

## Corporate Finance, Module 4, "Net Present Value vs Other Valuation Models"

*Required reading:*

(The attached PDF file has better formatting.)

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{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.}

Skip pages 91-92. The introductory skit (Vegetron) is not particularly good; others are better. On page 93, "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 93-94, focus on

- I. Three points to remember about NPV
- II. NPV depends on cash flow, not accounting income

The second of the three points is most important: "NPV depends solely on the 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"; 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 on the internal rate of return, and know the equation at the bottom of page 96. The final exam may ask you to determine the internal rate of return given cash flows in three periods. The mathematics requires solving a quadratic equation; the final exam focuses on the theory, and the arithmetic is not difficult.

Read Pitfall 1 on pages 98-99; *skip* Pitfall 2 on pages 99-101; read Pitfall 3 on pages 104; and *skip* Pitfall 4 on pages 104-105. Read the *verdict on IRR* on page 105.

Many pricing actuaries use the IRR criterion. Both the SOA syllabus (Atkinson and Dallas on Course 5) and the CAS syllabus (the IRR study note on Exam 9) use IRR, not NPV. You need not agree with Brealey and Myers regarding the relative worth of NPV vs IRR (we don't), but you must know their perspective for this course on why NPV is better.

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

Skip section 5.4 on page 105-109. 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.

Read the summary on pages 109-110; this is a good review of the chapter. Skip the mini-case on pages 116-117; this deals with book rates of return.

Most of the quiz questions and problems in the textbook deal with the unusual situations discussed in the four pitfalls. These quiz questions and end of chapter problems are useful for the CAS transition exam, not for the final exam of this course. The practice problems on the discussion board 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 CAS Exam 7 syllabus compares 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 too hard for most firms. In contrast, 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.