

## Corporate Finance, Module 18: Financing and valuation: weighted average cost of capital

### *Corporate finance module 18: Readings for Eleventh Edition*

(The attached PDF file has better formatting.)

The page numbers here are for the *eleventh* edition of Brealey and Myers. You may also use the seventh, eighth, ninth, or tenth editions of this text. The page numbers for earlier editions are in separate postings. The substantive changes in the textbook are slight among these editions, but the final exam problems are based on the eleventh edition.

{The Brealey and Myers textbook is excellent. We say to read certain sections and to skip others. This does not mean that certain sections are better; it means that the homework assignments and exam problems are based on the sections that you must read for this course. Some of the skipped sections are fascinating, but they are not tested.}

Read the introduction on page 479 from the top to the end of bullet point 1 (“... via the after-tax weighted average cost of capital or WACC. ... lot more guidance on how it is calculated and used”). Module 18 covers the weighted average cost of capital; module 19 covers the adjusted present value approach. The modules are hard for many candidates.

Read section 19.1, “The After-Tax Weighted Average Cost of Capital,” on pages 479-483. Module 16 introduces the weighted average cost of capital; module 18 covers the WACC approach to capital structure. Know the formula at the top of page 480. The effect of corporate income taxes on optimal capital structure implies that financing may vary by country. Don’t forget that the tax adjustment (“ $1 - T_c$ ”) affects the return on debt, not the return on equity. Work through the Sangria Corporation example on pages 481-483; the final exam problems are similar. The *returns* on debt and equity give the return on assets; the *betas* of debt and equity give the beta of assets. The formulas are the same.

Skip section 19.2, “Valuing Businesses,” on pages 483-488. This section is helpful if you work on mergers and applications or if you must value a company’s stock price, but it is not essential for the financial theory.

Read section 19.3, “Using WACC in Practice - Some Tricks of the Trade,” on pages 488-492. Focus on the tricks of the trade, which the final exam covers: know how to deal with multiple sources of financing, short term debt, and high yield bonds. The final exam specifies whether to include short-term debt or not, since both methods are valid. The final exam does *not* cover convertible debt, which is covered in a section not in the readings for this course. (It is covered in the textbook after option pricing, since the conversion to stock is an option.)

Read section 19.3 from page 491 until “Unlevering and Relevering Betas” on page 492. Know the effects on the cost of equity and the WACC as the debt ratio increases on page 492; Figure 19.1 helps to understand the relations. Skip the rest of section 19.3 (pages 492-495). Unlevering betas is a technique to estimate the weighted average cost of capital when the debt ratio changes; the final exam does not test this subject.

Read the summary on page 501 until “APV is, in concept ...” The rest of the summary deals with adjusted present value, which we cover in the next module.

Review problems 1 and 2 on page 502; problems 11, 14, and 15 on pages 503-504; and problem 22 on page 506.

Skip the appendix on pages 508-511.

This subject is difficult. For items that have a market value, we need a valuation method that supports the market value.

- The Black-Scholes formula gives market values that accord with empirical trading of options; this gives us confidence that the Black-Scholes formula is correct.

- Stocks with high unique risk but low systematic risk do not seem to have high returns; this supports the modern portfolio theory perspective on systematic risk.
- The effect of interest rate movements on bond prices is worked out by discounted cash flow procedures; the bond markets support the theory.

Some subjects are clear. We may not have empirical evidence supporting the theory, but few theorists dispute the theory.

- The dividend growth model gives the value of a stock. We rarely know the dividend growth pattern or the market capitalization rate, so we can't test the theory. But the capitalization rate is the rate that gives the observed stock price, so we assume the formula is correct.
- Some assumptions about the effects of taxes on investment strategy are hard to test, since tax rates vary by investor and by type of investment. But the theory is not disputed; taxes paid to the government are not received by the investor, so the value of the investment is reduced by the cost of the taxes.

Capital structure in the presence of positive corporate taxes, costs of bankruptcy, principal agent problems, and other market imperfections is difficult to justify. The empirical evidence does not support any one theory, reflecting both the uncertainty in our understanding and the lack of good data. Brealey and Myers posit that the adjusted present value depends on the firm's financing position: is the debt fixed or does it vary with the value of the project? In practice, neither assumption is correct: a firm has dozens or hundreds of projects, and it deals with each financing issue as it comes up.

*Illustration:* Ford produces dozens of vehicles; at any time, it has hundreds of projects that are financed partly by debt and partly by equity. Debt issues are not tied to specific projects. Each project has a finite life, but we don't know whether it is five years or fifty years. We do not know if Ford intends its debt financing for a given project to be fixed or to vary with the value of the project, since Ford doesn't think of its debt in this fashion. Its debt strategy is a corporate decision, based on its views of the optimal mode of financing at that time.

For Brealey and Myers, adjusted present value depends on the financing rule. It might seem that we can evaluate the financing perspective by seeing which projects Ford accepts.

- Before the project is accepted, Ford has only a vague idea of the probable cash flows. Outside academicians, like Brealey and Myers, do not even know what projects Ford is considering; they surely have no idea of the probably cash flows.
- Some academicians use hind-sight measures, assuming that the realized cash flows are good proxies for the expected cash flows. But we don't know the realized cash flows for a specific project even in hind-sight. Cash flows are not shown separately by project in Ford's financial statements, and most cash flows can't be separated by project even if we are given more data. Research, marketing, overhead, and most expenses cannot be easily separated by project.

The empirical evidence does not seem to support the aggregate theory, since firms seem to have too little debt and too much equity to optimize their operations. The uncertainties in principal agent problems and other capital market imperfections are so great that we don't know that the empirical evidence says.

We remain with theory, and the theory is disputed. We might say: "Given certain assumptions and modes of corporate behavior, firms do the following." We don't know if the assumptions are correct or if firms behave as we posit, so the predictions are often guesses.

*Question:* Do you mean that the capital structure modules are not important?

*Answer:* Just the opposite. The CFO must say whether a particular financing method is good. With just equity financing, we say: "Check the net present value." With both debt and equity financing, we must say: "Examine the present value adjusted for taxes, costs of bankruptcy, principal agent problems, and other capital market imperfections." We may not know the proper method to derive the adjusted present value, but we have theories. Theories that are closer to the truth make more successful firms.

Brealey and Myers do not wish to give an impression that they know the answer. They know more than most other analysts, but they are not arrogant. They say: "Here are several theories and several methods."