

8. **Decision Trees** B&B has a new baby powder ready to market. If the firm goes directly to the market with the product, there is only a 55 percent chance of success. However, the firm can conduct customer segment research, which will take a year and cost \$1.2 million. By going through research, B&B will be able to better target potential customers and will increase the probability of success to 70 percent.

If successful, the baby powder will bring a present value profit (at time of initial selling) of \$19 million. If unsuccessful, the present value payoff is only \$6 million. Should the firm conduct customer segment research or go directly to market? The appropriate discount rate is 15 percent.

9. **Financial Break-even Analysis** You are considering investing in a company that cultivates abalone for sale to local restaurants. Use the following information:

| | |
|----------------------------|-------------|
| Sales price per abalone | = \$35 |
| Variable costs per abalone | = \$6.10 |
| Fixed costs per year | = \$375,000 |
| Depreciation per year | = \$120,000 |
| Tax rate | = 35% |

The discount rate for the company is 15 percent, the initial investment in equipment is \$840,000, and the project's economic life is seven years. Assume the equipment is depreciated on a straight-line basis over the project's life.

- What is the accounting break-even level for the project?
- What is the financial break-even level for the project?

10. **Financial Break-even** Niko has purchased a brand new machine to produce its High Flight line of shoes. The machine has an economic life of five years. The depreciation schedule for the machine is straight-line with no salvage value. The machine costs \$575,000. The sales price per pair of shoes is \$60, while the variable cost is \$14. \$165,000 of fixed costs per year are attributed to the machine. Assume that the corporate tax rate is 34 percent and the appropriate discount rate is 8 percent. What is the financial break-even point?

17. **Abandonment Value** We are examining a new project. We expect to sell 9,000 units per year at \$35 net cash flow apiece for the next 10 years. In other words, the annual operating cash flow is projected to be $\$35 \times 9,000 = \$315,000$. The relevant discount rate is 16 percent, and the initial investment required is \$1,350,000.
- What is the base-case NPV?
 - After the first year, the project can be dismantled and sold for \$950,000. If expected sales are revised based on the first year's performance, when would it make sense to abandon the investment? In other words, at what level of expected sales would it make sense to abandon the project?
 - Explain how the \$950,000 abandonment value can be viewed as the opportunity cost of keeping the project in one year.
18. **Abandonment** In the previous problem, suppose you think it is likely that expected sales will be revised upward to 11,000 units if the first year is a success and revised downward to 4,000 units if the first year is not a success.
- If success and failure are equally likely, what is the NPV of the project? Consider the possibility of abandonment in answering.
 - What is the value of the option to abandon?
19. **Abandonment and Expansion** In the previous problem, suppose the scale of the project can be doubled in one year in the sense that twice as many units can be produced and sold. Naturally, expansion would be desirable only if the project were a success. This implies that if the project is a success, projected sales after expansion will be 22,000. Again assuming that success and failure are equally likely, what is the NPV of the project? Note that abandonment is still an option if the project is a failure. What is the value of the option to expand?
22. **Option to Wait** Hickock Mining is evaluating when to open a gold mine. The mine has 48,000 ounces of gold left that can be mined, and mining operations will produce 6,000 ounces per year. The required return on the gold mine is 12 percent, and it will cost \$34 million to open the mine. When the mine is opened, the company will sign a contract that will guarantee the price of gold for the remaining life of the mine. If the mine is opened today, each ounce of gold will generate an aftertax cash flow of \$1,400 per ounce. If the company waits one year, there is a 60 percent probability that the contract price will generate an aftertax cash flow of \$1,600 per ounce and a 40 percent probability that the aftertax cash flow will be \$1,300 per ounce. What is the value of the option to wait?
24. **Expansion Decisions** Applied Nanotech is thinking about introducing a new surface cleaning machine. The marketing department has come up with the estimate that Applied Nanotech can sell 15 units per year at \$305,000 net cash flow per unit for the next five years. The engineering department has come up with the estimate that developing the machine will take a \$15 million initial investment. The finance department has estimated that a 16 percent discount rate should be used.
- What is the base-case NPV?
 - If unsuccessful, after the first year the project can be dismantled and will have an aftertax salvage value of \$11 million. Also, after the first year, expected cash flows will be revised up to 20 units per year or to 0 units, with equal probability. What is the revised NPV?