



Opinion - Management

Using real options to manage risk

A. V. Vedpuriswar

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ENTERING into a new business or making a major investment in an existing business may result in a variety of outcomes that demand a range of strategic responses. Each outcome poses several alternatives to the venture. Plans to change operating or investment decisions later, depending on the actual outcome, must form an integral component of the projections.

Thinking of the investment in terms of options allows uncertainty to be taken into account more effectively. These, called 'real options', share not only many similarities but also some important differences with financial options. The basic point is that real options can be used to measure uncertainty in various situations where putting numbers looks almost impossible.

Researchers Martha Amram and Nalin Kulatilaka have explained the use of real options while evaluating a project. Thus, when a company is setting up a plant, a timing option, in the form of a delayed expansion in capacity, could create value in a situation of uncertain demand. Similarly, an exit option in the form of a plant closure increases the value of the investment decision.

Normally, such options are not considered while using standard project appraisal techniques such as the Net Present Value. By looking at strategic decisions in terms of real options and then using information from financial markets to value these options, risk can be better assessed.

There are two main differences between financial and real options. First, the information necessary to value financial options and decide whether to exercise them or not is usually much more readily available than for real options. This is because financial options are widely traded.

The second important difference relates to the clarity of the terms. The right to exercise financial options, that is, buying or selling the underlying asset is unambiguous. But it is often not clear whether the holder of a real option has the right to buy or how long that right will last.

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But the major problem with real options is more behavioural than technical. There is a divergence between the way managers value options and the way they exercise them. In calculating real-option values, it is assumed that the option holders will make optimal decisions based on a rational analysis of all available information. But if an option holder fails to make such decisions, the options become far less valuable. If, for example, we buy auto insurance, but do not file a claim when we have an accident, we would have overpaid for the insurance. Similarly, if we hold a fixed-rate mortgage and have the option to refinance, we should refinance in the event of a significant interest-rate decline. But we often exercise such an option too late, or not at all.

The same problem arises when companies manage their debt portfolios. Many corporate bonds are 'callable', so that the company has the flexibility to refinance at a lower rate. But finance managers often exercise such an option too late.

Since management decisions are far more complex and ambiguous than financial options, many managers argue that it would be dangerous to try to reduce those complexities and fit them into standard option models, such as Black-Scholes.

This argument has merit. The Black-Scholes model was designed to value an option that was exercisable only at the end of its life and whose underlying share paid no dividends. It was not intended for use with compound options.

One way to get around the problem is to use models that need less sophisticated mathematics but where managers can add their own inputs based on intuition.

Binomial models fall in this category. These models can be more easily customised to reflect changing volatility, early decision points, and multiple decisions. Because of their relative transparency and flexibility, managers can tinker with a binomial model they have created until it closely reflects the project they wish to value.

Essentially, in a binomial model, we construct an event tree. Each time an event happens, we look at the possibility of the value of the investment going up or coming down. We keep drawing the tree till we reach the end of the project. By using estimated probabilities, we can work out the terminal value of the project. This terminal value takes into account the different options and consequently the different asset values generated at each stage of the project. We keep working back from the end of the project to the beginning to arrive at the present value of the asset.

Building a customised binomial model for each real option involves more work than mechanically plugging numbers into the Black-Scholes formula. But binomial models are more transparent and easy to use. Even managers whose mathematical abilities are poor, can understand and thus provide insight into the assumptions.

For example, instead of guessing the "volatility" of a project's returns, managers can think about the probability that after an investment, a company's revenues would rise or fall by a particular percentage.

As mentioned earlier, lack of information is a problem while valuing real options. Decision makers will not be able to draw information from the financial markets for all decisions. Some decisions typically involve uncertainties that are insulated from the market mechanism and are specific to a company. Amram and Kulatilaka call these 'private risks'. But as more and more

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risks are securitised, the real options approach may become more and more feasible.

Real options will also become more popular if managers exercise them in a timely and rational manner. By modifying their planning and budgeting systems, managers can develop their ability to monitor the conditions for exercise defined in their models. This is particularly important as companies grow. If used effectively, real options can create real benefits, by promoting better decision making.

As Amram and Kulatilaka put it: "The real value of real options, we believe, lies not in the output of Black-Scholes or other formulas but in the reshaping of executive's thinking about strategic investment. By providing objective insight into the uncertainty present in all markets, the real options approach enables executives to think more clearly and more realistically about complex and risky strategic decisions. It brings strategy and shareholder value into harmony."

The main objective of risk management is not to eliminate risk but to take the right type and amount of risk that will lead to maximisation of value for shareholders. The real options approach enables companies to make a better assessment of risks in situations characterised by plenty of uncertainty. This ensures that the 'right' projects are taken up and the 'wrong' ones rejected.

(The author is Dean, ICFAI Knowledge Centre, Hyderabad.)