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TIM KOLLER · MARC GOEDHART · DAVID WESSELS

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VALUATION WORKBOOK

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Introduction

The purpose of any workbook is to actively engage the reader/learner in the transfer of knowledge from author to reader. Although there are many levels at which knowledge can be transferred, the *Valuation Workbook* endeavors to provide the following three services:

1. A walk-through accompaniment to *Valuation: Measuring and Managing the Value of Companies*, seventh edition
2. A summary of each chapter
3. Tests of comprehension and skills of many types

Multiple-choice questions pique your memory as you read the text. Lists and table completions force you to actively rearrange concepts, explicitly or implicitly, within the text. Calculation questions allow you to apply the skills deployed by the authors in accomplishing the analysis called valuation.

Our aim is to encourage you to question what you read against the background of your own business experience and to think about new ways to analyze and approach valuation issues.

Part One

Questions

1

Why Value Value?

The chief measures for judging a company are its ability to create value for its shareholders and the amount of total value it creates. Corporations that create value in the long term tend to increase the welfare of shareholders and employees as well as improve customer satisfaction; furthermore, they tend to behave more responsibly as corporate entities. Ignoring the importance of value creation not only hurts the company but leads to detrimental results such as market bubbles.

Value creation occurs when a company generates cash flows at rates of return that exceed the cost of capital. Accomplishing this goal usually requires that the company have a competitive advantage. Activities such as leverage and accounting changes do not create value. Frequently, managers shortsightedly emphasize earnings per share (EPS); in fact, a poll of managers found that most managers would reduce discretionary value-creating activities such as research and development (R&D) in order to meet short-term earnings targets. One method to meet earnings targets is to cut costs, which may have short-term benefits but can have long-run detrimental effects.

1. Data from both Europe and the United States found that companies that created the most shareholder value showed _____ employment growth.
2. The _____ in the late 1990s, and the _____ in 2007–08, arose largely because companies and banks focused on _____ over _____.
3. Maximizing current share price is not equivalent to maximizing long-term value because _____.
4. Discretionary expenses that managers can slash in order to pump up short-term profits include _____.

5. During the Internet boom of the late 1990s, many firms lost sight of value creation principles by blindly pursuing _____ without _____.
6. The empirical evidence shows that the link between the value created by the acquisition of another company and earnings per share (EPS):
   A. Is strong and positive.
   B. Does not exist.
   C. Is weak and negative.
   D. Is strong and negative.
7. Paying attention to which of the following tends to lead to a company creating long-term value for shareholders?
   I. Cash flow.
   II. Earnings per share.
   III. Growth.
   IV. Return on invested capital.
      A. I and II only.
      B. II and III only.
      C. II, III, and IV only.
      D. I, III, and IV only.
8. A firm that grows rapidly will:
   A. Always create value.
   B. Create value if the return on invested capital (ROIC) is greater than the cost of obtaining funds.
   C. Create value if the return on invested capital (ROIC) is less than the cost of obtaining funds.
   D. Create value if the firm increases market share.
9. In order to create long-term value, companies must:
   A. Focus on keeping costs at a minimum.
   B. Find the optimal debt-to-equity ratio.
   C. Seek and exploit new sources of competitive advantage.
   D. Monitor and follow macroeconomic trends.
10. Focus on short-term results by banks was a contributing factor to the financial crisis of 2007–08.
    A. True
    B. False

2

Finance in a Nutshell

Companies create value when they earn a return on invested capital (ROIC) greater than their opportunity cost of capital. If the ROIC is at or below the cost of capital, growth may not create value. Companies should aim to find the combination of growth and ROIC that drives the highest discounted value of their cash flows. In so doing, they should consider that performance in the stock market may differ from intrinsic value creation, generally as a result of changes in investors' expectations.

To illustrate how value creation works, this chapter follows a company from its early years through going public. Throughout the discussion, attention is given to key measures of performance, such as ROIC, growth, and company value based on discounted cash flow (DCF). Five core ideas around value creation and its measurement are illustrated:

1. In the real market, you create value by earning a return on your invested capital greater than the opportunity cost of capital.
2. The more you can invest at returns above the cost of capital, the more value you create. That is, growth creates more value as long as the return on invested capital exceeds the cost of capital.
3. You should select strategies that maximize the present value of future expected cash flows or economic profit (EP). The answer is the same regardless of which approach you choose.
4. The value of a company's shares in the stock market equals the intrinsic value based on the market's expectations of future performance, but the market's expectations of future performance may not be the same as the company's.
5. The returns that shareholders earn depend on changes in expectations as much as on the actual performance of the company.

6 QUESTIONS

1. Lily's Emporium creates value if it generates a _____ return on its invested capital (ROIC) than what they could earn if they invested their capital elsewhere.
2. Logan's Stores' superior growth over Lily's Dresses was not translating into a _____ ROIC because Logan's Stores had to invest _____ in order to grow and had a _____ differentiated product than Lily's Dresses.
3. Lily and Nate can address the trade-off between short-term decline in ROIC and long-term increase in ROIC by estimating whether the expansion is valuable through _____.
4. Lily and Nate should keep the _____-performing stores open because even though they have _____ ROICs than the other stores, these _____-performing stores still have ROICs _____ than the cost of capital. Thus, these stores still create additional _____ by staying open.
5. The intrinsic value of Lily's Emporium is based on the _____ _____, while the share price is based on _____. Investors would want to buy Lily's stock when their intrinsic value estimate is _____ than the current stock price.
6. As Lily's Emporium expands, it needs a planning and control system that incorporates both _____- and _____-looking measures that are _____.
7. (True/False) Suppose that an investor bought shares in Lily's Emporium and held them for five years. If the firm generated ROICs above their cost of capital, this means that the investor had returns above the cost of capital.
8. (True/False) Both the DCF and EP methods should yield the same valuations if properly applied.

3

Fundamental Principles of Value Creation

Earnings generation and value creation are correlated over the long run, but they are not the same. Value creation is determined by cash flows, which can be disaggregated into revenue growth and return on invested capital (ROIC). For any level of growth, increasing ROIC increases value; however, the reverse is not true. When ROIC is greater than the cost of capital, increasing growth increases the value of the firm; when ROIC is less than the cost of capital, increasing growth decreases the firm's value. When ROIC equals the cost of capital, growth does not affect a firm's value.

For the years 1995 to 2018, Rockwell Automation provides a good example of the importance of increasing ROIC. Over the period, revenue shrank by 3 percent per year, but ROIC increased from 12 percent to 35 percent, with a resulting annual total return to shareholders of 19 percent per year.

The key value driver formula, is:

$$\text{Value} = \frac{\text{NOPAT}_{t=1}\left(1 - \frac{g}{\text{ROIC}}\right)}{\text{WACC} - g}$$

where NOPAT is the net operating profit after taxes.

Because the formula assumes the relationships are static, it has some limitations on its application in practice; however, it does outline the important relationships that determine and drive value. Part Two of the text expands on the formula.

1. Rank the types of growth from highest to lowest, where highest = 1, in terms of the amount of shareholder value each typically creates from the same incremental increase in revenue.

Types of growth	Ranking
A. Increase share in a growing market.	1.
B. Expand an existing market.	2.
C. Acquire businesses.	3.
D. Introduce new products to market.	4.

2. High-ROIC companies typically create more value by _____, while lower-ROIC companies create more value by _____.
3. Most often in mature companies, a low ROIC indicates _____.
4. Complete the following sentence concerning the relationships among earnings, cash flow, and value. Earnings and cash flow are often _____, but earnings don't tell the whole story of value creation, and focusing too much on earnings or earnings growth _____ _____.
5. When ROIC is greater than the cost of capital, the relationship between growth and value is _____. When ROIC is less than the cost of capital, the relationship between growth and value is _____. When ROIC equals the cost of capital, the relationship between growth and value is _____.
6. With respect to countries, the core valuation principle is _____, as made evident by the fact that U.S. companies trade _____ companies in other countries.
7. When comparing the effect of an increase in growth on a high-ROIC company and a low-ROIC company, a 1 percent increase in growth will have _____.
8. At high levels of ROIC, improving ROIC by increasing margins will create _____ value than an equivalent ROIC increase by improving capital productivity.
9. Economic profit is the spread between _____ and _____ times _____.
10. If the growth of a company is 2 percent and the ROIC is 10 percent, what is the investment rate?
    A. 2 percent.
    B. 5 percent.
    C. 12 percent.
    D. 20 percent.

11. For a given company, next year's NOPAT is $300. For the foreseeable future, the growth rate will be 5 percent, the ROIC will be 15 percent, and the weighted average cost of capital (WACC) will be 13 percent. Using the key driver formula, calculate the value of the company.
    A. $1,666.
    B. $2,222.
    C. $2,500.
    D. $2,750.
12. Changing capital structure creates value only if it _____.
13. An acquisition will create value only if it increases cash flows by _____.
14. When the likelihood of investing cash at _____ is _____, share repurchases make sense as a tactic for avoiding value destruction.
15. With respect to value creation, define financial engineering.
16. Because interest expense is tax deductible, share repurchases can have the beneficial effect of _____, but this may not increase share price because _____.
17. Studies of share repurchases have shown that companies _____ at timing share repurchases, often _____.

4

Risk and the Cost of Capital

A company's cost of capital is critical for determining value creation and for evaluating strategic decisions. It is the rate at which you discount future cash flows for a company or project. It is also the rate you compare with the return on invested capital to determine if the company is creating value. The cost of capital incorporates both the time value of money and the risk of investment in a company, business unit, or project.

The cost of capital is an opportunity cost, based on what investors could earn by investing their money elsewhere at the same level of risk. Only diversifiable risks affect a company's cost of capital. Other risks, which can be diversified, should only be reflected in the cash flow forecast using multiple cash flow scenarios.

Companies should take on all investments that have a positive expected value, regardless of their risk profile, unless the projects are so large that failure would threaten the viability of the entire company. Most executives are reluctant to take on smaller risky projects even if the returns are very high.

The ability of investors to diversify their portfolios means that only nondiversifiable risk affects the cost of capital. Companies in the same industry will have similar costs of capital. The risks they cannot diversify away are those that affect all companies—for example, exposure to economic cycles.

Certain projects carry what many investors see as high risk. Companies should not bump up the assumed cost of capital to reflect the uncertainty of risky projects. In doing so, they often end up rejecting good investment opportunities as a result. A better approach for determining the expected value of a project is to develop multiple cash flow scenarios, value them at the unadjusted cost of capital, and then apply probabilities for the value of each scenario to estimate the expected value of the project or company.