

Corporate Finance, Module 22: “Real Options”

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.}

The boxed introduction on page 617 lists the four types of real options discussed in chapter 22. We cover the first three in this module, which are applicable to insurance companies and actuarial consulting firms: the options to expand, wait, and shrink. We do not cover the fourth real option (to vary the mix of output or the firm’s production method), which does not apply to actuarial applications.

Read section 22.1, “The Value of Follow-on Investment Opportunities,” on pages 617-622. This option is relevant for insurance pricing, since the sale of one product to a customer, such as an auto insurance policy, is often the best way to sell other products, such as life insurance, Homeowners insurance, health insurance, or investment products. Many insurers have subsidiaries selling other types of products; Brealey and Myers show how to evaluate the value of a product which may lead to expansion possibilities.

Read section 22.2, “The Timing Option,” on pages 622-625. The discussion forum has a common example using trade fairs to show the value of this option. Timing options are particularly important for industries with profitability cycles (such as the property-casualty underwriting cycle) combined with lag times to raise volume (caused by the high customer loyalty to insurance suppliers).

Read section 22.3, “The Abandonment Option,” on pages 625-628, skipping the sub-sections “Abandonment Value and Project Life” and “Temporary Abandonment” on pages 629-630. Abandonment options are particularly important for direct writers, who face large fixed costs setting up distribution systems (captive agents).

Skip section 22.4, “Flexible Production – and Another Look at Aircraft Purchase Options,” on pages 630-636; skip the side-bar on “Valuing Flexibility” on page 632, and skip section 22.5, “A Conceptual Problem?” on pages 636-637. This real option is relevant to manufacturers, not to insurance companies.

Read the summary on page 635.

Look at practice question 1(a) on page 637. Some readers (too hastily) say: “We drill only if the price of a crude oil exceeds \$32 a barrel.” That’s obvious, and that’s not the point.

The question is “How much are the drilling rights worth? Should we pay \$10 million for these rights, because it might be worthwhile to drill, or zero for these rights, because it is not worth drilling now?” The answer depends on the *volatility* of the price of crude oil.

Look at practice question 1(b) on page 637. One might think: “We can sell the real estate for \$5 million. If this is greater than the present value of the restaurant cash flows, we sell the land. Where is the option?” The option depends on the nature of the restaurant cash flows. If they are a random walk, and the cash flows increase (for whatever reason) the first year, these cash flows may now be worth more than \$5 million. If the *volatility* of the cash flows is great enough, it may be worth waiting a year or two to see if the cash flows increase, and selling the real estate if they don’t increase after a year or two.

Look at practice questions 1(c) and 1(d), and make sure you spot the option. Review practice question 4 on page 638; in the next Module, apply the Black-Scholes formula to this problem. Look at practice question 9 on pages 638-639, and apply the binomial tree pricing method to value this option. Do just Part (a) of this problem; Parts (b) and (c) are more complex, and will not be tested on the final exam.