Corporate Finance, Module 4, “Net Present Value and Other Investment Criteria”

Corporate finance module 4: Readings for Tenth Edition

(The attached PDF file has better formatting.)

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The page numbers here are for the *tenth* edition of Brealey and Myers. You may also use the seventh, eighth, or ninth 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 tenth 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.}

You can skip pages 101-103. The introductory skit (Vegetron) is not particularly good; others are better. On page 103, “net present value’s competitors,” focus on the internal rate of return; skip the sections on book rate of return and payback period. On pages 103-105, focus on

I. Three points to remember about NPV
II. NPV depends on cash flows, not on book returns

The second of the three points is most important: “NPV depends only on forecasted cash flows and the opportunity cost of capital.” At the moment that cash is transferred (if it cannot be recouped), a forecasted cash flow becomes a sunk cost.

Skip section 5.2, “Payback” on pages 105-107. This is not a financial yardstick, it is not discussed in the rest of the course, and you need not read this material to understand the financial theory.

Read section 5.3, pages 107- 115 on the internal rate of return, and know the equation at the middle of page 108. The final exam may determine the internal rate of return given cash flows in three periods. The general case is a quadratic equation; exam problems focus on the theory, and the arithmetic is not difficult. You won't need a financial calculator.

Know the IRR rule on page 109; it is tested in the final exam. Know how this rules applies to borrowing vs lending.

Read Pitfall 1 on page 109; *skip* Pitfall 2 on pages 110-111; read Pitfall 3 on pages 111-113; and *skip* Pitfall 4 on page 113. Pitfalls 1 and 3 apply to pricing insurance policies. Pitfall 2 is rare; the *expected* cash flows for insurance products have a single sign change and only one IRR. Pitfall 4 would be relevant if we could identify the opportunity cost of

capital for different time periods. In practice, we can not do so; we use a single opportunity cost of capital.

Read the *verdict on IRR* on pages 114-115. Many pricing actuaries use the IRR criterion. Both the SOA syllabus (Atkinson and Dallas textbook) and the CAS syllabus (IRR study note on the advanced pricing exam) use IRR, not NPV. Most actuaries don't agree with Brealey and Myers regarding the relative worth of NPV vs IRR, but you must know their perspective for this course on why NPV is better.

Skim section 5.4, “Chosing capital investments when resources are limited,” on pages 115-117. This is related to Pitfall 3, which is tested on the final exam. Section 5.4 has no direct problems on the final exam, but it summarizes the intuition for this chapter. Actuaries do not deal with capital rationing in the sense *discussed here*. This section is more important for start-up businesses than for the insurance industry. Actuaries deal with capital allocation by line of business, risk-based capital requirements, and rating agency capital adequacy measures. The issues are different from the material in these pages.

The practice problems for Module 4 have full comparisons of NPV and IRR, explaining the Brealey and Myers perspective and the common actuarial perspective.

Read the summary on pages 119-120; this is a good review of the chapter.

Review problems 3, 4, and 6 on page 121, and problem 13 on page 123. Skip the mini-case on pages 124-126; this deals with book rates of return.

Some of the problems in the textbook deal with the unusual situations discussed in the four pitfalls. The practice problems on the discussion forum for this course give standard scenarios with more explanation.

Jacob: If return on book equity (and other accounting ratios) is not a good profitability measure, why do Brealey and Myers discuss it?

Rachel: The accounting measures are far more common than net present value. It is difficult to project cash flows for future years, and it is exceedingly difficult to compute or to understand economic income (as Brealey and Myers define it). The accounting measures define ratios that everyone (firms, investors, creditors) uses the same way. Investors know what a 12% return on GAAP equity means; they are not sure what the firm means by a 12% internal rate of return or a 12% profitability index.

Jacob: Do actuaries use financial measures or accounting measures?

Rachel: The readings on the actuarial syllabus encourage net present value or internal rate of return. The actuarial exams compare return on book equity, return on statutory surplus, and return on invested capital, in the same manner as Brealey and Myers.

Insurance executives listen to the actuarial models and the indicated returns. But no matter how often actuaries tell them that net present value is better than accounting

measures, management generally uses a statutory or GAAP return measure, often recommended by the company's comptroller or CFO. You should understand these other measures for real work, though they are not covered here.

Jacob: Why isn't net present value used more often in practice?

Rachel: Suppose a firm builds a factory to manufacture cars, or sets up a research center to develop new medications. These are long-term projects; the economic income in any year depends on the expected cash flows from now until the project ends. The firm has no ending date for the project, and it can not project cash flows more than a year or two in advance. A pharmaceutical firm starting a research project in 20X0 may not have positive cash flows until 20X9, and the probability of positive cash flows is small and uncertain.

NPV may be theoretically correct, but it is hard to implement. GAAP returns are easy to compute. The GAAP equity and GAAP income are in the financial reports; management simply divides one by the other. Banks, investors, bondholders, and the Board of Directors all know what the return on GAAP equity means.