

Corporate Finance, Module 2: “How to Calculate Present Values”

The page numbers here are to the seventh edition of Brealey and Myers. You may also use the sixth edition or the eighth edition for this course.

Readings: from Brealey and Myers, chapter 3

(The attached PDF file has better formatting.)

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Module 2 deals with material that is covered in greater depth on SOA Course FM (CAS Exam 2). If you sat for Course 2 in 2004 or Course FM in 2005, you know this material; if you have not yet sat for Course FM, you must learn this material anyway.

Focus on section 3.2, perpetuities and annuities. Know especially the following formulas:

- Page 37: present value of perpetuity
- Page 38: present value of growing perpetuity
- Page 39: present value of perpetuity beginning in year $(t+1)$
- Page 39: present value of annuity

The notation for Course FM is slightly different, but the formulas are the same. This course focuses on the financial theory, not on annuity valuation. The final exam questions can be solved by writing out the present values of each cash flow, but the annuity and perpetuity formulas simplify the mathematics.

Jacob: Where do we use these formulas in corporate finance?

Rachel: The present value of a perpetuity is the market value of perpetual debt. The debt always itself has a maturity; it is not permanent. Perpetual debt means that the firm intends to refinance the debt at its maturity. We use this formula to evaluate the tax shields from perpetual debt for the capital structure modules of this course.

The next module takes the present value of common stock dividends, assuming a steady growth rate and no maturity; this is the growing perpetuity. A growing perpetuity starting after N years is a stock that pays no dividends now, but will begin paying after N years, or a stock that will change its dividend yield in N years. The annuity formulas are used to value finite debt.

Read section 3.3, “Compounding Intervals,” pages 40-45. Know the three paragraphs on page 43 regarding continuous compounding. This subject is covered on Course FM; know the formulas on page 43. Option pricing on SOA Course 6 and CAS Exam 8 uses continuous compounding. Brealey and Myers show the formulas with annual compounding, since not all their readers can handle exponentiation. The final exam for this course follows the formulas in the Brealey and Myers text.

Read section 3.4 and 3.5, and focus on the subsection “What happens when interest rates change?” on page 48. This is also covered in Course FM and in greater detail on SOA Course 6 and CAS Exam 8. The capital structure modules of this course use the *market values of debt and equity*. For equity, we use the stock price, not the book value of the firm. For debt, we discount future interest payments at the proper capitalization rate.

For valuing the tax shield of debt, we must know how changes in interest rates affect bond values. If the debt is perpetual, we need just the market value, not the yield to maturity; if the debt has a limited life, we need the yield to maturity as well.

The Summary on pages 49-50 lists the major formulas. From the quiz on page 50, review questions 1-8; these do not require much arithmetic. Review questions 12 & 14 (page 51).

The practice questions deal with Course FM material. The final exam for this course focuses on the finance aspects, not the annuity and bond aspects.