Chapter 34
THE TRADEOFF MODEL

There's no gain without pain

In the previous chapter we saw that the value of a firm is the same whether or not it has taken on debt. True, investors will pay less for the shares of a levered company, but they will have to pay back the debt (or buy it back, which amounts to the same) before obtaining access to the enterprise value. In the end, they will have paid, directly or indirectly, the same amount (value of equity plus repayment of net debt[1]), that is, the enterprise value.

Now, what about the financial manager who must issue securities to finance the creation of enterprise value? It does not matter whether he issues only shares or a combination of bonds and shares, since again the proceeds will be the same – the enterprise value.

Enterprise value depends on future flows and how the related, nondiversifiable risks are perceived by the market.

But if that is the case, why diversify sources of financing? The preceding theory is certainly elegant, but it cannot fully explain how things actually work in real life.

In this chapter we look at **two basic explanations of real-life happenings**. First of all, within the same market logic, biases occur which may explain why companies borrow funds, and why they stop at a certain level. The fundamental factors from which these biases spring are *taxes, financial distress* and *agency costs*. **Their joint analysis will give birth to the "tradeoff model".**

But there are costs of debt that can modify the optimal capital structure:

- **information asymmetries;**
- **disciplining role of debt;**
- **financial flexibility.**

Traditional tradeoff models generally limit their attention on the pros and cons of tax shield and financial distress costs. We believe that the elements of the balance are more numerous than just these factors. Two other factors may also be added:

- the business sector;
- the life cycle of the company.

To this end, Chapter 35 will discuss a more complete view of capital structure choice that tries to include all the factors mentioned above.

Maybe the main reasons for the interference between capital structure and investment are the divergent interests of the various financial partners regarding value creation and their differing levels of access to information. This lies at the core of the manager/shareholder relationship we shall examine in this chapter. A full chapter is devoted to an analysis of the capital structure resulting from a compromise between creditors and shareholders.

Rather than being simply a search for value, the choice of financing is far more an endeavour to reduce conflicts of interest between shareholders and managers or shareholders and lenders, as well as the information asymmetry between management and investors.

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Section 34.1

THE BENEFITS OF DEBT

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1/ CORPORATE INCOME TAXES

Up to now, our reasoning was based on a tax-free world, which of course does not exist. The investor's net return can be 2–5 times (or more) lower than the pre-tax cash flows of an industrial investment.

It would therefore be foolhardy to ignore taxation, which forces financial managers to devote a considerable amount of their time to tax optimisation.

For financial managers, this chapter will cover familiar ground and our insistence on the importance of tax aspects in every financial decision will seem obvious.

But we ought not go to the other extreme and concentrate solely on tax variables. All too many decisions based entirely on tax considerations lead to ridiculous outcomes, such as insufficient earnings capacity. Tax deficits alone are no reason to buy a company!

In 1963, F. Modigliani and M. Miller (MM) pushed further their initial demonstration, but this time they factored in corporate income tax (*but no other taxes*) in an economy in which companies' financial expenses are tax deductible, but not dividends. This is pretty much the case in most countries.

The conclusion was unmistakable: once you factor in corporate income tax, there is more incentive to use debt rather than equity financing.

Interest expenses can be deducted from the company's tax base, so that creditors receive their coupon payments before they have been taxed. Dividends, on the other hand, are not deductible and are paid to shareholders after taxation.

Thus, a debt-free company with equity financing of 100 on which shareholders require a 10% return will have to generate profit of at least 15.4 in order to provide the required return of 10 after a 35% tax.

If, however, its financing is equally divided between debt at 5% interest and equity, a profit of 12.4 will be enough to satisfy shareholders despite the premium for the greater risk to shares created by the debt (e.g. 12.9%).

Operating profit	12.4
− Interest expense	2.5
= Pre-tax profit	9.9
− 35% tax	3.5
= Net profit	6.4 or 12.9% of 50

Allowing interest expenses to be deducted from companies' tax base is a kind of subsidy the state grants to companies with debt. *But to benefit from this tax shield, the company must generate a profit.*

A company that continually resorts to debt benefits from tax savings that must be factored into its enterprise value.

When corporate income taxes are levied, the enterprise value of the levered company is equal to that of an unlevered company plus the present value of the tax savings arising on the debt.

Take, for example, a company with an enterprise value of 100, of which 50 is financed by equity and 50 by perpetual debt at 5%. Interest expenses will be 2.5 each year. Assuming a 35% tax rate and an operating profit of more than 2.5 regardless of the year under review (an amount sufficient to benefit from the tax savings), the tax savings will be 35% × 2.5 or 0.88 for each year. The present value of this perpetual bond increases shareholders' wealth by $0.88/12.9\% = 6.8$ if 12.9% is the cost of equity. Taking the tax savings into account increases the value of equity by 12% to 56.8 (50 + 6.8).

TAX SAVINGS AS A PERCENTAGE OF EQUITY

V_D/V	k_E	Maturity of debt		
		5 years	10 years	Infinity
0	10.0^2	0	0	0
25	11.0	2.1	3.3	5.1
33	11.4	3.1	4.8	7.0
50	12.9	5.8	8.7	12.0
66	15.6	10.1	14.3	17.9

The longer the maturity of the debt and the larger the amount, the greater the present value of the tax savings.

2 *Based on a β of 1.1, a 4% risk premium and a risk-free rate of 5.6%.*

The value of a levered company is equal to what it would be without the debt, plus the amount of savings generated by the tax shield.[3]

The question now is what discount rate should be applied to the tax savings generated by the deductibility of interest expense? Should we use the cost of debt, as Modigliani and Miller did in their article in 1963, the weighted average cost of capital or the cost of equity?

3 *This is the basis of the APV method (Adjusted Present Value).*

Using the cost of debt is justified if we are certain that the tax savings are permanent. In addition, this allows us to use a particularly simple formula:

$$\text{Value of the tax savings} = \frac{T_C \times k_D \times V_D}{k_D} = T_C \times V_D$$

Nevertheless, there are good reasons to prefer to discount the savings at the cost of equity, since it would be difficult to assume that the company will continually carry the same debt, generate profits and be taxed at the same rate. Moreover, the tax savings accrue to the shareholders, so it should be reasonable to discount them at the rate of return required by those shareholders.

Bear in mind that these tax savings only apply if the company has sufficient earnings power and does not benefit from any other tax exemptions, such as tax loss carryforwards, etc.

Let's discuss in more detail the implication of the interest deductibility. To this end, we use the example used at the end of Chapter 33 in which a company with an invested capital of €500,000 generates a constant (and perpetual) operating income of €120,000.

Let us limit the analysis to a range of leverage values between 0% and 50%. The cost of debt still is 8%. Now we introduce a corporate tax rate of 35%.

The following table shows the effects of debt tax shield on net income and on total cash flows (dividends + interest expenses), *when there are no other distortions*:

$V_D/(V_D + V_E)$ **market values**	0.00%	7.49%	14.60%	21.35%	27.78%	33.90%
Operating income	120,000	120,000	120,000	120,000	120,000	120,000
Interest expenses	0	(4000)	(8000)	(12,000)	(16,000)	(20,000)
Operating income before taxes	**120,000**	**116,000**	**112,000**	**108,000**	**104,000**	**100,000**
Tax rate	35%					
Taxes	(42,000)	(40,600)	(39,200)	(37,800)	(36,400)	(35,000)
Net income	**78,000**	**75,400**	**72,800**	**70,200**	**67,600**	**65,000**
Dividends	78,000	75,400	72,800	70,200	67,600	65,000
Total cash flows	**78,000**	**79,400**	**80,800**	**82,200**	**83,600**	**85,000**

Total cash flows increase together with the increase of debt in the capital structure. When corporate taxes are introduced in the analysis, the "pizza" of the firm value must be divided into three parts: shareholders, creditors and the state (cash outflows for taxes). One of the shareholders goals is to *reduce the state's slice* because the cash outflow subtracted to the state accrues to them (a similar privilege does not belong to creditors as the dimension of their slice is fixed!).

To achieve this result, shareholders – and the management acting on their behalf – prefer to increase the percentage of debt in the capital structure in order to exploit as much as possible the deductibility of interest expenses, and reduce the outflows for taxes (in a few words: they act to reduce the slice of the state).

The value of the levered company is always higher than the value of the unlevered firm. The **first proposition of MM with corporate taxes** then transforms into:
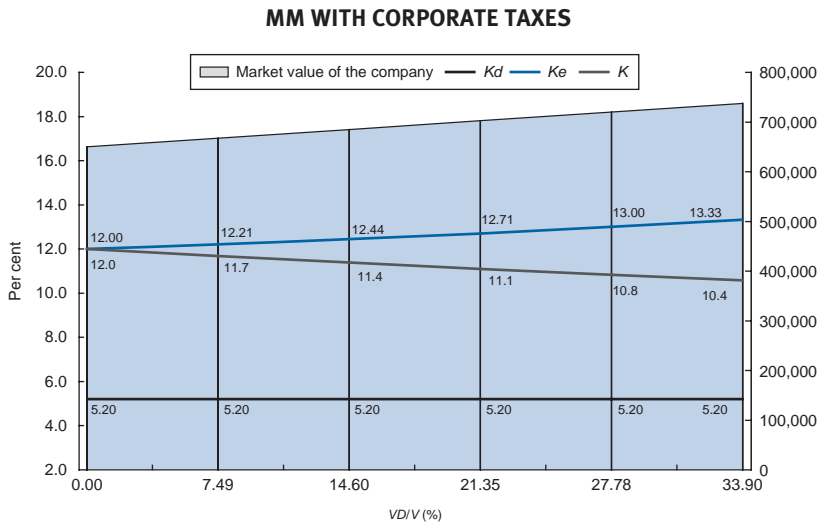
$$V_L = V_U + T_C \times V_D$$

Correspondingly, the cost of equity becomes:

$$k_E = k_O + (k_O - k_D) \times (1 - T_C) \times \frac{V_D}{V_E}$$

The cost of equity is similar to the one we have seen in Chapter 33, while the weighted average cost of capital decrease constantly.

Graphically, we can represent this new situation as follows:

MM WITH CORPORATE TAXES

The reader is surely thinking that something in the reasoning above is not completely clear. How can we say that shareholders improve their financial situation by increasing debt if the dividends they get continue to decrease (see the second-last line of the table above)? The answer is that the debt increase is obtained substituting debt with shares (through, for example, leveraged share repurchase). It is true that the total market value of equity decreases but it must now be divided by a lower number of shares. The net result is an increase of the value of *each share* – that is, the figure the reader should always focus the attention on:

$V_D/(V_D + V_E)$	0.00%	7.49%	14.60%	21.35%	27.78%	33.90%
No. of shares	5000	4513	4053	3612	3141	2630
Price × share	130.0	136.8	144.3	153.0	165.6	185.4

2/ INTRODUCING PERSONAL TAXES, A POSSIBLE RESTRICTION TO OUR REASONING

The personal taxes paid by investors can *reduce* and even *cancel out* the advantages of deducting interest payments on corporate debt.

Let us return to the example of the company at the beginning of the chapter. We shall assume that the dividends are not taxed at the personal investor's level but that – for sake of simplicity – the interest income is taxed 70% at the creditors' level.

If the company has no debt financing, it will still have to generate a pre-tax profit of at least 15.4 to satisfy shareholders' required rate of return. However, if its financing is 50 debt and 50 equity, the company will need to turn in a minimum profit before taxes and interest of 18.2. This will allow it to pay 8.3 interest to its creditors, leaving them with a net return of 5%[4] after the 70% tax. The shareholders get 6.4 (equivalent to 12.9% return) after a tax of 3.5 ($3.5 = 35\% \times (18.2 - 8.3)$). If, on the contrary, the company cannot get 18.2 but only 15.4, there is a subtraction of value from shareholders to creditors (shareholders would get 4.6, equivalent to 9.2% return).

[4] 5% of 50 is 2.5. This is net return. The gross return is 8.3.

> Given the net expected return required by creditors – the introduction of the tax rate on interest income increases the total amount of money necessary to pay debt and subtracts resources to shareholders.

If the personal tax rate on interest income is cut to 30%, thus lower than the tax rate on corporate income, debt becomes cheaper, giving rise to (low) tax savings, although still less than MM found in their 1963 article.

In 1977, Miller released a new study in which he revisited the observation made with Modigliani in 1958 that there is no one optimal capital structure. This time, however, he factored in both corporate **and personal taxes**.

Miller claimed that the taxes paid by investors can cancel out those paid by companies. This would mean that the value of the firm would remain the same regardless of the type of financing used. Again, there should be no optimal capital structure.

Miller based his argument on the assumption that equity income is not taxed, and that the tax rate on interest income is marginally equal to the corporate tax rate.

But these assumptions are shaky, since in reality investors are not all taxed at the same marginal rate and both equity returns and the capital gains on disposal of shares are taxed as well. In fact, Miller's objective was to demonstrate that real life is far more complicated than the simplified assumptions applied in the theories and models. The value of the tax shield is not so big as the 1963 article would make us believe. Suppose that, in addition to the corporate income tax (T_C) that there are also two other tax rates:

T_D = personal tax rate on interest income;
T_E = personal tax rate on dividends.

If we:

1 consider the cash flows net of all taxes that shareholders and creditors must pay to tax authorities;
2 sum them; and
3 rearrange terms,

the "complete" tax shield (G) is:

$$G = \left[1 - \frac{(1 - T_C) \times (1 - T_E)}{(1 - T_D)} \right] \times V_D$$

The reader will immediately notice that if $T_E = T_D$ the tax shield turns back to the "original" $T_C \times V_D$.

In our last example, if T_E is zero, $T_D = 30\%$ and $T_C = 35\%$, G is still positive but much lower because it equals to only 0.0714 (or 7.14%).

If we include T_E into the analysis two alternatives may be possible:

● if $T_E > T_D$ the tax shield is bigger than the basic case (i.e. the case with only corporate taxes);
● if $T_E < T_D$ the tax shield tends to be smaller than the basic case.

When personal taxes are introduced into the analysis, the firm's objective is no longer to minimise the corporate tax bill; the firm should minimise the present value of *all* taxes paid on corporate income (those paid by bondholders and shareholders).

Once we factor in the tax credit granted before shareholders are taxed, the tax benefits on debt disappear although, since not all earnings are distributed, not all give rise to tax credits. Say a company has an enterprise value of 1000. Regardless of its type of financing, investors require a 6% return after corporate **and** personal income taxes. Bear in mind that this rate is not comparable with that determined by the CAPM ($r_F + \beta \times (r_M - r_F)$), which is calculated **before** personal taxation.

In France, for example, the main tax rates applied in 2004 were:

● corporate tax: 34.43%;
● tax on dividends: marginal income tax rate of 50%;
● capital gains tax: 26% including social contributions;
● tax on interest income: 25% including a flat-tax of 15% and social contributions.

Many listed and unlisted companies distribute one-third of their profits in the form of dividends. The average holding period of shares is estimated to be 3 years. This means that only one-third of corporate net profits are taxed immediately at the shareholder level (at 50%). The remainder is taxed only when the capital gains are realised, i.e. after 3 years at a rate of 26%, of which the present value (at 6%) is 22%. In other words, the tax rate on equity held by shareholders is $1/3 \times 50\% + 2/3 \times 22\% \approx 31\%$.

Now let us assume that the company has operating profit of 127. This corresponds to a cost of equity of 6% if it is entirely equity-financed.

The net return of the investor, who is both shareholder and creditor of the firm, can be calculated depending on whether net debt represents 0%, 33.3%, 100% or 3 times the amount of equity.

Enterprise value	1000	1000	1000	1000
Equity	1000	750	500	250
Debt	0	250	500	750
Interest rate	–	6 %	7 %	8 %
Operating profit	127	127	127	127
− Interest expense	0	15	35	60
= Pre-tax profit	127	112	92	67
− Corporate income tax	44	39	32	23
= Net profit Income tax:	83	73	60	44
On dividends / capital gains (31%)	26	23	19	14
On interest (25%)	0	4	9	15
Shareholder's net income	57	50	41	30
Shareholder's net return	6 %	7 %	9 %	13 %
Creditor's net income	0	11	26	45
Creditor's net return	–	4 %	5 %	6 %
Net income for investors	57	62	67	75
Total taxes	70	65	60	52

The value created by debt must thus be measured in terms of the increase in net income for investors (shareholders and creditors). Our French example shows that flows increase significantly only when the debt level is particularly high, well above the French average (15% market value).

Miller's reasoning now becomes clearer. The table below shows that in certain countries, such as Morocco, the tax savings on corporate debt are more than offset by the personal taxes levied.

Bear in mind, too, that companies do not always use the tax advantages of debt since there are other options, such as accelerated depreciation, provisions, etc.

In the study mentioned above, Graham (2000) shows that if we take into account the personal taxes paid by the investor, the value created by debt falls from 9.7% to 4.3% of the firm's value. And we haven't even factored in the present value of bankruptcy costs yet!

What all this amounts to is that, while taxation is certainly a key parameter in absolute terms, it is unlikely to be the determinant of capital structure.

TAX RATES IN VARIOUS COUNTRIES (%)

Country	On dividends	On capital gains	On interest	On earnings
Germany[5]	28.5%	26.4%	26.4%	30–33 %
Belgium	15.0% or 25.0%	0.0%	15.0%	33.99%
Spain	18.0%	18.0%	18.0%	30.0%
France	29.0%	29.0%	29.0%	34.43%[6]
Italy	12.5%	12.5% or 27.0%	12.5%	31.4%
Switzerland[7]	30.0%	0.0%	30.0%	24.1%
UK	32.5%	40.0%	20.0%	28.00%
United States	15.0%	15.0%	38.6%	39.5%
Morocco	10.0%	10.0%	20.0%	35.00%
Tunisia	0.0%	0.0%	0% − 35.0%	35.00%

5 Beginning in 2009.

6 15% on the first taxable part of €38,120.

7 The tax rate might change in the various Swiss cantons.

In fact, Modigliani and Miller's theory states the obvious: all economic players want to reduce their tax charge!

A word of caution, however. Corporate managers who focus too narrowly on reducing tax charges may end up making the wrong decisions.

3/ INFORMATION ASYMMETRIES AND THE PECKING ORDER THEORY

The analysis of the impact of informational asymmetries on capital structure decisions requires the introduction of two new concepts: internal capital and external capital. **Internal capital** is represented by the cash flows generated internally or, more generically, by periodical income which is not distributed among shareholders; **external capital** is raised outside the firm, and can either be financial debt or equity from new shareholders.

The categories that operate within the company (directors, management, major shareholders, employees – in short, the "insiders") normally know more about the company than all other stakeholders ("outsiders"). These asymmetries tend to penalise the company when it needs to raise funds outside. External creditors receive a smaller set of information and do not believe that insiders find convenient to spread all the information they have. This in turn may have two forms:

1 a higher cost of capital;
2 a smaller amount of capital raised (capital rationing).

It is reasonable to assume that informational asymmetries are more relevant:

- for small companies;
- in startup phases;
- when the control of the company is in the hand of few shareholders.

Internal capital doesn't penalise the company either in terms of cost or in terms of quantity. However, the use of excess liquidity and the residual borrowing capacity determines a lower **financial flexibility** and may hamper the future financial equilibrium of the company.

The major disadvantages of external capital are the additional cost of informational asymmetries and the dilution of control (for example, if shares are sold at a "bargain price" to new shareholders or if the debt contracts introduce covenants and guarantees).

It is well documented that the additional cost of informational asymmetries are higher if the new external capital is a share issue. All other things being equal, new debt thus has the comparative advantage of a lower cost and volume penalisation.

The evidence shows that the reaction of the market to the announcement of bond issues is:

- not necessarily negative;
- of limited amount;
- not always statistically significant, when the reaction is negative.

The reaction of share prices may even be positive if the company announces the use of additional bank debt.[8] The reason may lie in the arm's length relationship that banks have with companies which should signal higher quality of information. The bank may know confidential information regarding its clients, control its liquidity or be part of their board of directors, all elements that justify a higher quality of companies that prefer to raise funds through the bank channel.

A totally different result is obtained when firms announce the issue of equity capital to new shareholders. These announcements are in fact generally viewed by the market as a bad signal and the evidence shows that the negative reaction tends to be statistically significant.

Debt may be raised through a public offer or a private placement. It is reasonable to say that debt raised through private placements – which is by definition more concentrated than the public – has two important additional advantages:

1 it increases the control of outsiders in the company;
2 it is more flexible if the contract needs to be amended or restructured.

This is why companies with lower informational asymmetry "problems" tend to use more frequent public issues; vice versa, there is a more frequent use of intermediated debt by small, young and family-controlled companies.

Having established that information asymmetry carries a cost, our next task is to determine what type of financing carries the lowest cost in this respect. The uncontested champion is, of course, internal financing, which requires no special procedures. Its advantage is simplicity.

Debt comes next, but only low-risk debt with plenty of guarantees (pledges) and covenants restricting the risk to creditors and thus making it more palatable to them. This is followed by riskier forms of debt and hybrid securities.

Capital increases come last, because they are automatically interpreted as a negative signal. To counter this, the information asymmetry must be reduced by means of road shows, one-to-one meetings, prospectuses and advertising campaigns. Investors have to be persuaded that the issue offers good value for money!

8 *See, for example, James and Smith (2003).*

In an article published in 1984, Myers elaborates on a theory initially put forward by Donaldson in 1961, stating that according to the **pecking order theory**, companies prioritise their sources of financing:

- Internal financing heads their list of preferences. Companies adjust their dividend payout objectives to their investment opportunities.
- Since earnings and investment opportunities vary from year to year, companies may have to draw down their cash balances.
- If this is not enough and external financing becomes necessary, they issue risk-free debt. Credit lines are kept open to ensure that they can do so as needed.
- When a company cannot resort to traditional borrowings, it issues securities, starting with the least risky type and gradually moving up the scale.
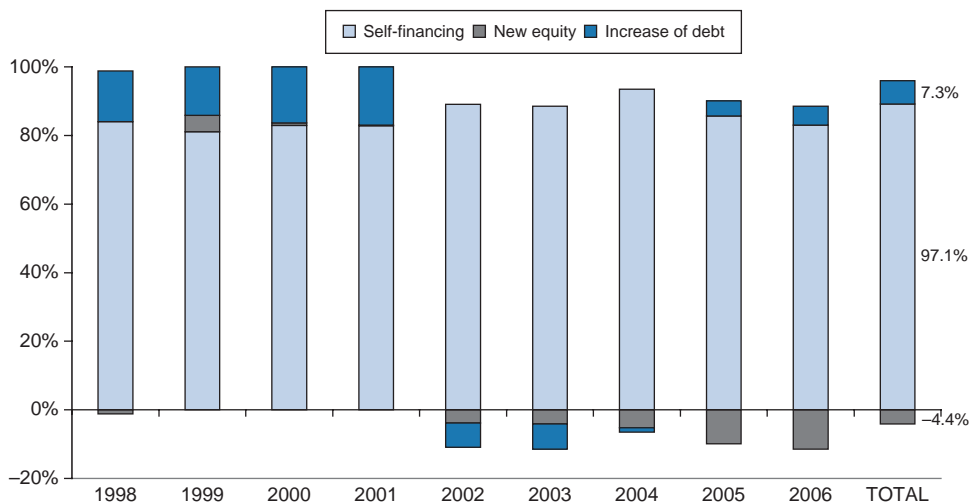- Lastly, when all else fails, the company issues equity.

As can be seen, although the corporate manager does not choose the type of financing arbitrarily, he does so without great enthusiasm, since they all carry the same cost relative to their risk.

The pecking order is determined by the law of least effort. Managers do not have to "raise" internal financing, and they will always endeavour to limit intermediation costs, which are the highest on share issues.

Let's take a look at what happens in the real world to see if companies really privilege internal capital. The following graph shows the evolution of the breakdown of financing of 237 multinational companies belonging to three different geographical areas (Europe, USA and Japan) between 1993 and 2001.

The histograms represent the percentage of internal capital (self-financing) and external capital (new equity and the variation of the stock of debt).

SOURCE OF FINANCE FOR 247 MULTINATIONAL ENTERPRISES

The picture suggests three major comments:

➢ Internal financing has always represented the major source of companies' financing. The average incidence (80%) of internal capital is consistent with the findings
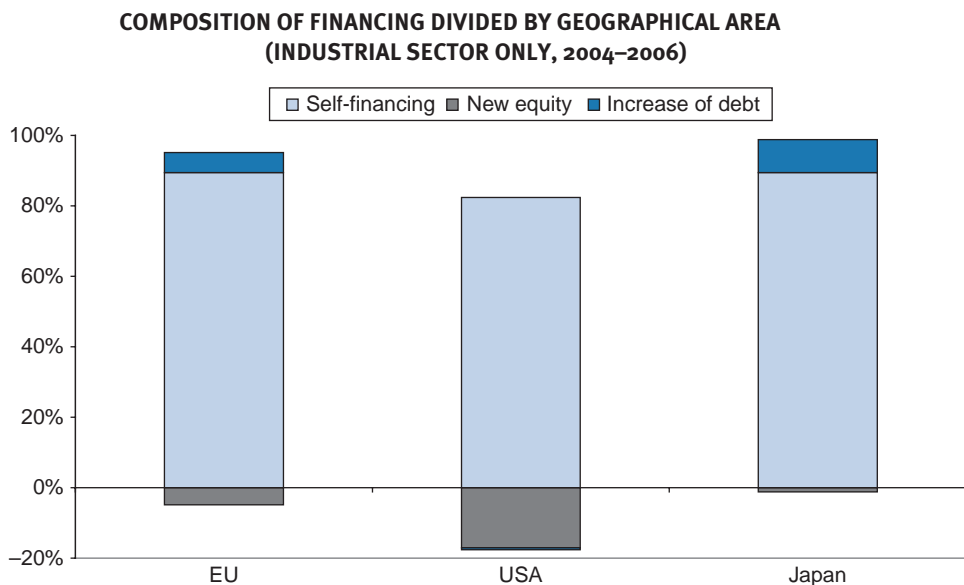
of Donaldson, who suggested that the behaviour of management is driven by two important factors:

a   Firms' survival. The need for preserving the life of the company induces the management to accumulate liquidity in excess and to keep the residual borrowing capacity unchanged.

b   Independence and self-sufficiency. The management prefers to be free to decide, regardless of external "influences", including capital markets. An appropriate reserve of liquidity could ease the achievement of this objective.

➤   Internal financing has not covered the entire amount of funds required by new investments. Each period thus shows a "financial gap" that need to be filled with external capital.

➤   The financial gap has been mostly covered with debt and, if necessary, equity capital. However, the latter resource assumes a marginal role, consistent with the predictions of the pecking order model.

The evidence shown in the above picture seems to confirm the existence of a pecking order of financing choices.

A word of caution, however. The reader should never forget that internal capital has a cost like all other sources of financing, which can be estimated with the models presented in Chapters 22 and 23 where we have discussed the cost of equity capital. So it is important to avoid considering internal capital as a zero-cost or discretionary-cost capital. The cost of capital is always an *opportunity cost of capital*, and should be estimated by looking at the expected returns required (or obtained) by shareholders of similar (in terms of risk and duration) investments and companies.

Finally, it is interesting to note that, although the general preference for internal capital is common to all the three areas, there also exist some differences in each of them, as shown by the graph below.

**COMPOSITION OF FINANCING DIVIDED BY GEOGRAPHICAL AREA
(INDUSTRIAL SECTOR ONLY, 2004–2006)**

4/ DEBT AS A MEANS OF CONTROLLING CORPORATE MANAGERS

Now let us examine the interests of nonshareholder executives. They may be tempted to shun debt in order to avoid the corresponding constraints, such as a higher breakeven threshold, interest payments and principal repayments. Corporate managers are highly risk averse and their natural inclination is to accumulate cash rather than resort to debt to finance investments. Debt financing avoids this trap, since the debt repayment prevents surplus cash from accumulating. Shareholders encourage debt as well because it stimulates performance. The more debt a company has, the higher its risk. In the event of financial difficulties, corporate executives may lose their jobs and the attendant compensation package and remuneration in kind. This threat is considered to be sufficiently dissuasive to encourage sound management, generating optimal liquidity to service the debt and engage in profitable investments.

The explicit cost of debt is a simple yet highly effective means of controlling a firm's management team. Large groups are well aware of the leverage this gives them and require the executives of their main subsidiaries to carry a level of "incentive debt" which is charged to the subsidiary.

Given that the parameters of debt are reflected in a company's cash situation while equity financing translates into capital gains or losses at shareholder level, management will be particularly intent on the success of its debt-financed investment projects. This is another, indirect, limitation of the perfect markets theory: **since the various forms of financing do not offer the same incentives to corporate executives, financing does indeed influence the choice of investment.**

This would indicate that a levered company is more flexible and responsive than an unlevered company. This hypothesis was tested and proven by Ofek, who shows that the more debt they carry, the faster listed US companies react to a crisis, either by filing for bankruptcy, curtailing dividend payouts or reducing the payroll.

Debt is thus an internal means of controlling management preferred by shareholders. In Chapter 42 we shall see that another is the threat of a takeover bid.

However, the use of debt has its limits. When a group's corporate structure becomes totally unbalanced, debt no longer acts as an incentive for management. On the contrary, the corporate manager will be tempted to continue expanding via debt until his group has become too big to fail, like the Korean groups at the end of the 1990s. This risk is called "moral hazard".

With more empirical evidence researchers have examined if companies which have experienced a fast increase of leverage have become more efficient, as measured by profit margins and the return on invested capital.

It is this the case of **Leveraged Buy Outs or LBOs.** An LBO is the acquisition, generally by management (MBO), of all a company's shares using borrowed funds. It becomes a leveraged buildup if it then uses debt to buy other companies in order to increase its standing in the sector. The 1980s were the heyday of funds dedicated to such LBOs.

It is generally thought that the purpose of the funds devoted to LBOs is to use accounting leverage to obtain better returns. In fact, the success of LBOs cannot be attributed to accounting leverage, since we have already seen that this alone does not create value.

The real reason for the success of LBOs is that, when it has a stake in the company, management is far more committed to making the company a success. With management most often holding a share of the equity, resource allocation will be designed to benefit shareholders. Executives have a two-fold incentive: to enhance their existing or future (in the case of stock options) stake in the capital and to safeguard their jobs and reputation by ensuring that the company does not go broke. It thus becomes a classic case of the carrot and the stick!

The results reported by Palepu (1990) show an improvement – although quite limited – of the operating efficiency of companies subjected to leveraged buyouts. Similar results are discussed in Kaplan (1989) and Smith (1990).

Mature, highly profitable companies with few investments to make are the most likely candidates for an LBO. Jensen (1986) demonstrated that, in the absence of heavy debt, the executives of such companies will be strongly tempted to use the substantial free cash flow to grow to the detriment of profits by overinvesting or diversifying into other businesses, two strategies that destroy value.

> The only value created by debt is the fact that it forces managers to improve enterprise value.

We examine LBOs in greater detail in Chapter 44.

Similar circumstances characterise **leveraged recapitalisations** (commonly obtained by a share repurchase funded with new debt). Denis and Denis (1993) report a relevant improvement of the operating efficiency (return on the assets increased by 21.5%) of the 29 companies included in the sample.

Section 34.2
THE COSTS OF DEBT

1/ COSTS OF FINANCIAL DISTRESS

We have seen that the more debt a firm carries, the greater the risk that it will not be able to meet its commitments. If the worst comes to the worst, the company files for bankruptcy, which in the final analysis simply means that assets are reallocated to more profitable ventures.

In fact, the bankruptcy of an unprofitable company strengthens the sector and improves the profitability of the remaining firms and therefore their value. Bankruptcy is a useful mechanism which helps the market stay healthier by eliminating the least efficient companies.

The public authorities would do well to apply this reasoning. Better to let a troubled sector rid itself of its lame ducks than to keep them artificially afloat, which in turn creates difficulties for the healthy, efficient firms to the point where they, too, may become financially distressed.

For investors with a well-diversified portfolio, the cost of the bankruptcy will be nil, since when a company is discontinued, its assets (market share, customers, factories, etc.) are taken over by others who will manage them better. One man's loss is another man's gain! If the investor has a diversified portfolio, the capital losses will be offset by other capital gains.

In practice, however, markets are not perfect and we all know that even if bankruptcies are a means of reallocating resources, they carry a very real cost to those involved. These include:

- **Direct costs:**

  - redundancy payments;
  - lawyers fees;
  - administrative costs;
  - shareholders' efforts to receive a liquidation dividend.

- **Indirect costs**:

  - order cancellations (for fear they will not be honoured);
  - less trade credit (because it may not be repaid);
  - reduced productivity (strikes, underutilisation of production capacity);
  - no more access to financing (even for profitable projects); as well as
  - incalculable human costs.

One could say bankruptcy occurs when shareholders refuse to inject more funds once they have concluded that their initial investment is lost. In essence, they are handing the company over to its creditors, who then become the new shareholders. The creditors bear all the costs of the malfunctioning company, thus further reducing their chances of getting repaid.

The following table reports the major results of some studies regarding direct and indirect costs in the USA:

	Direct costs	Indirect costs	Sample	Period
Altman (1984)	4.3	8.7	18 companies	1970–78
Ang et al. (1982)	7.5	NA	55 companies	1963–78
Betker (1995)	3.9	NA	75 companies	1986–93
Cutler and Summers (1988)	3.0	9.0	Case study	
Warner (1977)	5.3	NA	11 railway companies	1933–55
Weiss (1990)	3.1	NA	37 companies in US Chapter 11	1980–86
White (1983)	6.0	NA	96 companies	1978–79

Even without going to the extremes of bankruptcy, a highly levered company in financial distress faces certain costs that reduce its value. It may have to cut back on R&D expenditure, maintenance, training or marketing expenses in order to meet its debt payments and will find it increasingly difficult to raise new funding, even for profitable investment projects.

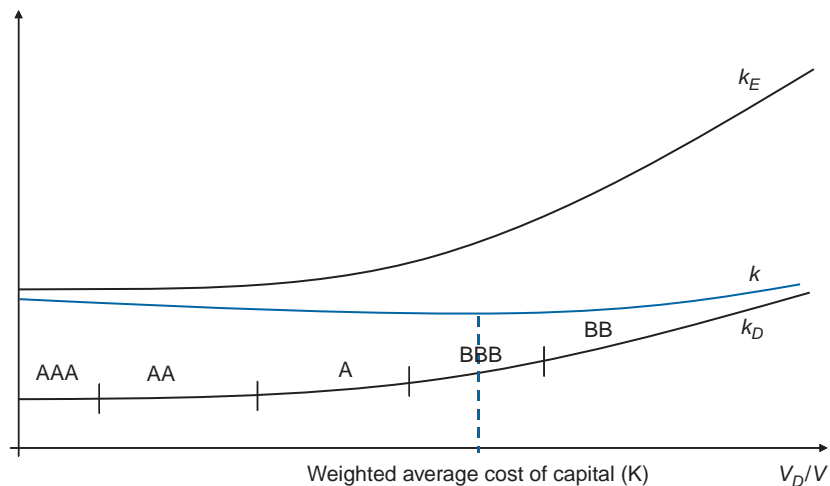After factoring all these costs into the equation, we can say that:

Value of levered firm	=	Value of unlevered firm	+	Present value of the tax shield arising on debt	−	Present value of bankruptcy costs and malfunction costs

Because of the tax deduction, debt can, in fact, create value. A levered company may be worth more than if it had only equity financing. However, there are two good reasons why this advantage should not be overstated. Firstly, when a company with excessive debt is in financial distress, its tax advantage disappears, since it no longer generates sufficient profits. Secondly, the high debt level may lead to restructuring costs and lost investment opportunities if financing is no longer available. As a result, debt should not exceed a certain level.

In 2000, J. Graham demonstrated that the value of the tax advantage of interest expenses is around 9.7%, and it goes down to 4.3% if personal taxation of investors is also considered. H. Almeida and T. Philippon (2007) have, on the other hand, estimated the bankruptcy costs, they believe the right percentage is around 4.5% – shortly, it seems that one effect "perfectly" compensates the other.

The same reasoning applies to the weighted average cost of capital. When a company borrows funds, its cost of capital declines thanks to the tax savings on the interest payments, but if there is a risk of default, shareholders factor the bankruptcy costs into the cost of equity.

This relationship can be observed by charting a given industry's cost of capital according to its credit rating.

Paradoxically, this long detour brings us back to our starting point – the real world approach which says "Some debt is fine, but not too much."

The theoretical optimal debt ratio appears to be when the present value of the tax savings arising on additional borrowing is offset by the increase in the present value of financial distress and bankruptcy costs.

One concern of shareholders is that they want to estimate the *expected* costs of financial distress. They are not satisfied with the estimation of distress costs, because these costs must be "weighted" with the probability that they will actually occur.

If we define *CFD* as the costs of financial distress and π the probability of financial distress or bankruptcy, the expected costs of financial distress are the result of:

$$\text{Expected costs of financial distress} = \pi \times \text{CFD}^9$$

The probability of bankruptcy (we use bankruptcy and financial distress synonymously for sake of simplicity) is given by the probability that internally cash flows could be insufficient to face the contractual commitments of creditors.

This probability is a function of:

- the ratio between the operating cash flows and the cash flow of debt (interests and principal repayment). The higher this ratio, the lower the probability of default;
- the volatility of operating cash flows. The probability of default is directly linked to cash flow volatility.

A direct approach for the estimation of the probability of default is the use of historical default rates produced by rating agencies, major investment banks and research centres, which comes under the form of cumulated percentage of insolvencies occurred along different time horizons.

In practice, the reader should use the time horizon consistent with that of the average life (or duration) of the company debt. The following table illustrates the cumulative default rates of US companies over 1, 5, and 10 years. Thus, the cumulative probability of default (π) of an A-rated company having a debt with an average life of 10 years should be around 1.73%.

9 *The reader should consider that by calculating the expected financial distress costs as a percentage of the unlevered value of the firm, we are already including their present value into the analysis (since the unlevered value of the firm is the present value of cash flows).*

CUMULATIVE AVERAGE DEFAULT RATES BY RATING, 1981–2004 (%)

	1 year	5 years	10 years
AAA	0.00	0.28	0.67
AA	0.00	0.18	0.72
A	0.07	0.60	1.73
BBB	0.23	1.95	4.44
BB	0.81	8.38	14.62
B	6.27	23.84	30.43
C	25.59	44.50	49.76

Source: Annual Global Corporate Default Study 2007.

2/ AGENCY COSTS

The conflicts of interest between shareholders and creditors reach their apex when the company is in financial distress. In these circumstances, shareholders may be tempted to use three types of actions for damaging creditors' interests:

1   **Risk shifting**, investing in high-risk projects, whose return distribution is wider than the average. Shareholders hope to increase the chance of exploiting the positive side of the probability distribution, since their responsibility (and their potential loss) is limited to the capital invested in the company, regardless of the risk of the operating activity.
2   **Underinvesting**. The management of a highly-indebted company could refuse to invest in a project which has a positive NPV but not enough to restore the financial equilibrium of the company. This of course may happen if shareholders contribute to finance the project. In this case, the value created could be used to repay debt, thus leaving the wealth of shareholders unchanged.
3   **Milking the property**. Shareholders could distribute high ordinary dividends, and even extraordinary dividends, by selling part of the assets-in-place.

The most important consequence of agency conflicts is that the relative costs could be paid by shareholders! Let's see why: creditors know that shareholders can adopt one or more of the three strategies described above. Their *ex ante* reaction is to increase the required remuneration on new funds, charging shareholders with the likelihood of opportunism.

What are the possible solutions to the agency problems? There are basically four answers to this question:

➤   Introduce contractual provisions (**covenants**) that discipline the role of management and major shareholders.

➤   Increase the **degree of concentration of debt**. This is the equivalent of saying that it is necessary to reduce the number of creditors the company has. By so doing, the cost of debt renegotiation should decrease, should the company incur any financial distress.

➤   Use appropriate **placement techniques**. Take, for example, the so-called "strip financing", a technique by which all lenders "buy" simultaneously portions of all the tranches of the issuing securities. Needless to say, in this case the conflicts of interests between classes of claimants tend to vanish rapidly.

➤   Raise **guaranteed debt** and **leasing**. In both cases, the value of debt tends to be correlated to the value fixed assets. Hence:

1   the losses suffered by creditors are limited by the liquidation value of the assets over which they have a privilege;
2   monitoring costs may be lower because the borrower cannot sell the assets used as collaterals or simply possessed thanks to a leasing contract.

Agency and financial distress costs are detrimental to shareholders. Now we shall discuss two alternatives that can be used to estimate this value destruction effect.

The first methodology is based on an explicit estimate of financial and distress costs. The value obtained must then be subtracted from the value of the company (inclusive of the taxshield):

$$\text{Value of a levered company} = V_L = V_U + G - (\pi \times CFD)$$

This technique – known as the **Adjusted Present Value (APV)** – enlightens the three major sources of value creation and destruction. At the same time, the APV suffers the important limitations related to the uncertainty surrounding the estimate of parameters (π and CFD) for which there still isn't robust or well detailed evidence.

The second technique is to rectify the cost of debt (K_D) and the cost of equity (K_E). However, in order to use this methodology we must be able to identify firms with a similar risk profile. Two major advantages are that:

- we examine simultaneously the effects of both the financial distress and agency cost;
- it is easier to apply and to collect appropriate information.

3/ LOSS OF FINANCIAL FLEXIBILITY

Having and retaining flexibility is of strong concern to finance directors. They know that choice of financing is a problem to be evaluated over time, not just at a given moment; a choice today can reduce the spectrum of possibilities for another choice to be made tomorrow.

Thus, taking on debt now will reduce borrowing capacity in the future, when a major investment – perhaps foreseeable, perhaps not – may be needed. If borrowing capacity is used up, the company will have no choice but to raise fresh equity. From time to time, though, the primary market in equities is closed because of depressed share prices. If that should be the case when the company needs funds, it may have to forgo the investment.

The equity capital market may not be open for new business during a crisis, when investors prefer to stick with safer debt securities. Debt markets stay open regardless of economic conditions.

True, the markets for high-yield debt securities react as the equity markets do and may at times be closed to new issues. There are periods – such as the second half of 2001 and first half of 2002 – when the number of issues of shares and high-yield bonds has been extremely small.

Raising money today with a share issue, however, does not foreclose another capital increase at a later time. Moreover, an equity financing today will increase the borrowing capacity that can be mobilised tomorrow.

A sharp increase in debt reduces the company's financial flexibility, whereas a capital increase augments its borrowing capacity.

The desire to retain flexibility prompts the company to carry less debt than the maximum level it deems bearable, so that it will at all times be in a position to take advantage of unexpected investment opportunities. Here again, we find the option concept applied to corporate finance.

In addition, the finance director will have taken pains to negotiate unutilised lines of credit with the company's bank; to have in hand all the shareholder authorisations needed to issue new debt or equity securities; and to have effective corporate communication on financial matters with rating agencies, financial analysts and investors.

Going beyond the debt–equity dichotomy, the quest for financial flexibility will require the finance director to open up different capital markets to the company. A company that has already issued securities on the bond market and keeps a dialogue going with bond investors can come back to this market very quickly if an investment opportunity appears.

The proliferation of financing sources – bilateral or syndicated bank loans, securitised receivables, bonds, convertibles, shares, and so on – allows the company to enhance its financial flexibility even further. But this strategy faces two limitations:

- issues on different markets have to be big enough to ensure sufficient liquidity for investors;
- multiple disparate sources of financing (possibly at different levels with a group structure) make the capital structure more complex and harder to manage (especially during liquidity crises).

Financial flexibility has a value, although it is difficult to estimate. We should bear in mind that the value of financial flexibility is reasonably linked to the number and the dimension of investment projects. If the company has a lot of investment opportunities and the average value of the investments is high, it should also have a high financial "reserve".

Section 34.3
THE TRADEOFF MODEL

Let us continue with the example used throughout the chapter by introducing the costs of debt into the analysis: financial distress costs and agency costs.
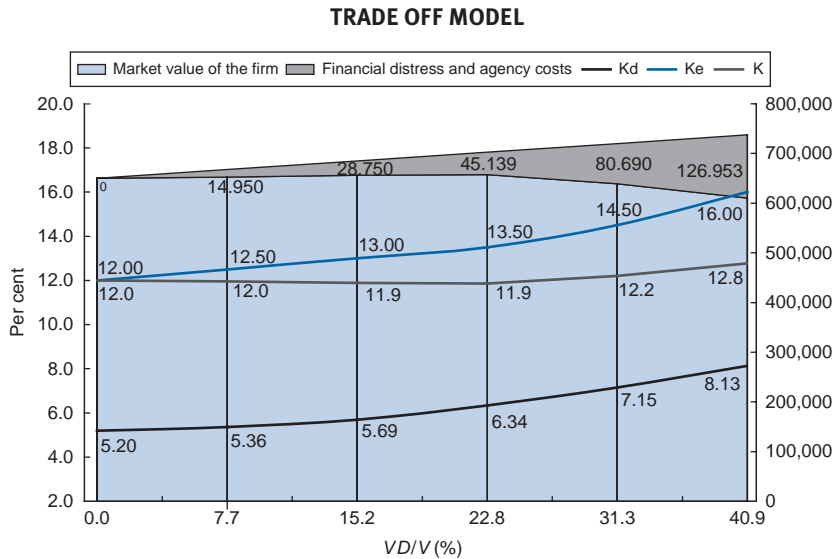
Debt disadvantages determine a crucial consequence: the cost of debt is no longer a horizontal line. It becomes a convex curve. The reader can go back to Chapter 23, where we discussed the estimate of k_D and concluded that the cost of debt reflects the financial distress and agency costs.

The following table shows the effects of debt on net income and on total cash flows (dividends + interest expenses), *when the cost of debt is an increasing function of leverage*:

$V_D/(V_D + V_E)$ **market values**	0%	8%	15%	23%	31%	41%
Operating income	120,000	120,000	120,000	120,000	120,000	120,000
Interest expenses	0	(4,125)	(8,750)	(14,625)	(22,000)	(31,250)
Operating income before taxes	**120,000**	**115,875**	**111,250**	**105,375**	**98,000**	**88,750**
Tax rate	35%					
Taxes	(42,000)	(40,556)	(38,938)	(36,881)	(34,300)	(31,063)
Net income	**78,000**	**75,319**	**72,313**	**68,494**	**63,700**	**57,688**
Dividends	78,000	75,319	72,313	68,494	63,700	57,688
Total cash flows	**78,000**	**79,444**	**81,063**	**83,119**	**85,700**	**88,938**

The cost of equity line, already positive, steepens even further because it follows the evolution of the line of the cost of debt.

The weighted average cost of capital is a typical U-shaped curve: it decreases at the beginning thanks to the increasing weight of the cheaper "ingredient" and it increases when the leverage is "not so small". The increase of leverage pushes the cost of debt *and* the cost of equity rapidly up. The final result is that – starting from a certain degree of leverage – the weighted average cost of capital begins to increase.

TRADE OFF MODEL

According to the extended tradeoff model, the optimal leverage is obtained where the weighted average cost of capital reaches the minimum point (k^*). This is also the point where the value of the company is maximised.

In our example, this value is around 11.9% while the optimal leverage ranges between 15% and 25%. As always, a word of caution. The reader should in fact note that the optimal leverage and the minimum cost of capital are best represented by ranges of values rather than single points. A point estimation is not reasonable in the day-by-day activity of companies.

The graph also illustrates the positive line of the value of the firm under the hypothesis that tax advantages are progressively offset by financial distress costs. The difference between the values of this line and the curve of the effective value of the company indicates the eroded value of debt costs: financial distress costs; agency costs and loss of flexibility.

The existence of an optimal capital structure implies that financial management shouldn't base a company's financial policies opportunistically, but rather should devote themselves to understanding the determinants of their company's temporary optimal financial ratio.

Above all, the finance manager should be aware that there are at least three important things that can add value:

- adopt appropriate tax planning, with the major goal of exploiting as much as possible the additional value that a comprehensive tax shield can bring to the company;
- try to match the assets with liabilities, i.e. match the duration of assets with the duration of liabilities;
- write financial contracts that minimise the conflict of interest between financial claimants.

The finance function contributes value by setting optimal financial policies. In this regard, the optimal leverage policy is a crucial step because it represents the "place" where the company maximises its value.

The tradeoff model allows for different leverages among different industries. Companies belonging to sectors with high and stable operating income and a high percentage of fixed assets are those with an expected high leverage. Conversely, those with an unsatisfactory profitability and a high incidence of intangible assets should have a lower debt level.

The model explains that it is possible to seek a convergence path towards the optimal leverage. If the financial manager believes that his company is not at the optimal point, he may choose the best alternatives which can bring the company to the desired leverage.

Finally, as we will see in Chapter 35, the model teaches us not to give too much importance to Earning Per Share (EPS). The typical attitude of examining alternative financial policies according to their result on EPS could be weak. What matters is not only EPS: it is price (or value) per share! The two things may not always give the same results. EPS focalisation catches the "return" aspects of financial policies but it neglects the "risk" profile of the available alternatives. And our reader knows perfectly well that financial decisions should always take into account the entire risk/return profile!

Notwithstanding the importance of the extended tradeoff model some questions are still looking for an answer:

- Is the optimal capital structure influenced by the lifecycle stage the company is going through?
- Is there a role for competitors in determining the optimal capital structure of the firm?
- Why do managers sometimes prefer to use funding as a way to send signals to financial markets?
- What is the optimal maturity structure of debt? And the optimal percentage of floating debt? How much debt issued in different currencies should a company have?
- When a company wants to move towards an appropriate debt/equity mix, should it reach that leverage rapidly or gradually?

In Chapter 35, we shall focus on these issues to illustrate how to reach an appropriate **design** of the capital structure of a company. After having explored the bulk of the theory, the time will come to examine details.

SUMMARY

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In this chapter we went beyond the simplified structure of perfect markets, and looked at a number of different factors (tax, bankruptcy costs, information asymmetry, conflicts of interest) which make analysis more complex, but also more relevant.

Modigliani and Miller demonstrated how, when corporate tax is included in the equation (financial expenses are tax deductible whereas dividends are not), debt financing becomes an attractive option. The optimal capital structure is thus one which includes a maximum amount of debt, and the value of a levered company is equal to what it would be without the debt, plus the amount of savings generated by the tax shield.

There are however two major drawbacks to this approach. Firstly, the higher a company's debts, the greater the probability of bankruptcy and attendant costs, whether direct or indirect (profitable investments that are not made). Secondly, if the personal tax situation of the investor is taken into account, this offsets the tax shield that debt enjoys at a corporate level. For individual taxpayers, the tax breaks on income on equity are better than they are for debt.

Problems stemming from information asymmetry between shareholders and investors have an obvious impact on the choice of capital structure. Managers believing that their companies are undervalued would prefer to increase debt levels than to issue new shares at a low price, and possibly carry out a capital increase once the share price has gone up. Similarly, a decision to use debt finance for a project is a sign of management's confidence of its ability to meet payments on the debt and an indirect sign that the project is likely to be profitable.

Pushing the information asymmetry problem to the limit brings us to the pecking order theory which holds that managers choose sources of financing on the basis of the amount of intermediation costs and agency costs. cash flow, debt and only then a capital increase.

Finally, according to agency theory, debt is analysed as an internal means of controlling management, which has to work hard to ensure that debt repayments are met. For a mature company making healthy profits but without major growth prospects, incurring large debts is a way for its managers to avoid spending its cash on risky diversification projects or rash expansion projects, which both destroy value. The LBO, an innovation of the 1980s, is what has come out of this theory. LBOs create value, not on the basis of the accounting illusion of the leverage effect, but thanks to the high motivation of managers who are under pressure to repay debts, and who have a financial incentive to work harder as a result of the potentially very lucrative profit sharing schemes that have been set up.

This takes us a long way from the simplistic assumptions made in the first models designed by Modigliani and Miller!

1/ According to the new approach by Modigliani and Miller (1963), how does the value of a levered company differ from the value of an unlevered company?

2/ What are the two drawbacks to Modigliani and Miller's 1963 theory?

3/ What is Modigliani and Miller's 1977 theory based on and what conclusions do they draw?

4/ Describe the tax breaks for debt financing and for equity financing.

5/ What are the latest tax trends with regard to sources of financing?

6/ Why are holding companies keen to have stakes that are larger than 5%?

QUESTIONS

@
quiz

7/What is the value of a levered company when there is a strong likelihood that it will file for bankruptcy?

8/What is your view of the following statement: "*X* went bankrupt because its financial expenses amounted to 13% of its sales"?

9/Why do managers tend to be wary of debt?

10/Why is it a good thing for a highly profitable company that has reached maturity to carry a lot of debt?

11/During the 1990s, interest rates in Europe were generally revised downwards. If Modigliani and Miller's 1963 theory was right, should debt levels of companies have increased or decreased? Debt levels actually fell. State your views.

12/According to signal theory, should undervalued companies carry more or less debt than other companies? Why?

13/If Modigliani and Miller's 1963 theory had been right, how much corporate income tax would the state have collected every year?

14/In your view, after a failed takeover bid, will the debt-to-equity ratio of the target tend to rise or fall? Why?

15/In your view, can the theories of capital structure described in this chapter be proven with as much certainty as, say, the put/call parity described in Chapter 28 that deals with options? Why?

16/Is it better to calculate book value or the value of leverage (debt-to-equity ratio) in order to assess the level of risk taken by a company?

17/Does the pecking order theory imply that the company has an optimal capital structure? What are the criteria for determining capital structure according to this approach?

18/If there was an optimal debt-to-equity ratio, should it be stable over time? Why?

19/An LBO fund is prepared to pay 3000 for operating assets if the financing is split equally between debt and equity, and 35,000 if the split is 75% debt and 25% equity. State your views.

EXERCISES

1/ 70% of company *A*'s needs are equity-financed at a cost of 10% and 30% debt-financed at 6%. What is the weighted average cost of capital of this company if the tax rate is 20%, 50% and 80%?

2/ A company is totally financed by equity capital for a market value of 200m. The only tax it has to pay is corporate income tax at a rate of 40%. Calculate the value of this company if it borrows 50m at 6% to perpetuity, to be used to repay a part of shareholders' equity. Shareholders would then require an 11% return.

3/ Company *C* is financed by equity for a market value of 40 and by debt for a market value of 30. This debt is perpetual and its interest rate is 6%. The corporate income tax rate is 40%

  (a) How much of *C*'s enterprise value is due to debt? The shareholders' required rate of return is 11%.
  (b) By how much will the enterprise value increase if the company borrows 5 on the same terms as previously (assume a required rate of return of 11% to simplify calculations)?
  (c) By how much will the enterprise value fall if there is a change in the tax laws and in four years' time, financial expenses will no longer be tax deductible.

4/ Redo the table on p. 700 for Spain and Tunisia assuming two situations: no debt and 500 of debt at 7%. Assume Tunisian tax rate on interest is 35%. State your views.

Questions

1/ *Difference: present value of tax saving due to the fact that financial expenses are tax deductible.*
2/ *The cost of bankruptcy and individual income tax.*
3/ *The individual tax payable by the investor cancels out the impact of the corporate tax payable. Conclusion: no optimal capital structure.*
4/ *Financial expenses are tax deductible. Tax credit.*
5/ *More favourable treatment for equity due to the drop in the corporate income tax rate, and heavier taxes on debt income for creditors.*
6/ *So that they can enjoy a more favourable tax regime (the "parent company" regime, under which dividends received from subsidiaries in which they have a stake of more than 5% are exempt from corporate income tax).*
7/ *Value of unlevered company + present value of tax saving – present value of cost of filing for bankruptcy.*
8/ *This line of reasoning is false. A company goes bankrupt because its present and expected profits are inadequate compared with its risk, and not because it is carrying too much debt. If it is carrying too much debt, this is because its profits are too low, and not the other way round.*
9/ *Because by increasing the risk to which their companies are exposed, they increase their chances of losing their jobs.*
10/ *Because it can avoid using its free cash flows, it will not destroy value by diversifying or making unprofitable investments.*
11/ *Debt levels should have risen to set off the drop in interest rates so that tax deductible financial expenses at least remain constant. Conclusion: either this theory does not stand up or there are other factors which explain the situation.*
12/ *More debt, because they are not keen to issue new equity while the value of their shareholders' equity is undervalued.*
13/ *Zero, since all companies would incur sufficient debts to reduce their tax bills to zero.*
14/ *It should go up, because shareholders will put pressure on management to achieve better results.*
15/ *No, because we are not dealing with mathematical certainties but with behaviour.*

16/ *Value, because if the company is very profitable, its equity capital will be worth much more than its book value. A more accurate assessment of the company's ability to meet its debt repayments will then be possible.*

17/ *No, because financial resources are used in a given order in line with requirements. The difference between operating inflows and investment outflows.*

18/ *No, because interest rates, tax rates, risk aversion, volatility of operating assets, the maturity of a sector, etc. change over time.*

19/ *A difference of this amount cannot simply be due to the tax break on debt. It is also difficult to believe that management would be more motivated by the higher level of debt (50/50 is already a high level). This can only be some sort of trap.*

Exercises

1/ *8.44% ; 7.9% ; 7.36%.*

2/ *200 − {} − +50 × 40% × 6%/11% = 210.9.*

3/ *(a)   (30 × 6% × 40%) /11% = 6.5.*
   (b)   The value increases by 1.1.
   (c)   Reduction of the value by 5.

	Spain		Tunisia	
	$D = 0$	$D = 500$ at 7%	$D = 0$	$D = 500$ at 7%
Operating income	101.0	101.0	101.0	101.0
− Interest expense	0.0	35.0	0.0	35.0
= Pre-tax profit	101.0	66.0	101.0	66.0
− Income tax expense	30.3	19.8	30.3	19.8
= Net earnings	70.7	46.2	70.7	46.2
Income tax: on dividends / capital gains on interest	12.7 0.0	8.3 6.3	0.0 0.0	0.0 12.3
Investors' net income	58.0	66.6	70.7	69.0
Total taxes	43.0	34.4	30.3	32.1

Source: In Spain, debt receives more favourable tax treatment, while in Tunisia, equity enjoys better tax breaks.

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