

# OPTIMUM CAPITAL

RELEVANT TO ACCA QUALIFICATION PAPER F9

## Is it possible to increase shareholder wealth by changing the capital structure?

The first question to address is what is meant by capital structure. The capital structure of a company refers to the mixture of equity and debt finance used by the company to finance its assets. Some companies could be all-equity-financed and have no debt at all, whilst others could have low levels of equity and high levels of debt. The decision on what mixture of equity and debt capital to have is called the financing decision.

The financing decision has a direct effect on the weighted average cost of capital (WACC). The WACC is the simple weighted average of the cost of equity and the cost of debt. The weightings are in proportion to the market values of equity and debt; therefore, as the proportions of equity and debt vary, so will the WACC. Therefore the first major point to understand is that, as a company changes its capital structure (ie varies the mixture of equity and debt finance), it will automatically result in a change in its WACC.

However, before we get into the detail of capital structure theory, you may be thinking how the financing decision (ie altering the capital structure) has anything to do with the overall corporate objective of maximising shareholder wealth. Given the premise that wealth is the present value of future cash flows discounted at the investors' required return, the market value of a company is equal to the present value of its future cash flows discounted by its WACC.

**Market value of a company =**  $\frac{\text{Future cash flows}}{\text{WACC}}$   
(perpetuity formula)

THE FIRST QUESTION TO ADDRESS IS WHAT IS MEANT BY CAPITAL STRUCTURE. THE CAPITAL STRUCTURE OF A COMPANY REFERS TO THE MIXTURE OF EQUITY AND DEBT FINANCE USED BY THE COMPANY TO FINANCE ITS ASSETS.

It is essential to note that the lower the WACC, the higher the market value of the company – as you can see from the following simple example; when the WACC is 15%, the market value of the company is 667; and when the WACC falls to 10%, the market value of the company increases to 1,000.

Market value of a company  $\frac{100}{0.15} = 667$      $\frac{100}{0.10} = 1,000$

Hence, if we can change the capital structure to lower the WACC, we can then increase the market value of the company and thus increase shareholder wealth.

Therefore, the search for the optimal capital structure becomes the search for the lowest WACC, because when the WACC is minimised, the value of the company/shareholder wealth is maximised. Therefore, it is the duty of all finance managers to find the optimal capital structure that will result in the lowest WACC.

What mixture of equity and debt will result in the lowest WACC?

As the WACC is a simple average between the cost of equity and the cost of debt, one's instinctive response is to ask which of the two components is the cheaper, and then to have more of the cheap one and less of expensive one, to reduce the average of the two.

Well, the answer is that cost of debt is cheaper than cost of equity. As debt is less risky than equity, the required return needed to compensate the debt investors is less than the required return needed to compensate the equity investors. Debt is less risky than equity, as the payment of interest is often a fixed amount and compulsory in nature, and it is paid in priority to the payment of dividends, which are in fact discretionary in nature. Another reason

# STRUCTURE

why debt is less risky than equity is in the event of a liquidation, debt holders would receive their capital repayment before shareholders as they are higher in the creditor hierarchy (the order in which creditors get repaid), as shareholders are paid out last.

Debt is also cheaper than equity from a company's perspective is because of the different corporate tax treatment of interest and dividends. In the profit and loss account, interest is subtracted before the tax is calculated; thus, companies get tax relief on interest. However, dividends are subtracted after the tax is calculated; therefore, companies do not get any tax relief on dividends. Thus, if interest payments are £10m and the tax rate is 30%, the cost to the company is £7m. The fact that interest is tax-deductible is a tremendous advantage.

Let us return to the question of what mixture of equity and debt will result in the lowest WACC. The instinctive and obvious response is to gear up by replacing some of the more expensive equity with the cheaper debt to reduce the average, the WACC. However, issuing more debt (ie increasing gearing), means that more interest is paid out of profits before shareholders can get paid their dividends. The increased interest payment increases the volatility of dividend payments to shareholders, because if the company has a poor year, the increased interest payments must still be paid, which may have an effect the company's ability to pay dividends. This increase in the volatility of dividend payment to shareholders is also called an increase in the financial risk to shareholders. If the financial risk to shareholders increases, they will require a greater return to compensate them for this increased risk, thus the cost of equity will increase and this will lead to an increase in the WACC.

COST OF DEBT IS CHEAPER THAN COST OF EQUITY. AS DEBT IS LESS RISKY THAN EQUITY, THE REQUIRED RETURN NEEDED TO COMPENSATE THE DEBT INVESTORS IS LESS THAN THE REQUIRED RETURN NEEDED TO COMPENSATE THE EQUITY INVESTORS.

In summary, when trying to find the lowest WACC, you:

- Issue more debt to replace expensive equity; this reduces the WACC
- But more debt also increases the WACC as:
  - ⬆️ Gearing ⬆️ Financial risk ⬆️ Beta equity ⬆️ Keg
  - ⬆️ WACC

Remember that Keg is a function of beta equity which includes both business and financial risk, so as financial risk increases, beta equity increases, Keg increases and WACC increases.

The key question is which has the greater effect, the reduction in the WACC caused by having a greater amount of cheaper debt or the increase in the WACC caused by the increase in the financial risk. To answer this we have to turn to the various theories that have developed over time in relation to this topic.

The Theories of Capital Structure:

## Which has the greatest effect on the WACC?



The **reduction in WACC** caused by the cheaper debt

The **increase in WACC** caused by the increase in financial risk and keg

1. M + M (No Tax): Cheaper Debt = Increase in Financial Risk / Keg
2. M + M (With Tax): Cheaper Debt > Increase in Financial Risk / Keg

3. Traditional Theory: The WACC is U shaped, ie there is an optimum gearing ratio
4. The Pecking Order: No theorised process; simply the line of least resistance first internally generated funds, then debt and finally new issue of equity.

#### Modigliani and Miller's no-tax model

In 1958, Modigliani and Miller stated that, assuming a perfect capital market and ignoring taxation, the WACC remains constant at all levels of gearing. As a company gears up, the decrease in the WACC caused by having a greater amount of cheaper debt is exactly offset by the increase in the WACC caused by the increase in the cost of equity due to financial risk. The WACC remains constant at all levels of gearing thus the market value of the company is also constant. Therefore a company can not reduce its WACC by altering its gearing (**Figure 1** on **page 84**).

The cost of equity is directly linked to the level of gearing. As gearing increases, the financial risk to shareholders increases, therefore  $K_{eg}$  increases.

Summary: Benefits of cheaper debt = Increase in  $K_{eg}$  due to increasing financial risk.

The WACC, the total value of the company and shareholder wealth are constant and unaffected by gearing levels. No optimal capital structure exists.

#### Modigliani and Miller's with-tax model

In 1963, when Modigliani and Miller admitted corporate tax into their analysis, their conclusion altered dramatically. As debt became even cheaper (due to the tax relief on interest payments), cost of debt falls significantly from  $K_d$  to  $K_d(1-t)$ . Thus, the decrease in the WACC (due to the even cheaper debt) is now greater than the increase in the WACC (due to the increase in the financial risk/ $K_{eg}$ ). Thus, WACC falls as gearing increases. Therefore, if a company wishes to reduce its WACC, it should borrow as much as possible (**Figure 2** on **page 84**).

Summary: Benefits of cheaper debt > Increase in  $K_{eg}$  due to increasing financial risk.

Companies should therefore borrow as much as possible. Optimal capital structure is 99.99% debt finance.

#### Market imperfections

There is clearly a problem with Modigliani and Miller's with-tax model, because companies' capital structures are not almost entirely made up of debt. Companies are discouraged from following this recommended approach because of the existence of factors like bankruptcy costs, agency costs and tax exhaustion. All factors which Modigliani and Miller failed to take in account.

#### Bankruptcy costs

Modigliani and Miller assumed perfect capital markets; therefore, a company would always be able to raise funding and avoid bankruptcy. In the real world, a major disadvantage of a company taking on high levels of debt is that there is a significant possibility of the company defaulting on its increased interest payments and hence being declared bankrupt. If shareholders and debt-holders become concerned about the possibility of bankruptcy risk, they will need to be compensated for this additional risk. Therefore, the cost of equity and the cost of debt will increase, WACC will increase and the share price reduces. It is interesting to note that shareholders suffer a higher degree of bankruptcy risk as they come last in the creditors' hierarchy on liquidation.

If this with-tax model is modified to take into account the existence of bankruptcy risks at high levels of gearing, then an optimal capital structure emerges which is considerably below the 99.99% level of debt previously recommended.

MODIGLIANI AND MILLER ASSUMED PERFECT CAPITAL MARKETS; A COMPANY WOULD ALWAYS BE ABLE TO RAISE FUNDING AND AVOID BANKRUPTCY. IN THE REAL WORLD, A DISADVANTAGE TAKING ON HIGH LEVELS OF DEBT IS THAT THERE IS A POSSIBILITY OF THE COMPANY DEFAULTING ON ITS INTEREST PAYMENTS AND BECOMING BANKRUPT.

#### Agency costs

Agency costs arise out of what is known as the 'principal-agent' problem. In most large companies, the finance providers (principals) are not able to actively manage the company. They employ 'agents' (managers) and it is possible for these agents to act in ways which are not always in the best interest of the equity or debt-holders.

Since we are currently concerned with the issue of debt, we will assume there is no potential conflict of interest between shareholders and the management and that the management's primary objective is the maximisation of shareholder wealth. Therefore, the management may make decisions that benefit the shareholders at the expense of the debt-holders.

Management may raise money from debt-holders stating that the funds are to be invested in a low-risk project, but once they receive the funds they decide to invest in a high risk/high return project. This action could potentially benefit shareholders as they may benefit from the higher returns, but the debt-holders would not get a share of the higher returns since their returns are not dependent on company performance. Thus, the debt-holders do not receive a return which compensates them for the level of risk.

To safeguard their investments, debt-holders often impose restrictive covenants in the loan agreements that constrain management's freedom of action. These restrictive covenants may limit how much further debt can be raised, set a target gearing ratio, set a target current ratio, restrict the payment of excessive dividends, restrict the disposal of major assets or restrict the type of activity the company may engage in.

As gearing increases, debt-holders would want to impose more constraints on the management to safeguard their increased investment. Extensive covenants reduce the company's operating freedom, investment flexibility (positive NPV projects may have to be forgone) and may lead to a reduction in share price. Management do not like restrictions placed on their freedom of action. Thus, they generally limit the level of gearing to limit the level of restrictions imposed on them.

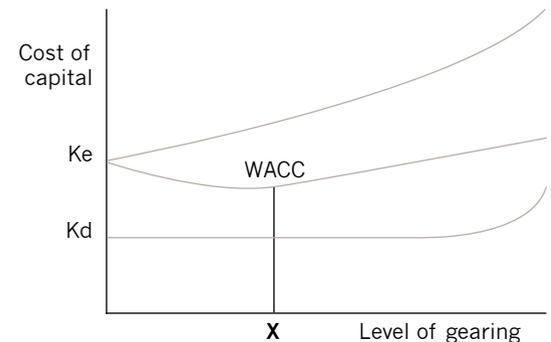
#### Tax exhaustion

The fact that interest is tax-deductible means that as a company gears up, it generally reduces its tax bill. The tax relief on interest is called the tax shield – because as a company gears up, paying more interest, it shields more of its profits from corporate tax. The tax advantage enjoyed by debt over equity means that a company can reduce its WACC and increases its value by substituting debt for equity, providing that interest payments remain tax deductible.

However, as a company gears up, interest payments rise, and reach a point that they are equal to the profits from which they are to be deducted; therefore, any additional interest payments beyond this point will not receive any tax relief.

This is the point where companies become tax-exhausted, ie interest payments are no longer tax deductible, as additional interest payments exceed profits and the cost of debt rises significantly from  $K_d(1-t)$  to  $K_d$ . Once this point is reached, debt loses its tax advantage and a company may restrict its level of gearing.

#### The traditional view



SHAREHOLDER WEALTH IS AFFECTED BY CHANGING THE LEVEL OF GEARING. THERE IS AN OPTIMAL GEARING LEVEL AT WHICH WACC IS MINIMISED AND THE TOTAL VALUE OF THE COMPANY IS MAXIMISED. FINANCIAL MANAGERS HAVE A DUTY TO ACHIEVE AND MAINTAIN THIS LEVEL OF GEARING.

The WACC will initially fall, because the benefits of having a greater amount of cheaper debt outweigh the increase in cost of equity due to increasing financial risk. The WACC will continue to fall until it reaches its minimum value, ie the optimal capital structure represented by the point X.

Benefits of cheaper debt > Increase in Keg due to increasing financial risk

If the company continues to gear up, the WACC will then rise as the increase in financial risk/Keg outweighs the benefit of the cheaper debt. At very high levels of gearing, bankruptcy risk causes the cost of equity curve to rise at a steeper rate and also causes the cost of debt to start to rise.

Increase in Keg due to financial and bankruptcy risk > Benefits of cheaper debt

Shareholder wealth is affected by changing the level of gearing. There is an optimal gearing level at which WACC is minimised and the total value of the company is maximised. Financial managers have a duty to achieve and maintain this level of gearing. While we accept that the WACC is probably U-shaped for companies generally, we cannot precisely calculate the best gearing level (ie there is no analytical mechanism for finding the optimal capital structure). The optimum level will differ from one company to another and can only be found by trial and error.

Pecking order theory

The pecking order theory is in sharp contrast with the theories that attempt to find an optimal capital structure by studying the trade-off between the advantages and disadvantages of debt finance. In this approach, there is no search for an optimal capital structure. Companies simply follow an established pecking order which enables them to raise finance in the simplest and most efficient manner, the order is as follows:

1. Use all **retained earnings** available;
2. Then **issue debt**;
3. Then **issue equity**, as a last resort.

The justifications that underpin the pecking order are threefold:

- Companies will want to minimise issue costs.
- Companies will want to minimise the time and expense involved in persuading outside investors of the merits of the project.
- The existence of asymmetrical information and the presumed information transfer that result from management actions.

We shall now review each of these justifications in more detail.

*Minimise issue costs*

1. Retained earnings have no issue costs as the company already has the funds
2. Issuing debt will only incur moderate issue costs
3. Issuing equity will incur high levels of issue costs

*Minimise the time and expense involved in persuading outside investors*

1. As the company already has the retained earnings, it does not have to spend any time persuading outside investors
2. The time and expense associated with issuing debt is usually significantly less than that associated with a share issue

*The existence of asymmetrical information*

This is a fancy term that tells us that managers know more about their companies' prospects than the outside investors/the markets. Managers know all the detailed inside information, whilst the markets only have access to past and publicly available information. This imbalance in information (asymmetric information) means that the actions of managers are closely scrutinised by the markets. Their actions are often interpreted as the insiders' view on the future prospects of the company. A good example of this is when managers unexpectedly increase dividends, as the investors interpret this as a sign of an increase in management confidence in the future prospects of the company thus the share price typically increases in value.

Suppose that the managers are considering how to finance a major new project which has been disclosed to the market. However managers have had to withhold the inside scoop on the new technology associated with the project, due to the competitive nature of their industry. Thus the market is currently undervaluing the project and the shares of the company. The management would not want to issue shares, when they are undervalued, as this would result in transferring wealth from existing shareholders to new shareholders. They will want to finance the project through retained earnings so that, when the market finally sees the true value of the project, existing shareholders will benefit. If additional funds are required over and above the retained earnings, then debt would be the next alternative.

When managers have favourable inside information, they do not want to issue shares because they are undervalued. Thus it would be logical for outside investors to assume that managers with unfavourable inside information would want to issue share as they are overvalued. Therefore an issue of equity by a company is interpreted as a sign the management believe that the shares are overvalued. As a result, investors may start to sell the company's shares, causing the share price to fall. Therefore the issue of equity is a last resort, hence the pecking order; retained earnings, then debt, with the issue of equity a definite last resort.

One implication of pecking order theory that we would expect is that highly profitable companies would borrow the least, because they have higher levels of retained earnings to fund investment projects. Baskin (1989) found a negative correlation between high profit levels and high gearing levels. This finding contradicts the idea of the existence of an optimal capital structure and gives support to the insights offered by pecking order theory.

AS THE PRIMARY FINANCIAL OBJECTIVE IS TO MAXIMISE SHAREHOLDER WEALTH, THEN COMPANIES SHOULD SEEK TO MINIMISE THEIR WEIGHTED AVERAGE COST OF CAPITAL (WACC). THIS CAN BE ACHIEVED BY HAVING DEBT IN THE CAPITAL STRUCTURE, AVOIDING THE EXTREMES OF TOO LITTLE GEARING, OR TOO MUCH GEARING.

Another implication is that companies should hold cash for speculative reasons, they should built up cash reserves, so that if at some point in the future the company has insufficient retained earnings to finance all positive NPV projects, they use these cash reserves and therefore not need to raise external finance.

#### CONCLUSION

As the primary financial objective is to maximise shareholder wealth, then companies should seek to minimise their weighted average cost of capital (WACC). In practical terms, this can be achieved by having some debt in the capital structure, since debt is relatively cheaper than equity, while avoiding the extremes of too little gearing (WACC can be decreased further) or too much gearing (the company suffers from bankruptcy costs, agency costs and tax exhaustion). Companies should pursue sensible levels of gearing.

Companies should be aware of the pecking order theory which takes a totally different approach, and ignores the search for an optimal capital structure. It suggests that when a company wants to raise finance it does so in the following pecking order: first is retained earnings, then debt and finally equity as a last resort.

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FIGURE 1: MODIGLIANI AND MILLER – NO-TAX MODEL

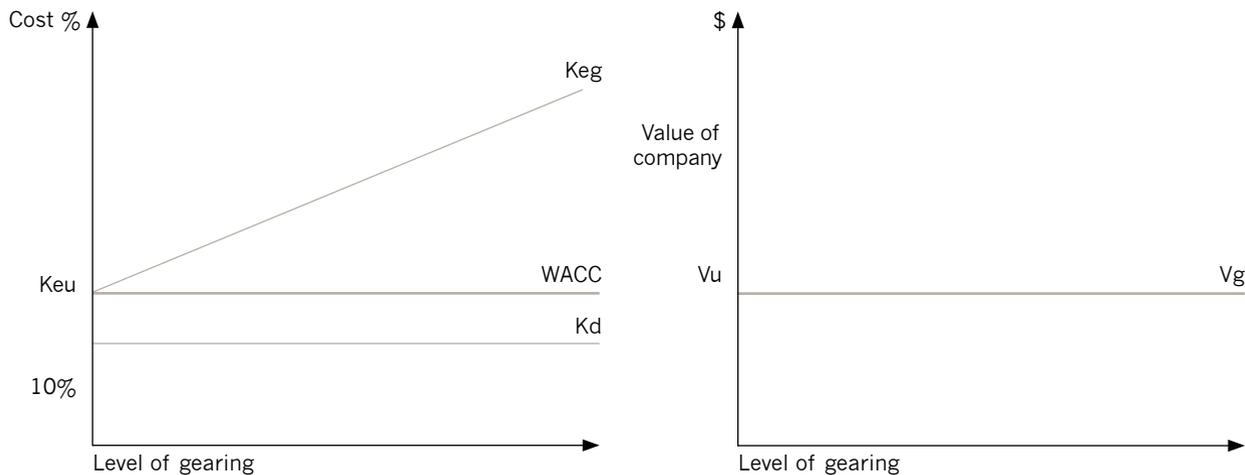
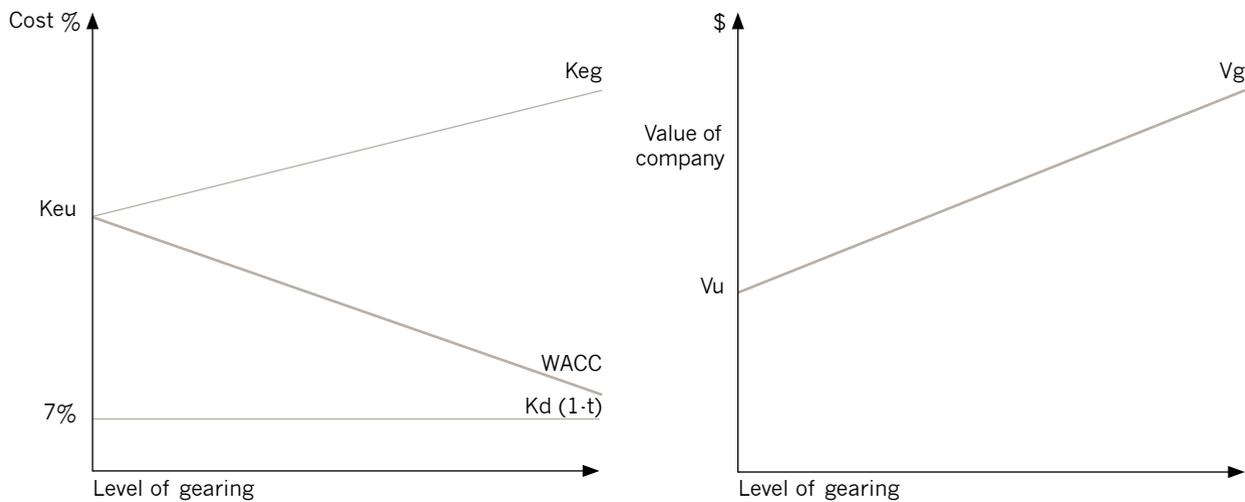


FIGURE 2: MODIGLIANI AND MILLER – WITH-TAX MODEL



KEY:  
 Keu = Cost of equity ungeared      Vu = Value ungeared  
 Keg = Cost of equity geared        Vg = Value geared