

Spotlight Quiz

Capital Structure

December 2010

Question 1

The key question about capital structure concerns the relative proportions of debt and equity in the long term capital financing the company. Already there is one issue raised – is it only long term capital or should we include short term debt? If we exclude short term debt then firms that run a semi-permanent overdraft would appear to have much smaller ‘capital’ than they really have. For large companies this may be a theoretical question but for many smaller companies – many SMEs – the overdraft is the only form of bank finance. This raises questions about whether short term debt should be included in Capital Employed, for instance. For the moment, let’s sidestep the problem and include debt that is present on a long-term basis wherever it is located in the balance sheet.

As always in finance, risk and return are fundamental considerations. We could finance the firm entirely with equity; when profits are good the shareholders will get a good return and when returns are poor or negative the shareholders will get little or nothing. We can add debt to the mix but debt returns always have to be paid at the rate of interest. Effectively this is a fixed cost for the firm – and that makes the equity returns (the variable cost) more variable – good times get better but bad times get worse. So why would firms enter into such a situation by borrowing?

Why do firms introduce debt into their long term financing, when it makes their equity returns riskier?

- (a) because the argument above is only theory: in practice we need debt
- (b) because firms are not profitable enough to survive without debt
- (c) because debt always enhances equity earnings
- (d) because debt enhances equity earnings as long as margins are greater than interest rates and creates a tax shield.
- (e) Don’t know

Answer

The right answer is (d) because debt enhances equity earnings as long as margins are greater than interest rates and creates a tax shield

That was a fairly easy question. As long as returns are greater than interest rates, the profits generated by the debt-funded investment will add to equity earnings – so that shareholders can only gain. The problem comes in bad years when margins are lower than interest rates: then shareholders have to subsidise the payment of interest! Of course, in addition to the above, debt interest is relieved from taxation so that there is less ‘tax leakage’ from the returns to the company. Another way of putting all of this is that the weighted average cost of capital WACC falls.

Question 2

Weighted Average Cost of Capital

This is pretty well explained by the name. It is the overall cost of capital for the firm weighted by the proportions of capital in use by the firm. Often this weighted average is just the weighted average of debt and equity, although there might be a variety of other forms of capital at different points along the debt to equity spectrum – mostly different hybrids of the two.

If we know the return required by our equity investors, then that is the return that we have to provide for them. This is a rather unfortunate truth because investors are highly mobile. If we don't provide the return that they think is fair or appropriate then they will sell their shares and invest elsewhere. If enough investors sell their shares then our share price will fall. If that happens then other investors will see their investment at risk and sell too. All this makes it harder to persuade new investors to invest, and therefore harder for us to raise new capital. So the return demanded by equity investors is the effective cost of equity to the company – we have to deliver it.

The cost of debt is the market rate for debt with our level of risk. There is often confusion here because if the company has a bond issued some years ago it will still be paying interest at the original rate. But this is not the cost of debt. The market cost of debt is the actual cost of the debt (interest being paid) compared to the amount of debt outstanding – the market value of the debt.

But then we have to remember that the cost of equity is met by the company after paying corporate tax while the cost of debt is met before paying corporate tax. So when we are trying to estimate the combined cost of debt and equity we have to be sure to combine both costs on the same basis – both before tax or both after tax. The convention is to use after tax numbers. So we should reduce the market rate for debt by the tax rate to get an after tax debt cost.

The weighted average cost is then

$$\% \text{ equity} \times \text{cost of equity} + \% \text{ debt} \times \text{post-tax debt cost}$$

Calculation of WACC:

XYZ PLC has 20 million shares in issue and a share price of £5. It also has a bond in issue: par value is £20 million it has exactly 8 years to run and pays a coupon of 8% annually. It is currently trading at 125.

The balance sheet of XYZ shows share capital at £5 million and retained earnings of £55 million. A respectable investment bank has stated that the cost of equity is 9%. If the corporate tax rate is 28%, what is the weighted average cost of capital?

- (a) 7.8%
- (b) 7.5%
- (c) 8.2%
- (d) 8.75%
- (e) Don't know

Answer

The right answer is (a) 7.8%

The right way to calculate WACC is to find the proportions of debt and equity and then take the weighted average of debt proportion times debt cost plus equity proportions times equity cost. There are three potential pitfalls in this question: taking the wrong proportions

(they should be based on market values not book values); taking the coupon as the cost of debt rather than the market rate (which has to be calculated – it's the IRR of the bond) and forgetting to take into account that the debt cost is after tax. Answer (b) makes the first mistake, answer (c) makes the first and second mistakes, answer (d) makes all three!

Values of debt and equity are equity: $20m \times £5 = £100m$, debt $20m \times 125\% = £25m$

So proportions are equity 80% (100/125) and debt 20% (25/125)

Cost of debt is the IRR of the 8-yr bond trading at 125 = 4.25%

PV at 4% = $-125 + \text{Annuity factor}(8\text{yrs}, 4\%) \times 8 + 100 \times (1+4\%)^{-8} = 1.93$

PV at 4.5% = $-125 + \text{Annuity factor}(8\text{yrs}, 4.5\%) \times 8 + 100 \times (1+4.5\%)^{-8} = -1.91$

Fortunately these are pretty well equal either side of zero, so the IRR (the market interest rate) must be 4.25%. After tax (28%) this is $K_d = 3.06\%$

So WACC = $20\% \times 3.06\% + 80\% \times 9\% = 7.8\%$

Question 3

Optimal capital structure

Almost always the market rate for debt is lower than the cost of equity. And then we reduce the cost of debt by the tax rate so that the cost of debt is much lower than the cost of equity! Why don't we just employ as much debt as we can raise?

In determining the optimal capital structure, why not use the maximum amount of debt that we can raise?

- (a) Good idea, why not!
- (b) the credit rating would suffer and management bonuses may be withheld
- (c) because equity would become much riskier and more expensive, ultimately resulting in a higher WACC
- (d) because our shareholders wouldn't like it
- (e) don't know

Answer

The right answer is (c) because equity would become much riskier and more expensive, ultimately resulting in a higher WACC.

While this is the "correct" answer, answers (b) and (d) are not really wrong. Credit ratings would suffer and some companies do target a specific minimum rating. The logic behind the target may not always be apparent – the pursuit of a particular rating can only be justified if it can be demonstrated to be in shareholders' interests, i.e. it enhances shareholder value. A target of, say, AA would be difficult to justify although a target of BBB might be easier – being at the lower end of investment grade. A fall below this could indicate an imminent hike in debt cost and consequent loss of shareholder value. Answer (d) could be regarded as correct because shareholders not liking something is another way of saying that they may sell their shares or require a higher return on their investment. Clearly in this case, if debt is very high then equity returns become riskier and the cost of equity must rise commensurate with the risk.

The underlying principle is clear though. As debt rises then equity risk rises because debt has the first call on any income. Equity as the receiver of residual earnings then must see a more variable income stream as overall income varies. Higher risk for equity must inevitably result in higher returns being demanded.

Question 4

But why do we want WACC to be low?

So far, we have assumed that we want a low WACC. All costs are better when they are lower, just as all revenues are better when they are higher. But there is more underlying the idea here.

The principle that underpins the desire for a low WACC is that the value of the business – its entity value or enterprise value – is the present value of all of the future cash flows accruing to the business. As long as we take all of the cash flows, that is before any deductions for interest or other costs of finance then the value that we calculate is for the whole of the business – debt and equity. The discount rate that we use should be the market rate for the risk of the cash flows – the combined rate for debt and equity in the proportion existing in the company: the WACC. So the lower the WACC the higher the company value! Value can be increased (for constant future cashflows) by either reducing equity risk or by adjusting the proportions of debt and equity.

Equity values given steady state earnings.

Two companies, A and B have different characteristics. Company A has a beta of 1.4 while company B is much lower risk with a beta of 0.7.

For each company, given the market data below, what multiple would the equity market place on £100 worth of ongoing equity earnings with zero growth.

Risk free rate 3%, Equity risk premium 6%

- (a) Company A – 8.8 and Company B – 13.9
- (b) Company A – 8.0 and Company B – 10.7
- (c) Company A – 7.6 and Company B – 9.4
- (d) Company A – 6.5 and Company B – 9.2
- (e) Don't know

Answer

The right answer is (a) Company A - 8.8 and Company B - 13.9

The values of £100 equity earnings can be determined by first determining the cost of equity and then using that in the perpetuity formula for finding the value of a constant cash flow. (This is the same formula as the dividend valuation model in corporate finance)

Cost of equity = risk free rate + beta × equity risk premium so

for company A cost of equity = 3% + 1.4 × 6% = 11.4%

for company B cost of equity = 3% + 0.7 × 6% = 7.2%

for both companies the equity value is given by dividing 100 by this cost:

Company A: 100/11.4% = £877.2 or a multiple of 8.8

Company B: 100/7.2% = £1388.9 or a multiple of 13.9

This is predicated on the assumption you want the company value to be maximised. An alternative model used by some private equity investors is to gear up as much as possible and extract value for the current owners by paying a big dividend and leaving the residual risk with the lenders.

Question 5

The idea that company value could be increased by implementing an 'optimal' capital structure took hold in the early 1990s. Until then the finance function had been relatively uninvolved in the drive to create shareholder value. Value creation was more about generating growth in volumes, growth in margins and other operational and commercial factors. Here was an opportunity for the finance professional to contribute to real value creation. By managing WACC the present value of future corporate cash flows could be increased – and as nominal debt values remained constant, this translated directly into value growth for shareholders. This idea caught hold when corporate indebtedness was relatively low. The logic then followed was to raise funds as debt and use those funds to buy back shares. This inevitably resulted in a much greater level of gearing for the companies that followed this path.

What is the appropriate metric for quantifying capital structure?

Before the ideas about capital structure took hold we were all clear: in the UK we measured gearing as debt divided by either total shareholders capital (equity) or tangible equity (the same figure less any intangibles) depending on the circumstances. In the US the more common measure was debt divided by the sum of debt plus equity and the term was described as leverage rather than gearing. The underlying ideas were essentially the same.

When attempting to quantify capital structure in the context of this 'new' methodology involving market values, which of the following is the better measure to use?

- (a) all debt divided by total shareholders funds
- (b) long term debt divided by tangible net worth
- (c) all debt divided by enterprise value
- (d) all debt at market values divided by enterprise value
- (e) don't know

Answer

The right answer is (d) all debt at market values divided by enterprise value.

The underlying issue here is about book values versus market values. Book values of equity, or total shareholders funds, can be very different from market values, as can book values for debt be different from market values of debt. When we think about present values and returns to shareholders we can only think in terms of the amount that the shareholder has invested (at market values) and the return that can be generated through share price appreciation and dividend payments. So enterprise value must be the appropriate value for the denominator of the possible answer choices. Another good candidate would have been market capitalisation, but that was not offered. The issue of 'long debt' versus 'all debt' is fairly clear in that classifying some debt as being 'short' should not exclude it from what is, essentially, a risk measure. More at issue is that debt should be included at market value rather than nominal value.

Question 6

What is the appropriate amount of debt?

The issue of market values is a key part of the capital structure argument – investors can only invest at market rates and debt can only be raised at market rates. But in practical terms it is also an Achilles heel of the argument. If a company finds its optimal level of debt and tries to manage the business with that level of debt – what happens when the stock market suddenly decides that the economic environment is not as benign as previously thought? Market values of equity fall across the board – what was a healthy, ‘optimal’ capital structure can change rapidly as equity values fall by, say, 25%. Take a company with a market value of debt of £100m and an equity value of £300m. Debt as a percentage of enterprise value would be 25% ($100 / (100+300)$). But as equity values fall by 25% to £225, then this figure would increase to ($100 / (100+225)$) i.e. just over 30%. In the case of the market crash of 2000, many high tech companies saw their equity values fall by much more than that! What was an optimal structure now looks decidedly over borrowed. All of a sudden debt needs to be paid down before equity investors start to become overly concerned about this new situation. The recent recession saw over-borrowed firms being targeted specifically.

So the appropriate amount of debt is going to be different for different businesses. The core issue is the variability of the firms returns – its ability to keep generating returns that can meet all debt servicing payments plus provide a reasonable return for shareholders.

Highly stable companies like pure utilities should be able to support much more debt than volatile businesses such as airlines who do well in the good times, but badly in the bad times.

The share buybacks of the last decade or so plus the debt-financed private equity boom are both facets of the mind set that, effectively, growth could last forever. Now that the markets have readjusted most managements are more cautious about debt and the desire for more cautious financing has resurfaced. Is it possible that we will see a wave of share issues specifically to pay back debt – the exact opposite of a share buyback? Maybe a share buyout?

But what about Pension Deficits?

The theories leading to the conclusions above were developed in a world where the assets and liabilities of the business were related to that business. Over the last decade or so UK companies in particular have had to deal with a situation of the normal business assets and liabilities existing alongside pension liabilities. These can be large – particularly at the present time with very low interest rates on government borrowing.

In accounting terms pension deficits arise due to the present values of future liabilities exceeding the market value of assets held to finance those liabilities. All can be in balance before government borrowing rates fall – but then that fall increases the value of future liabilities, by a great amount when the falls have been as large as in the UK in recent years. At the same time the assets offsetting those liabilities have not increased in value. Couple that with the increased longevity and the deficit is born.

Accounting for pensions is a contentious area, and likewise opinion on how best to manage the accounting and real pension risks is divided. The corporate finance view as to the characteristics of pension liabilities – are they equity or debt – is divided too. So with the caveat that there is no universally agreed answer, how should 'optimal capital structure' be determined when there is a pension deficit?

- (a) the pension deficit has no bearing on the debt / equity mix
- (b) the pension deficit is an offset against equity, so equity should assume a greater proportion of the capital structure.
- (c) Capital structure is the outcome from funding the various projects that comprise the company, or group. Just like funding a group of subsidiaries, each according to its risk characteristics the pension fund, being one component, should be funded according to its own risk characteristics.
- (d) Any excess of liabilities over assets (a deficit) should be eliminated immediately either by borrowing or issuing equity to increase the pension assets. After that there is no deficit to be concerned about
- (e) Don't know

Answer

The right answer is (c) Capital structure is the outcome from funding the various projects that comprise the company, or group. Just like funding a group of subsidiaries, each according to its risk characteristics the pension fund, being one component, should be funded according to its own risk characteristics

To restate the caveat at the beginning of this question, there is no agreed correct answer to the question. However, it is very probably wrong to argue that the pension deficit has no bearing on the debt / equity mix. Similarly it is very probably wrong to argue that any deficit should be paid off immediately – the liabilities side of the pension scheme balance sheet can change in terms of present value as soon as interest rates change. It would make little sense to issue equity for what might turn out to be a short term problem. Most companies would take a longer term view of eliminating the deficit – targeting a period of several years. Answer (b) is correct in accounting terms, the deficit is an offset against equity – but increasing the proportion of equity on this basis means that many companies would end up with almost all equity in their capital structure and the result would be an income stream which suffers a much greater tax leakage than would otherwise be the case. But the deficit is a prior claim on earnings, as is debt servicing so just maybe there should be a higher proportion of equity. But as a long term issue, the firm will pay a lot of tax in the meantime. Most companies would probably take a shorter term view and not balance off the deficit with equity.