

WACC attack

Ian Cornelius

The first part in a series of three articles explaining the many aspects of cost of capital theory

The cost of capital is a huge subject, incorporating many of the most famous and controversial theories in financial management. Given its breadth, it is tempting to treat it as a series of discrete topics with no common thread. This would be a mistake. The key to unlocking the mysteries of the cost of capital is to understand how all of these strands come together. It is particularly important for final-level students to gain a global overview of the subject and to understand how it links with other areas of the syllabus.

In a series of three articles I will cover all of the major topics under the “cost of capital” heading – namely:

- how to make basic weighted-average cost of capital (WACC) calculations;
- how different gearing levels affect the WACC (capital structure theory);
- how to use the capital asset pricing model (CAPM) to calculate the cost of equity;
- how to use the adjusted present value (APV) approach.

All three articles should be of use to final level Financial Strategy (FLFS) students, but those at intermediate level will also find parts in this first article relevant to the syllabus they are studying.

The cost of capital can be thought of as the minimum return required by providers of finance for investing in an asset, whether that is a project, a business unit or an entire company. It needs to reflect the capital structure used to finance the investment. As such, it is likely to include the cost of equity and debt.

Expressed as an annual percentage return, it represents the “hurdle rate” that a company’s projects must exceed if they are to increase the investors’ wealth. So the cost of capital is used as the discount rate in net present value (NPV) project appraisal techniques. Projects that earn positive NPV at the cost of capital are accepted because they earn more than the investors’ required rate of return and will add to their wealth. Negative NPV projects are rejected because they reduce the investor’s wealth by earning less than their target rate of return.

The cost of capital therefore has a pivotal role to play in corporate finance, forming the link between the investment decision (what the company should be spending money on) and the finance decision (how it should be funding that spend).

The weighted-average cost of capital (WACC) represents the overall cost of capital for a company, incorporating the costs of equity, debt and preference share capital, weighted according to the proportion of each source of finance within the business.

The models used to calculate the cost of each source all start from the premise that the required rate of return is a function of the investors’ expectations of future cash-flow returns, expressed as a percentage of the current value of their investment. The cost of equity share capital is calculated using the dividend valuation model. The usual assumption made is that future dividends are expected to grow at a reasonably even rate.

Preference share capital usually pays a constant dividend each year, so no growth function is required. For debt, the future cash-flow stream is the interest payments. As with preference shares, these cash flows are constant, but, given that a company can deduct interest payments in determining taxable profits, it will experience a tax saving on the interest it pays. This tax shield reduces the cost of debt finance from the company’s perspective.

In practice, the firm’s WACC is often used as the discount rate to appraise new projects. But it is crucial to realise that this approach makes three key assumptions:

- that the project has the same business risk as existing activities;
- that the project does not change the financial structure of the business;
- that the project is financed from a “pool of funds”.

The third assumption is not usually a problem. Most finance is not project-specific. Projects draw on the company’s general pool of finance, which incorporates funds from all of the company’s finance providers. The cost of using this pool of finance is, of course, the WACC.

The first two assumptions cause the main problems here. The company’s WACC reflects the riskiness of its current activities. It also reflects the current financial structure and gearing risk. If a new project changes either of these risk profiles, the WACC becomes an inappropriate discount rate.

When considering the effect of different capital structures on the WACC, it is important to focus on the action of two competing forces as the company gears up. The first force recognises that debt finance is cheaper than equity finance. As a firm increases its gearing, the proportion of this cheap finance within the capital structure increases. All other things being equal, this will reduce the WACC.

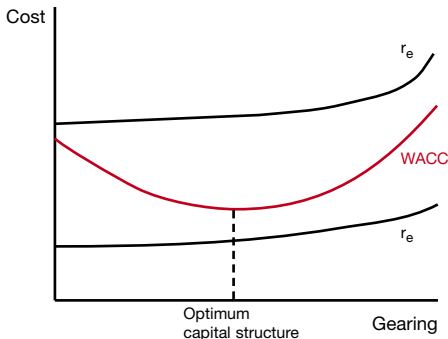
The second force focuses on the cost of equity. As a company gears up, shareholders’ returns become increasingly volatile, owing to the fixed interest bill that must be repaid before they are given their cut. This extra risk increases their required rate of return. All other things being equal, this increasing cost of equity will increase the WACC.

The overall effect on the WACC depends on the relative size and strength of these two opposing forces. There are two schools of thought here. The traditional view of capital structure theory, based on observation and intuition, suggests that an optimum capital structure exists. This minimises a firm’s WACC and therefore maximises its value. So the finance decision is as relevant to a firm’s value as the investment decision.

In 1958 two economists, Merton Miller and Franco Modigliani (M&M), presented a radically different view of capital structure theory. They suggested that value was about “what you do” (the investment decision). How you financed it, they argued, was irrelevant. In their “arbitrage proof”, they demonstrated that two firms with identical investments would have the same value, regardless of their gearing.

This theory is rock-solid, given the assumptions it makes. In a market with no imperfections, getting obsessed about where the money comes from is indeed misguided – businesses should focus on the

WACC theory in development

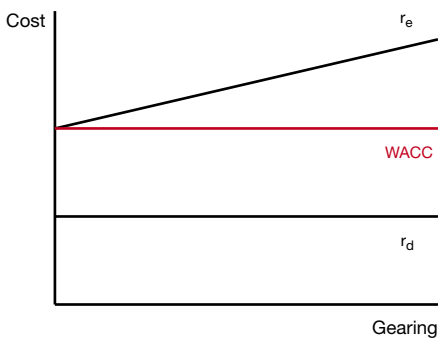


The traditional view

- Increasing use of cheap debt finance dominates at low gearing, pushing the WACC down.
- Rapidly increasing cost of equity dominates at high gearing, pushing the WACC up.
- The optimum capital structure exists, minimising the WACC and maximising the firm's value.

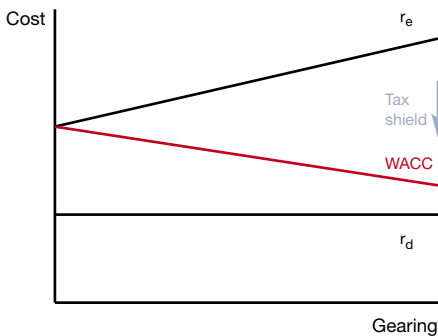
M&M I – 1958

- Value is a function of the investment decision, rather than the finance decision.
- Two identical businesses with different gearing should have identical values and WACCs.
- On gearing up, no force dominates. The increased use of debt finance is balanced exactly by an increasing cost of equity, leaving the WACC unchanged.
- In a perfect market there is no optimum gearing level. Companies should focus on the investment decision only.



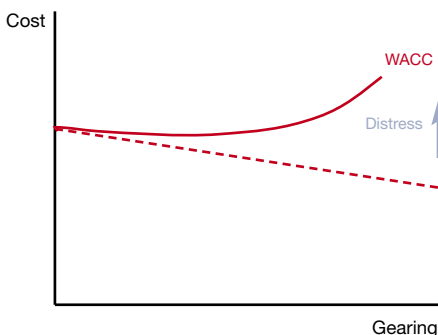
M&M II – 1963

- Once tax is introduced, debt finance becomes even cheaper, owing to the tax deductibility of the interest payments.
- Debt becomes the dominant force. Increasing gearing leads to reduced WACC and increased company value.
- The increase in value is the tax shield. To optimise this benefit, firms should gear up to the highest level possible.



The compromise view

- At extreme gearing levels, the costs of financial distress become significant, pushing the WACC back up.
- The position is now consistent with the traditional view.
- In an imperfect world, the tax shield effect and costs of financial distress probably mean there is an optimum capital structure.



quality of their investment decisions. The problem is that the world is not perfect. In particular, the presence of taxation gives debt finance an additional advantage.

Because interest is tax-deductible, the use of debt finance gives rise to a tax saving. So in 1963 M&M republished their model to propose that the value of a geared firm was the value of the equivalent ungeared firm plus the present value of any tax shield generated by the use of debt finance. This suggested that the optimum gearing level was 100 per cent.

In the real world, companies do not raise their debt-to-equity ratios to such extreme levels. This is because at high levels of gearing the costs of financial distress that may lead to liquidation are much more likely. This means that the cost of equity and debt increase significantly at high levels of gearing, causing the WACC to increase.

The traditional view of capital structure theory, leading through M&M's 1958 and 1963 positions, together with the final compromise position taking into account financial distress, is summarised in the panel. It suggests that, given market imperfections, the WACC is affected by changes in the gearing level within the company.

It is clear that the WACC lies at the heart of finance, linking together the key areas of the investment and finance decisions to measure whether the business has created or destroyed value. What is not yet clear is how the WACC is affected for changes in business risk – that is, the fundamental inherent risk of the sector in which the company operates. To grasp this, you need to understand what is arguably the most famous financial theory to appear in the past 40 years: the capital asset pricing model (CAPM). This will be the subject of the next article in this series. ■

Ian Cornelius is director of ATC's value creation department and specialises in final level Financial Strategy. He has co-written two books on shareholder value. He can be contacted at ian.cornelius@atc.co.uk