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Real Options: The Flexible Approach to Business Investment Decisions

Using Financial Option Analysis for Business Operations

During the decade of the '90s, activity-based costing was the leading analytic technique applied to the financial management of businesses. In the first decade of the 21st century, "real options" promises to become the most sophisticated tool for decision-making for the management of the assets of a business. Financial options are rights to buy or sell securities at a specified price before a specified date. Real options are identified opportunities to invest with or liquidate a business's real operating assets. These options are created through management's ability to change course and create new opportunities as new information becomes available and uncertainties are more narrowly defined. These options become "real" when management defines them and are implicitly held by management until they are exercised.

Valuing Future opportunities

Every small business owner or executive knows that his or her strategic plans can lead to unexpected results. As management reacts to these results, their strategies can be enhanced as time passes. Also, investments in expansion, diversification, or other growth strategies can often be made in stages. There is inherent value to this flexibility, because it increases the upside potential and decreases the downside risk of most investments. But how can this value be quantified?

Discounted Cash Flow ("DCF") is and will remain the primary means of valuing businesses. The financial markets tend to value companies on the basis of projected cash flow discounted by a risk-adjusted cost of capital. But many companies, particularly those without long histories, achieve market values in excess of the cash flows expected from their current strategy. Their market value may reflect investors' assessment of the options these companies have to expand in the future.

Therefore, real options valuation complements DCF. A company's total value is the sum of its DCF value and the value of additional real options.

Categories of Real Options

"Real Options" is an analytic technique that identifies the various stages in a business investment, where decisions must be made to "invest," "expand," "abandon," "contract," "switch," or "defer." These options are then characterized as equivalent to "put" or "call" options in the securities market and are valued utilizing established methods within those markets.

These are "in the money" when the present value of the cost of the investment (the "strike" price) is less than the present value resulting from the investment. The chart below illustrates the real options.

Real Option	Abandon	Contract	Switch	Defer	Expand	Invest
Option Type	Put	Put	Both	Either	Call	Call
Objective	Limit Downside	Limit Downside	Both	Either	Increase Upside	Increase Upside

Decision Tree Analysis

Real options helps management optimize its decision-making.

There are three commonly used methods to value real options: Decision Tree Analysis; Binomial Analysis, and Black-Scholes analysis.

The example of a company introducing a new highly technical product serves to illustrate this approach to investment decision-making. The product will require development costs, testing, and effective marketing. Through research the company determined that if development and marketing efforts were successful, the net present value of the product would be $50 million dollars. They estimated the cost of development at $25 million dollars. Past experience indicated that there was a 50 percent chance of success in the initial testing phase, an 80 percent chance of success in the final testing stage, and a 75 percent chance of success during test marketing. The overall probability of success was 30 percent (50% x 80% x 75%) and the overall chance of failure was 70 percent. This result leads to a DCF value of negative -$2.5 million (.30 x 50)+(.70 x -25). Should the company abandon its project?

To test the apparently logical conclusion to abandon the project a decision tree was created, which incorporated all probabilities of possible outcomes of initial and final testing of the product and test marketing it and all possible related management decisions. Real options helps management optimize its decision-making. For example, the technique permits quantifying the savings related to abandoning a project at an early stage, when it appears to no longer have sufficient profit potential to justify the risks. Standard DCF is applied to each possible outcome as if it were the final result. The decision tree assumes that management will always make the optimal choice available for each possible outcome. Non-optimal choices are rejected. This analysis determined that the real options NPV of the project was $5.5 million. The following chart illustrates the process:

The decision tree model is an excellent way to apply real options analysis when:

1. The possible outcomes of future decisions can be identified.

2. There is a statistical basis for measuring the probabilities of future outcomes.

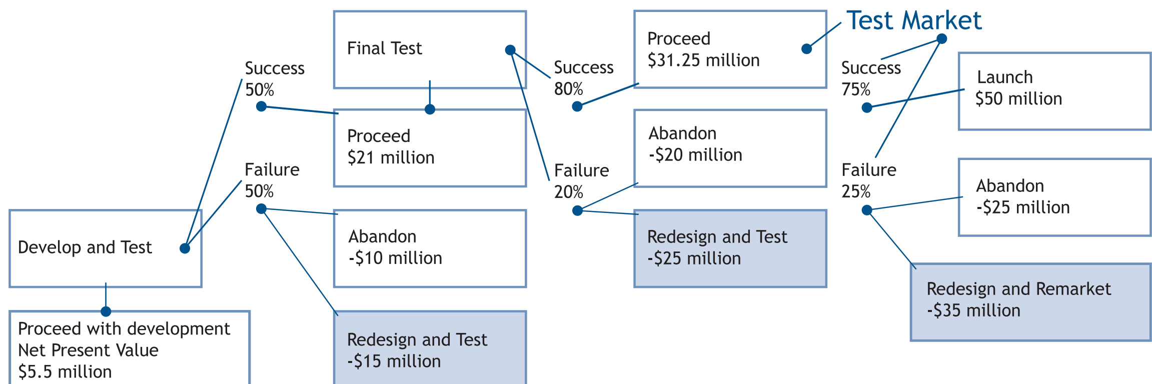
3. Managers make the optimal decisions as defined by the model.

— Joseph C. Paparone II, CPA
— Robert B. McMunigle, CPA, PFS, Registered Investment Advisor

Editor's Note — Joe Paparone is the partner in charge of the firm's Grove City office and routinely applies sophisticated forms of analysis of management information in providing business advisory services.

Bob McMunigle is a manager in the Meadville office. He is a tax specialist, has considerable experience with securities markets, and participates regularly in the professional valuation of businesses.

This article is based on an article in the July/August 2002 issue of the publication, Corporate Finance, published by Warren Gorham & Lamont. The article is entitled "Making Real Decisions with Real Options," and is authored by Tom Nodine, a vice president at L.E.K. Consulting.



To follow the calculations work backwards multiplying the success percentage times the NPV of the optimal success choice plus the failure percentage times the optimal failure choice.

Accounting Accountability

For decades Americans, when polled, indicated that they trusted the integrity of the accounting profession far above all others. That confidence is virtually a requirement of the relationship between accountant and client, considering the confidentiality and sensitivity of the information with which accountants are entrusted.

The capital that fuels a capitalistic economy comes primarily from lenders or investors. If the financial information upon which lending or investing decisions are based cannot be relied on, the economic system cannot survive. Accountants, as auditors, perform an "attest" function — that is they attest to the proper presentation of the financial information contained in the financial statements. It is primarily these reports upon which a capitalist society relies as it provides capital to businesses.

Recently, confidence in the accuracy of audited financial statements has been shaken by a series of dramatic corporate financial collapses, and by myriads of other reports of long respected companies making performance claims that were misleading and based on questionable accounting practices.

Surprising Disclosures

There are many ways in which earnings can be overstated and the balance sheet enhanced by overstating assets or hiding liabilities. A few that are currently being targeted by the SEC are:

- The use of pension income as a means of boosting earnings
- Accounting surrounding mergers and acquisitions
- Off-the-books entities and debt
- Any accounting area in which management has discretion, such as in the reporting of loan write-downs

In a recent survey of 190 chief financial officers, 21 percent believe they have "misled investors." Of the remaining 79 percent, many would disagree on what constitutes aggressive or marginal accounting practices.

Incentives for Dishonesty:

Conflicts of Interest?

One significant factor in the influences that can at least affect an executive's objectivity is the fact that many of them have stock options as the major portion of their compensation. Maintaining the stock price becomes a personal issue, as well as one demanded by shareholder and institutional investor pressure.

Another factor is that many boards of directors and audit committees are staffed by representatives of companies who are customers of the corporation. They have a clear incentive to support management. Often the rewards systems for employees favor "Yes Men," and discourage harbingers of ill tidings.

Accounting firms are often beneficiaries of large and continuing consulting engagements and have little incentive to lose the favor of management by insisting on unpopular or unfavorable disclosures on audit reports. The critical component of an accounting firm's credibility on attest engagements has been its "independence." If it is helping to shape management decisions, through its consulting role, the auditing function needs to be carefully structured in order to maintain independence.

Restoring Confidence

The restoration of confidence must simply be grounded in honesty — the assurance that financial information is candidly represented in as accurate a manner as possible, without an effort to mislead by placing a favorable construction on the results through omissions. To promote this confidence, essential to the successful operation of a capital based economic system, several issues must be addressed:

1. Decision-makers must not have their compensation contingent upon decisions that affect short-term stock prices. Tax laws defining "reasonable compensation" have contributed to the development of these counter-productive compensation packages. Even if these conflicts of interest are resolved, considerable dependence upon the ethical integrity of business leaders will still be required, because of the considerable pressure on them from investors.

2. Boards, compensation and audit committees must be comprised of individuals who have no contract, consulting or compensation arrangements with the company.

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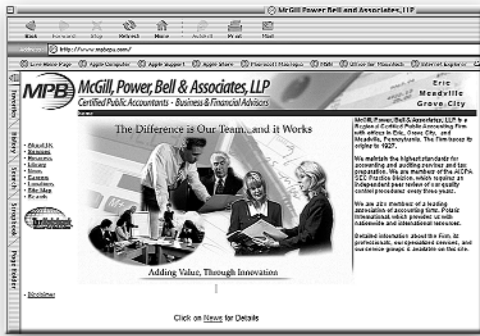

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3. The culture of the company must be conducive to open discussion, where employees can voice concerns and are not automatically penalized if their message is not a positive one.

4. Accounting practices should be reviewed and discussed within the company, particularly by the audit committee, and then voluntarily disclosed in the financial statements.

The objective is the restoration of trust and confidence in the accuracy of financial information through preventing conflicts of interest, promoting independence, and stimulating candid exchanges of information.

— John E. Litzinger, CPA

Editors Note — John is a partner in the Meadville office and has been a past president of the PICPA Northwest Chapter and a member of the its statewide ethics committee. Bob Power, a partner in the firm, has been the chairman of the State Board of Accountancy and another partner, Diana Schaney, has served on this board. One of its functions is to oversee the ethical conduct of the profession in the Commonwealth of Pennsylvania.

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