

APPLICATIONS OF CORPORATE FINANCIAL MODELS

E. Leonard Arnoff

ABSTRACT

Executives are searching for more effective ways to simultaneously face both inflation and recession -- and to better cope with mounting financial problems. There are many sweeping changes that affect business and industry today. Executives are now able to effectively anticipate those changes -- or, at least, are able to react to those changes in a timely and effective manner. The "key" to doing so lies in greater, and better, use of corporate financial models.

This paper defines a "corporate financial model"; states how corporate financial models are used; describes the major features and benefits of such models; and lists a wide variety of areas in which corporate financial models have been applied with substantial success.

INTRODUCTION

As we know, the economy has experienced some rather severe shocks during the past year or two. We are in the midst of rampant inflation ... accompanied by a deep and lingering recession. Unemployment has risen rapidly and, in the main, corporate profits have plunged. The energy crisis certainly hasn't helped. The economic outlook is indeed bleak.

Executives are searching for more effective ways to simultaneously face both inflation and recession. Executives are searching for effective ways to cope with mounting financial problems. There are many sweeping changes that affect business and industry today. We want to be able to anticipate these changes -- or, at least, be able to react to these changes in a timely and effective manner. We want to be able to influence and control our destiny much more effectively. To the extent possible, we want to turn these problems into opportunities.

We can do this through planning -- through a formal, systematic, managerial process to insure the direction and control of the future of the enterprise.

In a general sense, the "key" to assisting management to plan effectively lies in greater, and better, use of mathematical models, in general ... and corporate financial models, in particular. These models are used to:

1. Answer all kinds of "what if ...?" questions?
2. Evaluate a host of alternatives;
3. Help define the organization's objectives and goals in an operationally-meaningful manner;
4. Help develop sound decision rules;
5. Help answer key planning questions; and, hence,
6. Help develop sound, well-conceived, and well-executed plans.

A model is a symbolic, quantitative (i.e., mathematical) description of relationships among variables affecting, or reflecting, the results of business activities. The model provides results intended for use by management in determining strategy for the corporate entity or for a profit center within the entity.

A corporate financial model is one in which:

1. one or more financial variables appear (expenses, revenues, investment, cash flow, taxes, earnings, etc.);
2. the model user can manipulate (set and alter) the value of one or more financial variables; and
3. the purpose of the model is to influence management decisions by revealing to the decision-maker the implications of alternative values of these financial variables.

Financial Modeling Applications (Continued)

The model also enables management to evaluate the implications of assumptions -- and the sensitivity of the solution to variations in these assumptions. Such assumptions may arise with respect to trends not yet discernible, circumstances not fully crystallized, events yet to occur, and other factors of significance. Assumptions may involve economic factors, governmental policy and law, technological advances, market and consumer demand, changes in buying habits, and competitive actions.

FEATURES AND BENEFITS

Some of the features and benefits of a well-designed corporate financial model are:

- Rapid response to "what if ...?" questions.
- Easy substitution of new data, new parameters.
- Ability to determine and handle conditional relationships.
- Ability to handle the future impact of an immediate event.
- Ability to handle the effect of future period transactions on the current period.
- Ability to produce complete financial statements in the same "manner" in which the company's own accounting system would have produced them -- and in the same format.
- Ability to analyze -- and change -- the basic assumptions.
- Flexibility to produce non-routine statements, reports, and key indicators or ratios.
- Capability to reflect the company's historical interrelationships among all income statement and balance sheet accounts, thus offering the distinct advantage of producing realistic financial statements and self-balancing balance sheets at all times.
- Quick response (turnaround) to management needs.

APPLICATION AREAS

Corporate financial models have been applied -- with substantial success -- in a wide variety of application areas. These include:

General

1. Determination of objectives and goals -- and definition (statement) of objectives and goals in an operationally meaningful sense.
2. Evaluation of policies, objectives, and goals.
3. Evaluation of alternative courses of action and of alternative decisions.
4. Long-range planning.
5. Short-range planning and budgeting.
6. Profit planning.
7. Assessment of impact of economic, regulatory, union, or industry changes (actual and/or potential).
8. Capital investment decisions (expansion and replacement).
9. Allocation of resources.
10. Facilities planning.
11. Mergers and acquisitions (determination of specifications; evaluation of specific candidates).
12. Divestiture analyses.
13. Balance sheet, income statement and cash flow forecasts and projections (both internal and external uses).

Operating Unit Performance Budgeting and Control

1. Use key indicators (ROI, current ratio, inventory turnover, etc.) to evaluate actual performance and projected performance under various alternatives.
2. Evaluate unit, branch or subsidiary operations with respect to: sales volume; inventory/receivables management; profit contribution; cash contributions; ROI.
3. Prepare and evaluate projections and budgets for departmental operations.
4. Prepare operating unit cash requirements projections as basis for determining parent company borrowings.

Cash Management

1. Accounts Payable
 - a. Take discounts -- in all cases; selectively; not at all.
 - b. Regulate timing of receipts and disbursements.
 - c. Regulate the size of the monthly unpaid balance in accordance with the need for operating cash.
2. Inventories
 - a. Analysis of valuation and turnover.
 - b. Establish special datings.
 - c. Variance analysis.
3. Short Term Investments
 - a. Purchase at various levels of cash availability.
 - b. Compare return with that produced from alternative uses of cash.
4. Debt Structure
 - a. Vary principal, maturity, and types of debt.
 - b. Vary interest rates.
5. Cash from Operations
 - a. Reduce operating expenses.
 - b. Increase gross margin.
 - c. Increase sales volume.
 - d. Change product mix.

Marketing Management

1. Analyze various sales volumes.
2. Analyze alternative pricing policies.
3. Determine profit contribution -- by customer, sales territory, product line, and product.
4. Estimate impact of alternative product line decisions. Develop product line and product mix plans.
5. Evaluate alternative commission plans.
6. Analyze promotional campaign return-on-investment projections.
7. Determine distribution channel effectiveness/profitability.
8. Perform break-even analyses under various marginal contribution alternatives.
9. New product development -- examine:
 - a. Payback probability.
 - b. Break-even requirements as part of screening process.

10. Forecast sales under alternative assumptions:
 - a. Historical trend analysis, using curve fitting techniques.
 - b. Outside indicators (lead, lag, coincident), using correlation analysis.
 - c. Management's estimates.
11. Analyze selling, warehousing and shipping costs.
12. Use territory potential to develop sales quota assignments under various growth projections.

Human Resource Management

1. Analyze staffing and productivity alternatives, both with and without the use of discounted cash flow techniques.
2. Analyze the impact of Employee Retirement Income Security Act (ERISA); Pension Reform Act; labor negotiations.
3. Compensation planning.

Production Management

1. Analyze production equipment productivity in terms of return on investment -- and develop manufacturing facilities plan.
2. Analyze production scheduling alternatives.
3. Control inventories using materials requirements planning methods.
4. Compare vendors using value analysis techniques.
5. Analyze costs and variances -- material, labor, overhead.
6. Analyze new product materials, tooling, and start-up costs.
7. Compare bill of materials per unit costs and extended costs under varying design configurations.

Capital Asset Management

1. Analyze return on fixed assets.
2. Establish lease-or-purchase and make-or-buy criteria.
3. Use discounted cash flow techniques.
4. Perform risk and sensitivity analyses.
5. Analyze the effect of investment tax credit and depreciation alternatives.

Mergers/Acquisitions Analysis

1. Determine specifications for prospective acquisitions.
2. Screen and evaluate prospective acquisitions.
3. Evaluate alternative terms for an acquisition.
4. Consolidate forecasts under various assumptions.
5. Determine capital investment required.
6. Determine operating cash requirements.

This session of the 1978 Winter Simulation Conference is focusing on applications of corporate financial models. In particular, with this brief background, we will now concentrate on:
1) "Applications of Financial Modeling in Health Care" (a most important "industry" in which financial modeling has already had far-reaching results); and 2) "Financial Modeling: Simulating the Way to Planned Objectives" (a study of the highly successful application of financial modeling at the Warner & Swasey Company).