

## ENTREPRENEURIAL FINANCE: *Venture Capital, Deal Structure and Valuation*

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### Chapter 9 Assessing Cash Needs

#### Questions and Problems

1. Use the sustainable growth template in Figure 9.2 and the following data to answer the questions below:

Factor	Definition and Value
1. Asset Turnover	Sales / Total Assets = 2.0
2. Financial Leverage	Total Assets / Equity = 4.0
3. Return on Sales (ROS)	Net Income / Sales = 7%
4. Dividend Retention (R)	Fraction of Net Income Retained = 1/4

- What is the sustainable growth rate,  $g^*$ ?
  - What level of initial equity investment is required if Year 2 sales are to reach \$2,500?
  - What is the new  $g^*$  if the firm pays no dividend?
  - If the firm would like to achieve a  $g^*$  of 25% with no change in dividend policy, what level of financial leverage would be required?
2. EBIT/Sales = 15%, Sales/Assets = 2.0, Assets/Equity = 2.0, the dividend payout ratio = 10%, the interest rate on debt = 10%, and the tax rate = 40%.
- What is the sustainable growth rate?
  - How does the sustainable growth rate change in response to reducing any of the above ratios or percentages by one-half (e.g., EBIT/Sales = 7.5%)?
  - How does the sustainable growth rate change in response to increasing any of the above ratios or percentages by one-half (e.g., EBIT/Sales = 22.5%)?
  - Do some changes have greater impact on the sustainable growth rate than others? Are the effects linear or nonlinear? Explain your findings.
3. **SIM** Refer back to Problem 2. Suppose EBIT/Sales has an expected value of 15% with a standard deviation of 10%, Sales/Assets has an expected value of 2.0 with a standard deviation of 0.3, the interest rate is expected to be 10% with a standard deviation of 1%, and the tax rate is 40% if net taxable income is positive but zero if taxable income is negative.
- Build a simulation model of the sustainable growth rate. Set up the model so the leverage ratio and payout ratio are policy choices and dividend yield (the ratio of dividend payout to equity investment) is the objective.

- b. Simulate the model with the initial assumptions to determine the expected sustainable growth rate and its standard deviation.
  - c. Assume the company has targets for  $g^*$  and dividend yield of 20% and 5%, respectively. Given the base case values for the leverage and payout ratios, i.e., 2.0 and 10%, in what percent of the trials should they expect to achieve their targets? Using the financial leverage and payout ratios as policy choices, try to design a policy that increases the likelihood of achieving the targets for  $g^*$  and dividend yield.
4. A software start-up, Lutoj, Inc., is developing a new smart home software product. Lutoj believes revenue must reach \$5 million in Year 3 for the product to be viable. Lutoj's operating margin (EBIT/Sales) is 20%, the tax rate is 30%, and asset turnover is 5X. The founders have a total of \$200,000 for initial equity funding. Assume Lutoj will pay no dividend.
    - a. With no other financing, will the \$200,000 of founder investment be sufficient to achieve the Year 3 sales target? If not, what level of initial equity investment would be required?
    - b. Assume Lutoj cannot raise additional equity, but will use debt to achieve the scale necessary to reach the Year 3 sales target. They can borrow at an 8% annual interest rate before tax. How much debt will initially be required?
  5. As a result of a merger, Mike Bloom has just received a golden handshake of \$5 million from his former partners. Rather than taking a comfortable early retirement, he has decided to try to leverage the payment into something even more valuable. His plan is to use the money to start a new financial information service. If necessary, he is willing to invest all of the money in the venture. His goal is to realize an annual return of \$8 million per year beginning in five years. The \$8 million is to be measured as his share of venture net income after tax.
 

Bloom expects that each dollar invested in the venture can support \$3 in annual sales and that the before-tax return on sales will average 15% per year if only equity financing is used. Debt financing is expected to cost 8% per year, and the corporate tax rate is 30%. Bloom plans to draw no income from the venture until the end of the fifth year. After that, he expects to be able to take his share of net income as a distribution each year.

    - a. Can Bloom achieve his return objective by using debt financing? If so, what capital structure policy (with stable leverage ratio) will enable him to do so?
    - b. Suppose an outside investor is interested in participating in the venture by contributing equity capital at the initiation of the venture. Doing so would enable the venture to start up on a larger scale. The investor wants 1% of total equity in exchange for each \$250,000 of investment. Can Bloom achieve his objective using outside equity financing? If so, how much outside financing is needed?
    - c. In the event that either debt or equity could be used to meet the objective, what other considerations should affect the choice? In particular, how might you expect issues of control and risk to bear on the decision?
  6. Look back at Problem 5.
    - a. How does the sustainable growth rate of the venture with all equity financing change under the scenario where the service is very well-received by the financial community, so that each dollar of investment can support \$3.75 of sales and the profitability of sales is 20%? What does this do to the amount of equity financing that is required to achieve the objective?

- b. How are your conclusions affected by a scenario in which the product is not very well received, so that each dollar of investment supports only \$2.50 of sales and the profitability of sales is 10%?
  - c. How are your conclusions in parts (a) and (b) affected if outside debt financing is used instead of outside equity.
  - d. Do the results of the scenario analysis affect your perceptions of the relative merits of debt or equity financing in this case? If so, how, and why?
7. Lillian Jordan is considering using some of the cash generated from her mail-order business to open a retail store. The fixed investment in the store is expected to be \$3.5 million. The investment can be depreciated over five years, after which point annual expenditures of \$300,000 will be sufficient to maintain the facility. These maintenance outlays can be expensed in the years they are made. The required investment in net working capital is expected to be 25% of annual sales. Variable cost is estimated to be 35% of sales.
- a. If annual fixed costs other than depreciation total \$600,000, what is the cash flow breakeven point of the venture during the first five years? What is it after the fifth year? In either case, how does the cash flow breakeven point compare to the breakeven point of net income?
  - b. Suppose Lillian projects first-year sales of \$1 million, second-year sales of \$4 million, and sales after the second year of \$1.8 million. How much of an investment will be required to undertake the project? How much surplus cash is the venture expected to generate each year in the first six years of operation?
8. **SIM** Look back at Problem 7 and develop a 10-year simulation model that incorporates the following elements of uncertainty.
- The level of sales in the first year is uncertain. The expected level is \$1 million, and the uncertainty can be represented as a normal distribution with a standard deviation of \$100,000.
  - The level of sales in the second year is expected to be \$3 million above the realized level in the first year. The uncertainty about the actual growth from year 1 to year 2 can be represented as a normal distribution with a standard deviation of \$200,000.
  - The level of sales in the third year is expected to be \$1.8 million with a standard deviation of \$200,000.
  - After the third year, expected sales is equal to actual sales in the prior year, with uncertainty about the level being represented as a standard deviation of \$75,000.
  - The magnitude of the initial fixed investment is uncertain, with a mean of \$3.5 million and a standard deviation of \$200,000.
  - Working capital requirements increase when sales are higher than expected and decline if sales are lower than expected, but not to the same extent as the base investment in net working capital. The required level of net working capital is 25% of expected sales, plus 10% of the difference between actual and expected sales in any year (where the expected level is determined based on actual sales in the prior year).
  - When demand is high, more merchandise can be sold with a full markup. When it is low, more discounting is required. The uncertainty of variable cost can be represented as a standard deviation of 2% applied to 35% of expected sales, plus 50% of the difference between actual and expected sales.

- All other assumptions are the same as in Problem 7.
- a. Use the simulation model to estimate expected surplus cash in each of the first five years of operation. Be sure to include the amount of initial investment and required increases in net working capital. How much investment capital is needed each year (0 through 6), if performance is as expected? How much is needed each year to cover the results in 75% of the outcomes?
  - b. Are there any outcomes in your analysis in which the venture fails to achieve positive cash flow by year 6 and beyond? If so, and if Lillian would want to abandon the venture as soon as it becomes apparent that positive cash flows after year five are unlikely, how much initial investment capital is needed to pursue the venture? What criteria would you recommend for deciding whether to abandon the venture to meet this objective? Be as creative as you can in designing a response to this question.
9. What is the difference between a breakeven point measured in terms of net income and one measured in terms of cash flow? What factors would cause the two to be similar? What factors would cause them to be different?
10. Look back at the asset-driven models of performance in Problems 5 and 6. Suppose the probability of the scenario in Problem 5 is 40%, and the probabilities of the optimistic and pessimistic scenarios in Problem 6 (a) and (b) are each 30%.
- a. Consider an inside equity investment of \$5 million and initial outside equity levels of \$0, \$5 million (for 20% of total equity), \$10 million (for 40% of total equity), and \$15 million (for 60% of total equity). If all net income can be distributed beginning in year five, how does the entrepreneur fair in each scenario with each level of outside equity investment? What is the expected distribution to the entrepreneur? Which level of outside equity financing do you favor and why? (Plan your Excel work carefully, so you can easily explore these alternative strategies.)
  - b. Consider an equity investment by the entrepreneur of \$5 million, and debt to equity ratios of 0:1, 1:1, 2:1, and 3:1. If all net income can be distributed beginning in year five, how does the entrepreneur fair in each scenario with each level of outside debt investment? What is the expected distribution to the entrepreneur? Which level of outside debt financing do you favor and why?
  - c. Considering your answers in parts (a) and (b), do you favor equity or debt financing. Why? What, if any, changes in performance expectations would lead you to prefer the other form of outside financing (e.g., debt instead of equity)? Why?
11. Consider the VR example in Section 9.1. Suppose that, instead of \$10, the entrepreneur, Ms. Matrix, plans to market on Amazon.com for \$12 per unit. As in Section 9.1, variable cost, including production, marketing, and distribution, is estimated to be \$2.50 per unit (20.83% of price). During the first five years, the cash portion of annual fixed costs (i.e., excluding depreciation) is expected to total \$350,000. With the higher selling price, the entrepreneur projects that the venture can achieve sales volume that is about 10% lower than in Table 9.1; of 45,000 units in Year 1, 225,000 units in each of Years 2 and 3, and after this demand peak, annual sales volume will stabilize at around 55,000 units. Before deciding to move forward with the project, Ms. Matrix would like to develop a better understanding of the cash needs and potential of the venture.
- a. Revise Tables 9.1 to reflect the new assumptions.
  - b. Estimate the venture's expected operating cash needs in each of the first three years.
  - c. Does it appear that with the higher price and lower volume, the venture would be worth pursuing?

12. Reconsider Problem 11. Suppose the level of sales in each year could be 10% higher or lower than the expected level and variable cost in each year could be 20% higher or lower than the expected level. Construct a scenario analysis to assess the sensitivity of annual operating cash needs, ending-year profitability, and NPV to these variations in performance.

13. **SIM** NewCo learns some of the critical technology it needs for product development is available to license. Consider the following changes to the assumptions in the Section 9.6 NewCo simulation:

- Development time and uncertainty are reduced: the quarter of development success is represented by the following discrete distribution:

<b>Quarter</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Probability	5%	30%	40%	5%

Note that the probabilities sum to 80%; this means there is still a 20% chance development fails.

- The license fee for the technology is 3% of revenue, which is reflected in an increased Cost of Sales. Cost of Sales is uniformly distributed with minimum and maximum values of 48% and 58% respectively.
- If development is not successful, the venture will be abandoned at the end of Quarter 5.
  - a. Prepare a revised Figure 8.4 using the new assumptions. How do you interpret the differences between your figure and the original Figure 8.4?
  - b. Discuss the pros and cons of licensing some of the technology (versus developing everything in house).

14. A venture has fixed expenses of \$1 million, including \$200 thousand of annual depreciation expense. It has variable expenses equal to 20% of revenue. What is the venture's net income breakeven point? What is its cash flow BEP? How does the cash flow BEP compare to the NI BEP? If the venture expects to achieve first-year sales of \$900,000, will it fall short of its cash flow breakeven point? By how much?

15. A firm with beginning equity of \$1000, a policy of leveraging its equity with \$0.30 of debt for each \$1 of equity, a before tax cost of debt of 8% per year, a corporate tax rate of 30%, and an EBIT to sales ratio of 6%, has a sales to assets ratio of 5 times, and pays no dividends. Based on its sustainable growth rate, what is its equity after two years (at the start of year 3)?