends on the rate used to discount those cash flows

$$V = V_E + V_D$$

Modigliani and Miller's Theories of Gearing

Proposition 1

The total market value of any company is independent of its capital structure

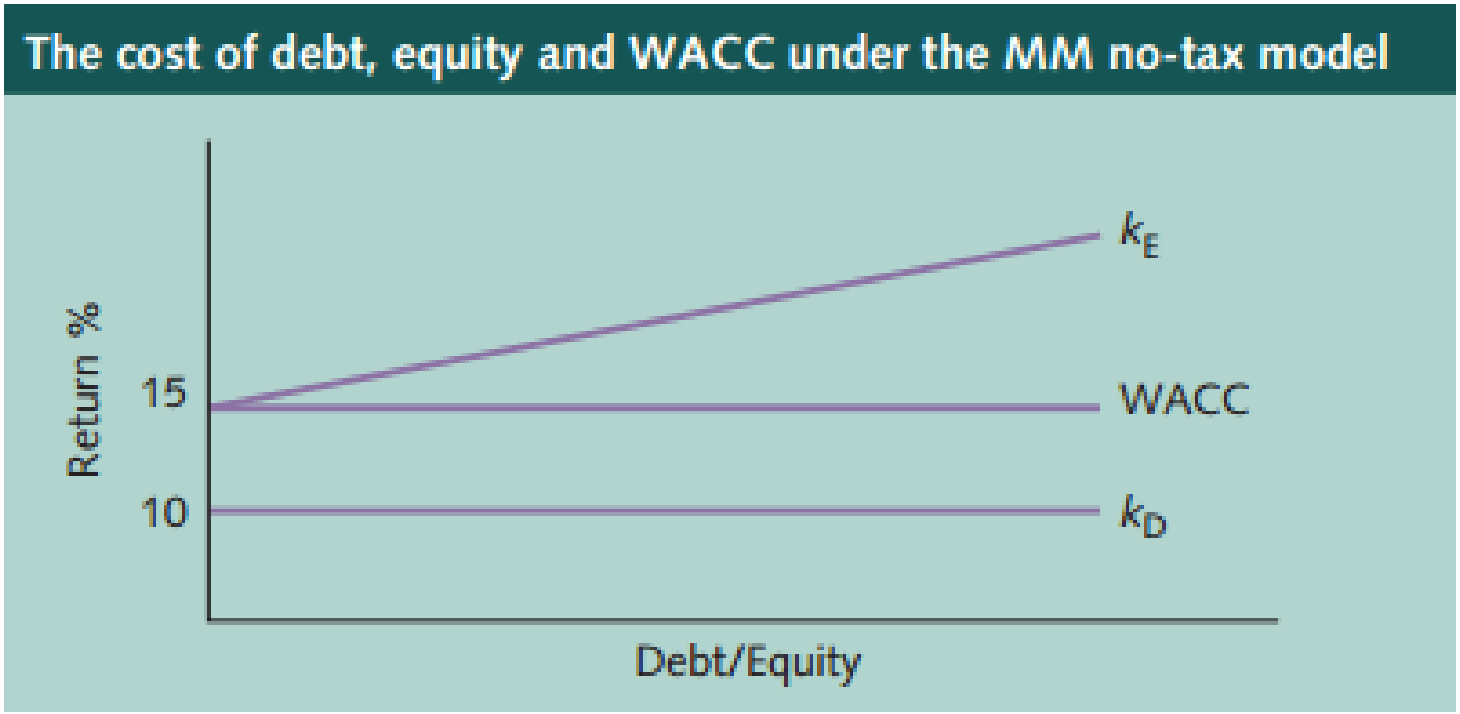
The assumptions

- There is no taxation
- There are perfect capital markets, with perfect information available to all economic agents and no transaction costs
- There are no costs of financial distress and liquidation (if a firm is liquidated, shareholders will receive the same as the market value of their shares prior to liquidation)
- Firms can be classified into distinct risk classes
- Individuals can borrow as cheaply as corporations

Modigliani and Miller's Theories of Gearing

Proposition 1

The total market value of any company is independent of its capital structure



The WACC is constant because the cost of equity capital rises to exactly offset the effect of cheaper debt and therefore shareholder wealth is neither enhanced nor destroyed by changing the gearing level

Modigliani and Miller's Theories of Gearing

Proposition 1

The total market value of any company is independent of its capital structure

$$V_g = V_{ug}$$
$$k_{eg} = k_{eu} + (D/E)(k_{eu} - k_d)$$
$$WACC_g = WACC_{ug}$$

where

V_g = value of geared company.
V_{ug} = value of ungeared company.
k_{eg} = cost of equity in geared company
k_{eu} = cost of equity in ungeared company
k_d = cost of debt (gross of tax).

X plc is identical in all operating and risk characteristics to Y plc, except that X plc is all equity financed and Y plc is financed by equity valued at £2.1m and debt valued at £0.9m based on market values. The interest paid on Y plc's debt is £72,000 per annum, and it pays a dividend to shareholders of £378,000 per annum. X plc pays an annual dividend of £450,000.

Requirements

(i) Identify the value of X plc.

(ii) Calculate the cost of capital for X plc.

(iii) Calculate the cost of equity for Y plc.

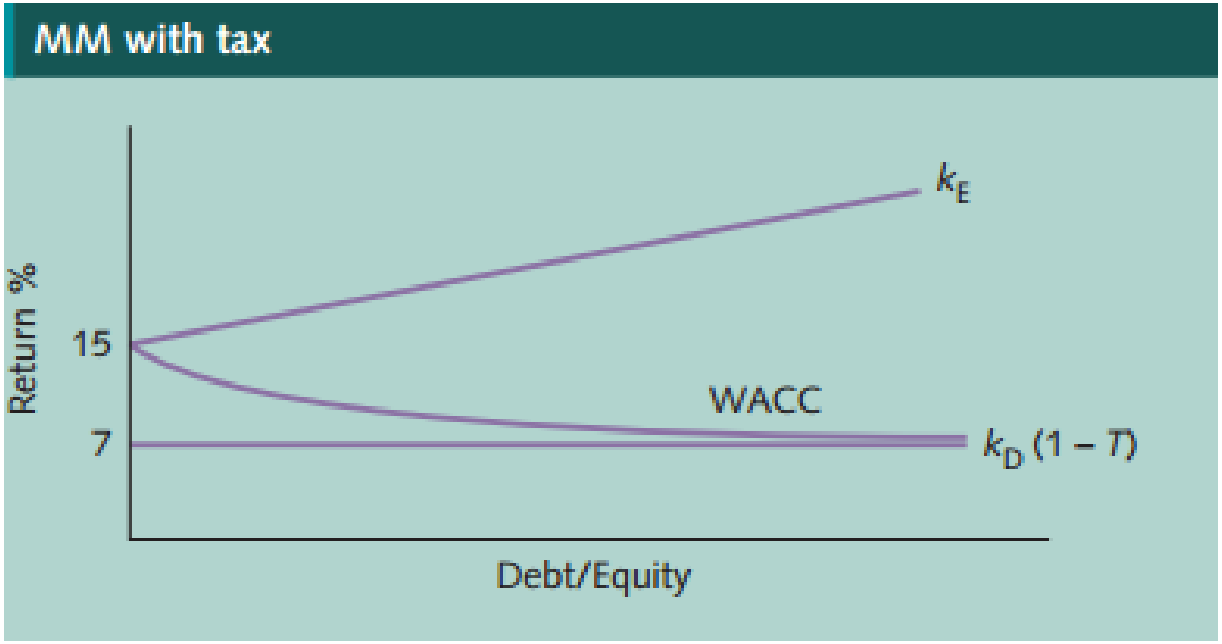
(iv) Calculate the cost of debt for Y plc.

(v) Calculate the weighted average cost of capital for Y plc

Modigliani and Miller's Theories of Gearing

Proposition 2

The expected rate of return on equity increases proportionately with the gearing ratio



The cost of equity rises but the extent of the rise is insufficient to exactly offset the cheaper debt. Thus the overall cost of capital falls throughout the range of gearing

Modigliani and Miller's Theories of Gearing

Proposition 2

The expected rate of return on equity increases proportionately with the gearing ratio

$$V_g = V_{ug} + TB$$

$$k_{eg} = k_{eu} + \left((1 - t)\frac{D}{E}(k_{eu} - k_d)\right)$$

$$WACC_g = WACC_{ug}\left(1 - \frac{TB}{D + E}\right)$$

or

$$WACC_g = \left(k_{eg} \times \frac{E}{D + E}\right) + \left(k_d(1 - t)\frac{D}{D + E}\right)$$

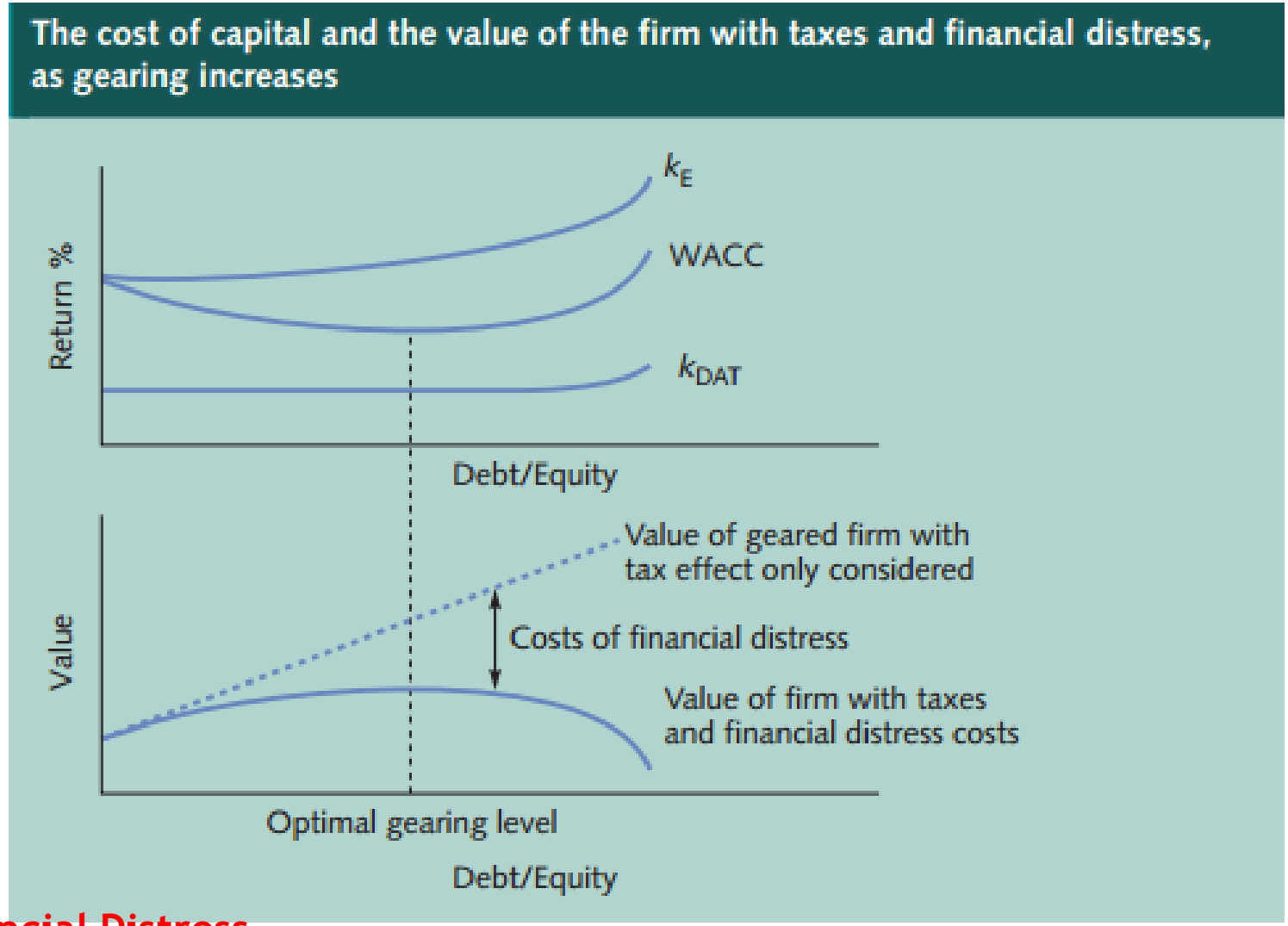
Modigliani and Miller's Theories of Gearing

Proposition 3

The cut-off rate of return for new projects is equal to the weighted average cost of capital – which is constant regardless of gearing

If the first two propositions hold, the cut-off rate used to evaluate investments will not be affected by the type of funding used to finance them, whatever may be the capital structure. The gain from using debt (at lower cost) is offset by the increased cost of equity (due to increased risk) and WACC therefore remains constant. In order to maximise equity holders' wealth, the company should therefore use its WACC as a cut off rate.

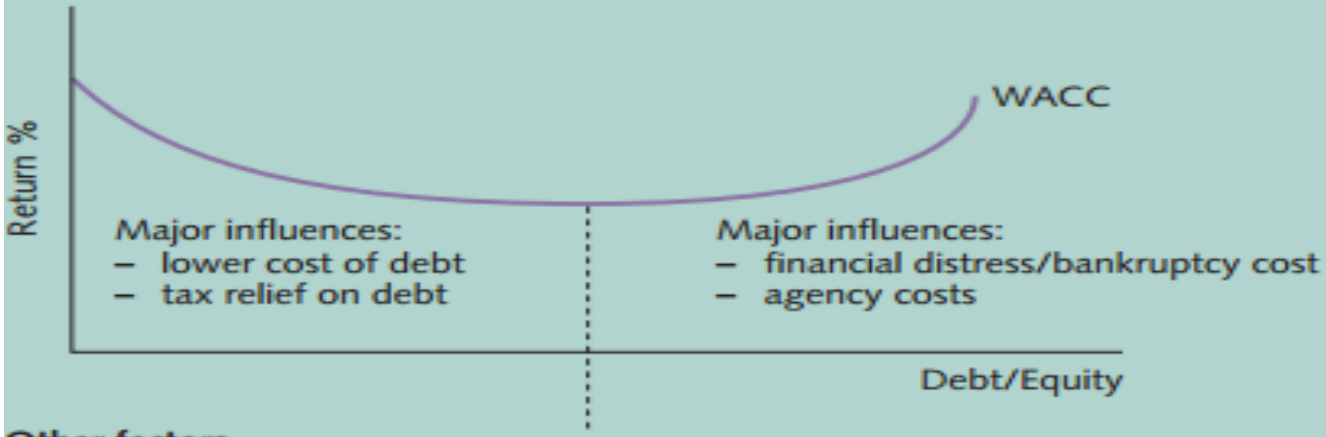
Modern View of Capital Structure



Financial Distress

The risk of incurring the costs of financial distress has a negative effect on a firm's value which offsets the value of tax relief of increasing debt levels.

The WACC is U-shaped and value can be altered by changing the gearing level



Other factors

The debt to equity ratio can also be affected by other factors. In the list below, the direction of the effect is indicated by an arrow.

1	Borrowing capacity	←
2	Managerial preference	↔
3	Pecking order	↔
4	Market timing	↔
5	Financial slack	←
6	Signalling	↔
7	Control	←
8	Tax exhaustion	←
9	Industry group gearing	↔
10	Motivation	→
11	Reinvestment risk	→
12	Operating and strategic efficiency	→

← tends to argue for lowering debt level

→ tends to argue for raising debt level

↔ uncertain

Adjusted Present Value

Net present value (NPV) of a project can be increased or decreased by the side-effects of financing

$$APV = NPV + \text{side-effect of financing}$$

A project has a net present value of £50m (the 'base case' NPV). However, as the project is considered socially desirable it qualifies for an immediate tax-free government grant of £10m. This is a special financing arrangement and hence needs to be taken into account:

Adjusted Cost of Capital

$$r^* = r(1 - T^*L)$$

r = the opportunity cost of capital
T^* = the rate of corporation tax
L = the project's marginal contribution to the firm's debt capacity as a proportion of the firm's present value

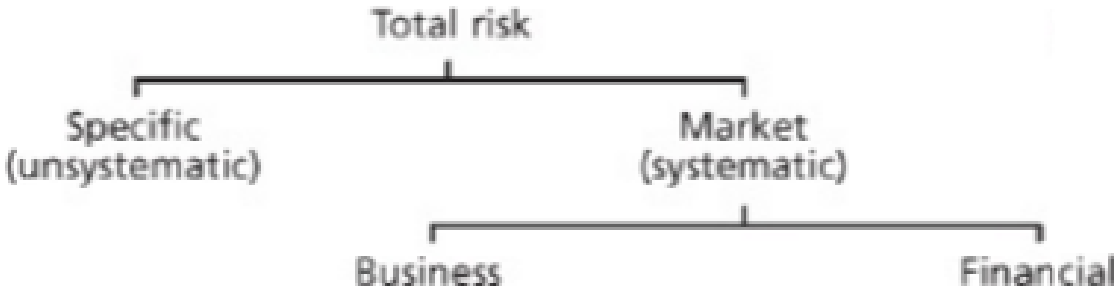
$$k_g = k_{eu}(1 - T^*L)$$

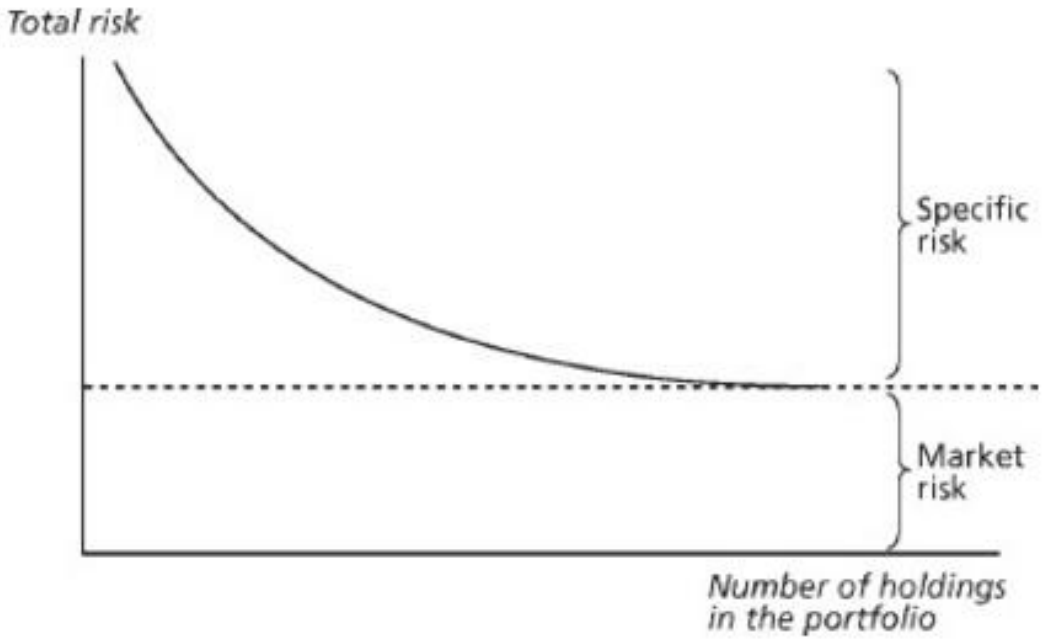
k_g = the average cost of capital in a geared company
k_{eu} = the cost of equity in an ungeared company.

Adjusted Cost of Capital

A project requires £1m capital investment. The project will save £220,000 per year after taxes in perpetuity, and will expand the firm's borrowing power by £400,000. The business risk of the venture requires a 20 per cent discount rate. The rate of corporation tax is 35 per cent. Calculate the adjusted cost of capital using Modigliani and Miller's formula.

MM, CAPM and Beta





MM, CAPM and Beta

Market risk

Market risk is associated with the economic environment in which all companies operate, so changes in interest rates, exchange rates, prices, taxation etc. Because investors can avoids specific risk through diversification, the CAPM would argue that the only risk worthy of consideration is market risk. This market risk is measured as a *beta value*

Business risk

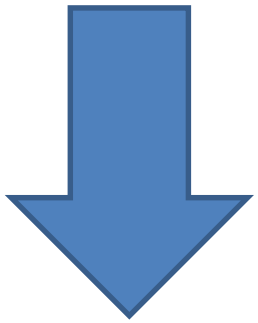
Business risk is the risk associated with the particular activities undertaken by the enterprise.

Financial risk

Financial risk is the risk resulting from the existence of debt in the financing structure of the enterprise

MM, CAPM and Beta

$$k_{eg} = k_{eu} + \left((1 - t)(k_{eu} - k_d)\frac{D}{E} \right)$$



$$\beta_G = \beta_U + (\beta_U - \beta_D)(1 - t)\frac{D}{E}$$

Ashton plc is identical in all operating and risk characteristics to Gate plc, except that Ashton plc is all-equity financed and Gate plc is financed by equity and debt in the proportion 75:25 at market valuation. The beta factor of Ashton plc is 0.9. Gate plc's debt capital is virtually risk-free, and corporation tax is levied at the rate of 33 per cent.

Requirement

Calculate the equity beta of Gate plc and the cost of equity for the company


ANY
QUESTIONS
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