

A Real Options Application: Valuing A New Venture.

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Portlandia Ale is two guys and a dream. The company needs \$4 million to begin product development and manufacturing and another \$12 million in two years for its market launch. The entrepreneurs are very optimistic about their business opportunity, despite considerable uncertainty about the value of the market opportunity they're chasing.

Portlandia is showing potential investors a traditional business plan. The partners plan to spend \$500,000 each quarter for the first two years. They will spend an additional \$12 million in the first quarter of the third year to launch the product line. The business plan assumes the launch would be successful, leading to a sustainable business with a market value of \$22 million. The value of the sustainable business is calculated by multiplying the average market value to sales ratio for mature microbrewery companies (which, according to the partners' research, is 3.66) times the projected annual sales (\$6 million).

Even under two optimistic assumptions—that business conditions will support the sales forecast in the plan and that the launch will be made—the value of Portlandia using the traditional discounted cash flow analysis is negative \$230,000. (Here's the logic in the traditional business plan: Portlandia must wait three years to obtain \$22 million, and today's value of "the prize" is \$14.46 million. Meanwhile, Portlandia must spend a total of \$16 million including the launch. Today's value of this investment is \$14.69 million, and exceeds the value of the prize by \$230,000.)

The traditional business plan fails to include the valuable option the startup holds: Portlandia need not undertake the market launch. The launch will be made only if business conditions are strong enough to make the launch profitable. Portlandia's strategy is more complex and its valuation is higher than is recognized by a traditional business plan.

The Black-Scholes equation is a well-known formula for pricing financial option contracts and can also be used to value Portlandia's launch option. The formula—for which Myron Scholes and Robert Merton won the 1973 Nobel Economics Prize—requires only five inputs to produce a single output, the current value of the option. Those inputs are: the current value of the underlying asset, the cost of investment, the risk-free rate of return, the time to expiration of the option, and the volatility of the underlying asset. (A note of caution: Not all real options can be valued so easily. Many corporate options are more complex and require tailored mathematical formulae. See the Web site for the Black-Scholes calculations for this

example and for more information on other methods.)

After plugging the appropriate numbers into the Black-Scholes formula, the partners determine that the current value of Portlandia's option to launch is \$4.96 million. (Here are the inputs used: value of the underlying asset/today's value of the business opportunity, \$14.46 million; cost of investment/cost of launch, \$12 million; risk-free rate of return, 5%; time to expiration of the option/time to market launch, 2 years; volatility of the underlying asset/volatility of the value of the business opportunity, 40% per year.) The value of the option is driven by upside potential. If two years from now business conditions are terrific, then there will be a very high payoff to the \$12 million launch cost. If two years from now business conditions are poor, the product will not be launched and the \$12 million will not be needed; there are no losses associated with the launch. Portlandia now has a contingent strategy, one that depends on business conditions. Before the launch decision date, Portlandia's total product development costs will be \$3.83 million in today's dollars. The value of Portlandia with the launch option is \$1.13 million (\$4.96 million minus \$3.83 million.)

Now let's more realistically characterize Portlandia's strategy by adding a second option: the option to abandon. Suppose that at any time during the first two years Portlandia could cease operations if business conditions soured to such a level that Portlandia could not foresee making the launch. The calculations are now a bit more complex, and require specialized mathematical tools known as numerical methods—tools widely used in engineering, science, and on Wall Street.

The option to launch and the option to abandon are valued in an integrated manner, resulting in a \$1.74 million valuation for Portlandia. This result is even higher than with a single option because now the valuation framework reflects how management will control losses—management won't continue to spend either the initial \$4 million or the follow-on \$12 million in the face of significant bad news.

The magnitude of increase given here, from -\$0.23 million in a traditional business plan to \$1.74 million for valuation that includes the key options, is fairly typical of strategic growth opportunities. The traditional business plan undervalues Portlandia because it fails to recognize that the company will be using a contingent strategy, one that responds to unfolding conditions.

If you would like to see more detail, download the spreadsheet at www.real-options.com/jbs.html.