# FINANCIAL ANALYSIS & DECISION MAKING

tools and techniques to solve financial problems and make effective business decisions

DAVID E. VANCE

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## Tools and Techniques to Solve Financial Problems and Make Effective Business Decisions

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# PREFACE

Financial analysis is about shaping the future. It provides the tools management needs to make sophisticated judgments about complex and challenging business issues. As a corporate controller, chief financial officer, and retired CPA, I found that outside auditors, purchasing managers, accountants, and corporate executives were making bad decisions because they didn't understand how to apply financial analysis to real-world situations. One example was a company president who was signing leases with a 24% imputed interest rate because neither he nor his auditors understood how to analyze leases.

Three principles guide this book: (1) it should get to the point without forcing the reader to wade through a lot of text, (2) there should be plenty of examples, and (3) the rationale for each analytical technique should be plainly stated.

In this book, we provide an overview of the three main financial statements: income statement, balance sheet, and statement of cash flows, and we discuss the major landmarks in each. We discuss financial ratios and other measures of performance that management can use to detect problems and isolate their root cause.

Interest rates are a factor in a number of decisions, including the required rate of return on a project, expansion, refinancing, lease versus buy decisions, and others. We discuss the factors that cause interest rates to rise or fall and what can be done about them.

The world is complicated, and things never unfold exactly according to plan. We discuss measures of risk in terms of yield or output and ways to manage that risk.

In the chapter on the time value of money, we discuss the accumulation of future wealth in terms of both a single investment and periodic investments. We also find the present value of investments, that is, the value in today's dollars of cash that will not be received until some future date. The principles discussed can be applied to savings, loans, mortgages, leases, annuities, and capital budgeting decisions. This chapter also provides the formulas

needed to create computer programs or spreadsheets tailored to the needs of individual businesses.

The chapter on bond valuation demonstrates how the value of bonds rises as interest drops, and how the value of bonds drops as interest rates rise. This has implications for both investments and issuance of bonds. We also discuss bond yield to maturity and yield to call.

The chapter on leases builds on the time value of money principles and integrates the effect of deposits, prepayments, and application fees to find the real cost of leasing in such a way as to make leases with different terms comparable to each other and to other financing sources.

A number of methods to value stocks are discussed along with the strengths and weaknesses of each. Stock valuation is important for investing, deciding on convertible bond terms, and initial public offerings.

The cost of capital is the composite cost of all sources of capital used by a company. It is used as a benchmark for determining whether management is creating or destroying wealth, and in making decisions about investments in new projects or acquisitions. The marginal cost of capital is the cost of incremental blocks of capital, which can be compared to the return on projects to determine the optimum capital budget.

In the chapter on capital budgeting, we discuss five methods for analyzing capital projects, that is, projects for which the payback is stretched out over several years. These methods include (1) payback, (2) discounted payback, (3) net present value, (4) internal rate of return, and (5) modified internal rate of return. We also discuss decision rules for ranking projects for each method of analysis. There is also a chapter on estimating cash flow for capital budgeting.

Correct product costing is critical to decisions about pricing, make versus buy, and production volumes. We discuss full absorption costing, which is used for valuing inventory, and the cost of goods sold, and we discuss variable costing. Each approach to costing is used to make a different class of decision.

We discuss break-even analysis, a technique that can be expanded to address issues of production volume, target profits, and

overhead targets. It can also be used to model strategic decision options and test the reasonableness of each.

Cash is oxygen to a company, and cash budgeting and working capital management are important keys to assure that a company has enough cash. We discuss the cash demand of opening a new facility, cash required for accounts receivable and inventory to support sales growth, and working capital as a source of cash.

Operating budgets are an important tool for management to guide a company's progress, but traditional budgets often fail to account for changes in sales volume. Master budgets, on the other hand, are designed to be flexible as sales volume changes. This flexibility improves variance analysis and helps improve placement of responsibility.

Most finance books concentrate on costs, but few discuss pricing in any depth even though correct pricing decisions are crucial to a company's financial health. We discuss a number of price setting techniques as well as the effects and strategic implications of supply and demand, market segmentation, product differentiation, and product life cycle.

We also discuss a number of financial analysis and decision-making techniques that don't fit neatly into any of the foregoing categories. These include cost drivers, activity-based costing, and job costing. We discuss two approaches to resource allocation: the theory of constraints and the profit ladder. We also discuss issues arising when discontinuing old products and selecting new products for introduction.

Finally, we discuss labor costs. Labor is one of the largest costs of any company, but it can be significantly reduced without layoffs by managing overtime, turnover, workers' compensation, and unemployment costs. We discuss techniques for better management of these areas and quantify the impact of improvements.

In sum, this book embraces a broad range of financial analyses and can be used as a primer by finance, accounting, and general management on the tools and techniques to solve financial problems and make effective business decisions.

*Dave Vance*

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I would like to thank the more than 300 corporate managers and graduate and undergraduate students who have used, commented on, and vetted various versions of this text. Their comments, questions, and criticisms have helped sharpen explanations and make sample problems more realistic. Their relentless probing of why things work as they do has shifted the focus of the book from the theoretical to the practical. Anything good about this book I owe to them. The faults are my own.

# CONTENTS

CHAPTER 1

# Financial Statements and Accounting Concepts

How does a company make money? A company can succeed only if it identifies and meets its customers' needs. It must also make a profit, but is that enough? Not quite. A company can make a profit every year and still run out of cash.

This chapter discusses three financial statements that provide a good understanding of company performance: (1) the income statement, (2) the balance sheet, and (3) the statement of cash flows. We will also define some of the terms accountants use and the philosophy underlying why accountants do what they do.

If you have a strong accounting background, you may want to skip this chapter. However, if you have no accounting background, or if it has been a long time since your last accounting course, take a few minutes to review this chapter. It will provide an overview of the accounting concepts that support financial decision making.

## INCOME STATEMENT

Consider the income statement of the Gladstone Book Store (Figure 1–1). Last year it had revenue of $1,000,000. Revenue is another name for sales. The books they sold cost them $500,000. This is called the cost of goods sold (COGS). The difference between revenue and COGS is called gross profit. Gross profit is the amount

**FIGURE 1-1**

Gladstone Book Store Income Statement

**GLADSTONE BOOK STORE**
**Income Statement**
**For the year ended 12/31/2002**

| | |
|---|---|
| Revenue | 1,000,000 |
| Cost of goods sold | 500,000 |
| **Gross profit** | 500,000 |
| Advertising, sales, and marketing | 50,000 |
| Store operations | 350,000 |
| Depreciation | 10,000 |
| **Total operating expense** | 410,000 |
| Operating profit | 90,000 |
| Interest | 25,000 |
| Earnings before tax | 65,000 |
| Taxes | 15,000 |
| Net income | 50,000 |

generated from the sale of books before operating expenses are subtracted. Gladstone has a gross profit of $500,000.

Expenses are separated into cost of goods and operating expenses because they have different characteristics. Cost of goods sold tends to increase in rough proportion to sales, whereas operating expenses should not increase in proportion to sales.

Gross profit allows us to compute gross margin, which is gross profit divided by revenue. The relationship between revenue, COGS, gross profit, and gross margin is given in Eq. 1–1.

$$\text{Gross margin} = \frac{\text{Revenue} - \text{COGS}}{\text{Revenue}} = \frac{\text{Gross profit}}{\text{Revenue}} \qquad \text{(Eq. 1–1)}$$

Gross margin represents the percentage of each dollar available for operating expenses, financing costs, taxes, and profit after COGS are subtracted from revenue. Gross margin is important because it can be used to help forecast gross profit as revenue rises or falls. The gross margin for Gladstone Books is

$$\text{Gross margin} = \frac{\$1{,}000{,}000 - \$500{,}000}{\$1{,}000{,}000} = \frac{\$500{,}000}{\$1{,}000{,}000} = 50\%$$

Operating expenses are sometimes called overhead. It includes things like advertising, sales, and marketing costs; salaries and rent for store operations; and depreciation. Gladstone's operating expenses were $410,000.

Operating profit is gross margin less operating expenses. Operating profit is a measure of the fundamental performance of a company, independent of a company's financing or tax structure. It is also called earnings before interest and taxes (EBIT). Gladstone's operating profit was $90,000.

Since interest is tax deductible, it is subtracted from operating profit before taxes are computed. Gladstone's earnings before taxes (EBT) were $65,000. On an income statement, taxes mean taxes on income. Real estate, franchise, or other taxes not related to income are included in either the cost of goods sold, if they are related to the purchase or manufacture of a product, or the operating expenses, if they are not. Gladstone's income taxes were $15,000.

Net income is income after all expenses, including interest and taxes, are subtracted. It is the amount available for distribution of profits or to increase retained earnings. Gladstone's net income is $50,000.

The Gladstone Book Store example uses a number of important terms. Having crisp definitions for these terms will be important as we discuss decision making in this and other chapters. The terms are as follows:

***Cost of goods sold*** Cost of goods sold are all the costs necessary to make a product or to deliver a service. It also includes the cost to make an item ready for sale. In Gladstone, the cost of goods sold (COGS) includes the cost of books, the cost of transportation if Gladstone paid for it, and any other work that had to be performed to prepare the goods for sale. Suppose, for example, books had to be uncrated by store employees; the labor for uncrating would become part of the COGS. Other names for cost of goods sold are cost of products sold (COPS) or cost of services (COS).

***Gross profit*** Gross profit is the amount of revenue left over after the cost of goods sold is subtracted. Gross profit increases more or less linearly with increases in revenue. Conversely, as revenue drops, the gross profit available to cover operating expenses, interest, taxes, and profit drops as well.

***Gross margin*** Gross margin is simply the ratio of gross profit to revenue. In Gladstone, gross margin is 50%, that is, gross profit of $500,000 divided by revenue of $1,000,000. Gross margin is important because it can be used as a performance measure. It is also important because it can be used as an estimator for break-even analysis, budgets, and other analytical techniques.

***Overhead*** Overhead, also called operating expenses, is all expenses not included in the cost of goods sold except interest and taxes.

***Earnings before tax*** Earnings before tax (EBT) is revenue less all expenses except income taxes.

***Taxes*** Only taxes assessed on income are included in this income statement line.

***Net income*** Net income is the amount of income available to the owners or shareholders of the business.

## Performance Standards

Suppose a company has a 50% cost of goods sold and a 50% overhead cost. How do we know whether 50% cost of goods sold is good or bad? How do we know whether overhead costs are out of control or as good as can be expected?

Ratios for other companies are summarized and published by Robert Morris Associates (RMA) and by Dun & Bradstreet. Ratios are provided by industry, as determined by SIC (standard industrial classification) code, and by the size of business in terms of revenue. RMA and D&B reports are available in most libraries. A U.S. Department of Commerce manual, available in most libraries, cross-references industries and SIC codes.