Corporate Finance, Module 22: “Real Options”

Corporate finance module 22: Readings for Tenth Edition

(The attached PDF file has better formatting.)

Updated: October 14, 2010

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.}

The introduction on page 554 lists four types of real options. 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.

Final exam problems may ask to identify real options and to price real options. Identifying real options is not hard, and Brealey and Myers give many examples. Pricing real options is hard, since we rarely know the needed parameters.

Read section 22.1, “The Value of Follow-on Investment Opportunities,” on pages 554-558. 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 558-561. 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 561-564, skipping the sub-sections “Abandonment Value and Project Life” and “Temporary Abandonment” on pages 564-566. 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,” Section 22.5, “Aircraft Purchase Options,” the side-bar on “Valuing Flexibility,” and section 22.6, “A Conceptual Problem?” This real option is relevant to manufacturers, not to insurance companies.

Read the summary on pages 571-572. Note the “healthy warning”: real options are difficult to value.

Review problems 1 and 2 on page 572; problems 4, 5, and 9 on page 573; problems 10 and 13 on page 574; and problem 20 on page 575.

For problem 9(a) on page 573, some readers say: “We drill if the price of crude oil exceeds $70 a barrel.” 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.

For problem 9(b) on page 573, 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.

Similar comments apply to the other real options in these problems. Good business people are aware of these options but rarely know how to value them. Options pricing allows us to value these options more precisely, leading to better business decisions.