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COMPUTER AIDS TO PLANNING: THE BUDGET AND FORECASTING MODULE

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ABSTRACT

The purpose of this paper is to explore a middle ground approach to the process of modeling financial decision-making in the "real-world" environment. Existing models, from both academia and practitioners, are seen as limited in the range of application. The proposed approach seeks to address this issue directly by developing a method more reasonably suited to a broad range of organizational applications. Beginning with a core of responsibilities, the basic model is refined to fit a specific sector and organization application. The test situation covers commercial banking for the period 1967 - 1976.

INTRODUCTION

Within the post World War II period, methods of financial planning have evolved from relatively unsophisticated intuitive approaches into complex mathematical and simulation approaches designed for use with high speed digital computers. The time line of development however is not entirely contiguous. Though the extremes are evident, there is a considerable grey area in which the planning methods and processes are vague. This paper will deal with that grey area and attempt to fill a void in modeling a part of the planning process.

The planning function is an essential activity of the financial manager in any organization of literally any size. Inherent within this function, and hence of equal importance, are the activities of budgeting and forecasting. In prior years, the tasks of producing long-term organizational plans and working these plans into short-term forecasts and operating budgets were essentially hand operations¹ for most organizations. And, in spite of the recent development and application of sophisticated modeling techniques, this hand approach remains as the major planning tool in many organizations today. The major disadvantage of the hand-approach is relatively obvious: it is an extremely time consuming activity and once done the short-term results, including both the forecasting and budgeting processes, tend to become relatively fixed in nature. The net result of this is for few changes to be made in plans prior to approval. Moreover, once the model is made operational, changes in budgets and forecasts occur only when absolutely necessary, if at all. Since update capabilities are limited or nonexistent, minor errors compound into significant errors over time; the potential to fine-tune the system is foregone.

Given the data manipulation capabilities of digital computers, the relative advantages of applying the computer to the planning function are significant. If approached properly, the entire process would not only save time and presumably be more accurate, but it would also provide for increased flexibility by allowing for both a broader range of coverage and a larger number of last minute modifications. These advantages have not necessarily gone unnoticed. Indeed, computerization of the planning process has been

adopted by both academics and practitioners

alike; yet, gaps in generalizing a successful approach still remain. Within the academic sphere, the most recent attempts to computerize the process have tended toward the development of a "general model" which could presumably be applied to all situations.⁽¹⁾ Inherent in these approaches is an outsider orientation. This tends toward the creation of increasingly complex and sophisticated black boxes which aim at the prediction of past organization behavior. The orientation of this approach provides for its greatest weakness. Because of its generality, it lacks the essential adaptability and flexibility necessary to be applied successfully within different economic sectors and over a broad range of firms.

Within the practitioner's sphere, there exists an extremely large set of models, some of which may or may not work well. Since there is such a large number of these models in existence, it is difficult to make generalizations concerning their individual applicability. However, it is clear that most practitioner models tend to bunch around extremes. Many models are so trivial in nature that they provide little decision support. On the other hand, many have been created as an end in themselves and hence are so complex that a true understanding of their underlying assumptions and theoretical operation tends to exist only within the confines of the MIS group. This is especially disheartening given the fact that few computer programmers understand the basic fundamentals of finance or financial planning. These models, too, suffer from an orientation difficulty. In this case, the lack of transportability is a result of the high level of configuration of the process. The model has been written for a specific application and short of duplicating the environment, it is difficult to apply the model to other organizations or even other divisions within the same organization.

An alternative practitioner approach, and one which is becoming increasingly popular, is to "model" the planning and forecasting process by means of one of several English language, business-related modeling languages available from a number of different vendors. This particular approach however, doesn't directly solve any specific application problems. The "modeling language" is simply that, a language used to create a model given a certain environment described by the user. Planning assistance (the ability to budget and forecast) comes only after a successful working model has been created by or for the user. The "state of the art" for a computerized approach to planning may be summarized below.

- 1 All situations is typically interpreted to be in terms of the manufacturing sector of the economy.

Insights into Experiential Pedagogy, volume 6, 1979

Academically Generated Models

- Outside Perspective
- Typically Complex
- Inflexible
- Difficult to Customize
- Generalized Approach/Orientation
- Transportable

Practitioner Generated

Languages

- Uses Both Perspectives
- Typically Complex
- Not a Model
- Sometimes Transportable

Models

- Inside Perspective
- Wide Range of Capabilities
- Inflexible
- Highly Customized
- Very Specific Orientation
- Seldom Transportable

If the summary is thought of as a continuum, a noticeable gap in usefulness appears between the general academic models and the more specific in-house methods which the "modeling" languages do not fulfill. It is felt that a middle-ground approach is both necessary and possible and it is our purpose to present and illustrate such an alternative.

APPROACH

The basis of this approach is the common core of theory which underlies the finance function, which in turn supports a common set of responsibilities that cut across all sectoral application areas. Through the accounting process there exists a common method of recording and reporting organizational activity which, through a commonly formed set of statements, reflect management's success in meeting these responsibilities. The upshot of this approach is that it is possible to identify general algorithms for solving commonly occurring financial problems which can then be tailored to meet both sectoral differences and individual organizational needs.

To simplify, it is well recognized that the overall goal of a financial manager is to maximize the value of the organization through time. In doing so, the manager attempts to approach perceived optimality in the decision areas of fund raising and fund allocation within the context of the planning horizon of the firm. Since all managers must address similar fundamental problems, there is no reason to expect the basic problem solving approach to be significantly different. What will be different will be the appearance of the problem statement and the final formulation of the solution model. In the case of the planning function, the need to look into the future and create appropriate guidelines for action exists within every organization. Hence, it should be possible to devise a general method for looking into the future (forecasting) and for creating the guides for action (budgeting) based on certain key relationships or associations which must hold for any organization. It is within this "key relationship" area that the accounting process assumes significant importance.

The approach discussed above is nothing more than the "general" method which most academic models are based on. But, why stop the modeling process at this point? Instead, the approach should be carried through a twofold refinement process designed to first shape the general relationships to fit the requirements of a specific application area; and second, to customize the basic relationships to meet the unique needs of a single organization.

What this approach proposes is the creation of a general program shell designed to meet certain broadly defined

needs (in this case the projection of future activity and the formulation of a set of operating plans based upon that projection) which in turn are tailored to fit the specialized needs of different organizational applications.

The modeling process follows certain well-defined steps. First, the basic direction of the model is established. Once done, the general application relationships are set. This is the first step in the molding process and involves identifying the general functional relationships hypothesized to hold for the specific sector application. The second step comes in molding the estimating equations to fit the characteristics of the specific organization for which the application is being tailored. The latter process represents a kind of fine tuning of the basic relationships based on a measured fit of the hypothesized relationships (for the sector) to the historical data of the application organization.

MODEL

The test situation illustrates application of the general budgeting and forecasting model for a medium sized, state chartered commercial bank operating in a highly concentrated midwestern manufacturing area.

The planning horizon is one year with provision for quarterly updates of the initial projection. The general purpose of the model is twofold. First, it is designed to meet the planning needs stated above based upon an independently determined annual projection of activity. Second, to provide management with a control device which can be used to monitor activity.

The initial set of hypothesized relationships, represented as standard financial statement data are shown below.

Balance Sheet Categories

Assets	Liabilities and Equity
Cash & Cash Items	Deposits
Securities	Federal Funds
Federal Funds	Capital Structure
Loans	
Physical Assets	

Income Statement Categories

Operating Revenues
Operating Expenses
Taxes
Net Income

where:

$$\text{Cash \& Cash Items} = f(\text{reserve ratio, risk aversion})$$

$$\text{Securities} = f(\text{monetary policy, risk aversion})$$

$$\text{Federal Funds} = f(\text{reserve position, monetary policy, risk aversion})$$

$$\text{Loans} = f(\text{business activity, money supply, rate of interest})$$

$$\text{Physical Assets} = f(\text{expansion plans, age})$$

$$\text{Deposits} = f(\text{interest rate, alternative investments})$$

$$\text{Capital Structure} = f(\text{regulation, expansion plans})$$

Insights into Experiential Pedagogy, volume 6, 1979

As previously indicated, the second molding involves application of the general sector model to a specific organization. This process is conducted by testing the basic proposed relationships for firm predictability. The process is essentially one of establishing the goodness of fit of the proposed equations using the standard multivariate regression model:

$$\hat{Y}_t = \alpha + \sum \beta_j + X_{jt} + \epsilon$$

where: $t = 1, 2, \dots, n$ time periods
 $j = 1, 2, \dots, m$ determinants
 $\epsilon =$ the random error term

and refining the proposed relationships to provide for an acceptable fit.

The time period selected for the test covers the years 1967 - 1976. The period was selected on the basis of relevancy both in terms of nearness to the current

period and diversity of conditions represented.

At the time of submission, testing of the model is in the final stages. Completed results and evaluations will be available during the conference.

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