хл вы Executive BASIC Planning with BASIC



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X.T. BUI





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PLANNING PLANNING WITH BASIC

To my parents

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Executive Planning with BASIC is a collection of interactive, business-oriented programs in BASIC; they can all be used in their present form as tools for management and planning decisions. Thorough discussions of the background and development of each tool, and application examples from actual business sources will help you understand the methods described in each chapter.

The book has three goals:

- 1. To explain the quantitative methods of management decision-making in clear and practical terms.
- 2. To dispel the idea, common in commercial and financial circles, that programming is only for specialists. Thanks to BASIC, it is practical for management to have direct access to computers for analysis, planning, and control. Experience has shown the benefits that result from personal exposure to the power of a computer in the various areas of management.
- 3. To provide an efficient and time-saving set of computer implementations for quantitative analysis; since the problems of management decision-making are becoming more and more complex, managers must now devote their personal resources to analysis, reflection, and judgment rather than to the development of accounting tools.

This book is designed to serve both as a teaching text and as a reference work for professionals in the field. It will help data processing professionals, economists, and managers to understand the techniques of data processing for management decisions. This understanding will lead to better decision-making and improved general performance.

The programs of this book are organized into the following five groups:

- Decision Models under Certainty
- Decision Models under Uncertainty
- Forecasting Models
- Investment Models
- Multicriteria Decision-Aid Model.

Three appendices complete the text:

- Statistical Analysis Programs
- Matrix Operation Subroutines
- A Summary of BASIC.

Each chapter contains five sections:

- 1. A concise description of the method to be examined: definitions, fundamental principles, application areas.
- 2. A description of the program: its structure, its characteristics, and the options it offers to the user.
- 3. An application example, illustrating how the program can be used.
- 4. The output from a run of the program, using the data from the application example described above.
- 5. A complete listing of the program.

The BASIC computer language is easy to learn and to use. The essentials of BASIC are expressed in twenty or so simple instruction words (such as **READ**, **PRINT**, **FOR/TO/NEXT**, **IF/THEN**, and so on). BASIC is thus an excellent language for those who wish to solve information problems with a computer, without devoting excessive time and effort to the technicalities of software systems.

This book may be used either by the manager who needs an immediate implementation of the powerful techniques described, or by the data processing professional whose interest in programming may lead to an in-depth examination of the structure of each program presented.

A business manager begins by formulating a question or a problem to be solved and then chooses the model that most closely fits this formulation. The format of this book will guide the decision-maker in both of these tasks; particularly relevant are the descriptions of the models, and the application examples, which clarify the use of each program.

For the programmer who might be assigned the task of modifying these programs according to a given set of specifications, the structure of each program has been carefully outlined and the essential algorithms have been described. Many of the programs in this book can easily be abridged to perform a very specific task or generalized to take on a broader family of

tasks. For example, the Multiple Linear Regression program can be "downgraded" for use with a fixed number of dependent variables. On the other hand, the Portfolio Management Program can be "up-graded" for input of covariances.

All the programs in this book have been run and tested on the Apple II computer, and on the Ohio Scientific C-1P and C-4P microcomputers. Some of the programs have also been tested on Commodore's CBM 3032 and the P-2000 from Philips. While there are some implementation differences between BASICs, adapting these programs to different computers should be an easy task.



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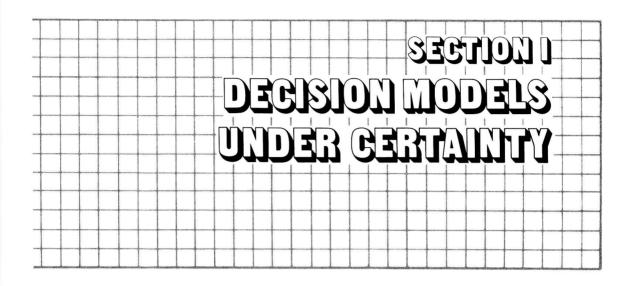
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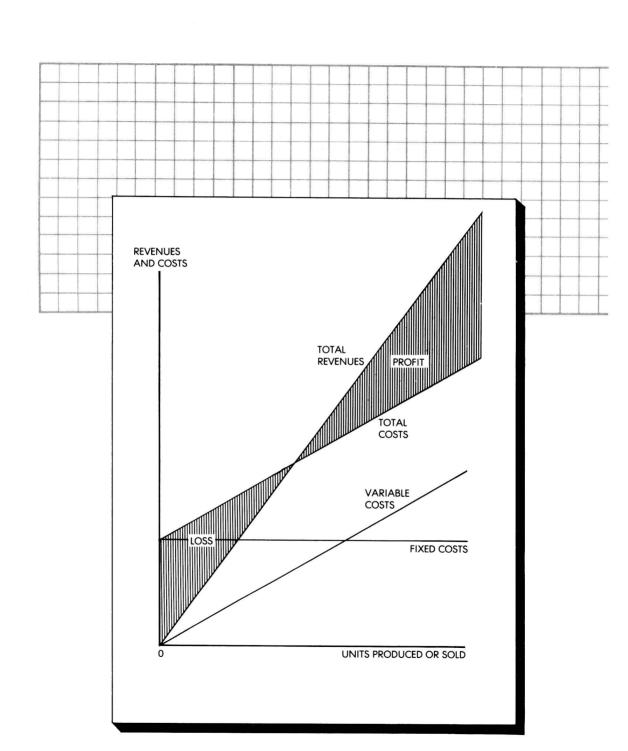
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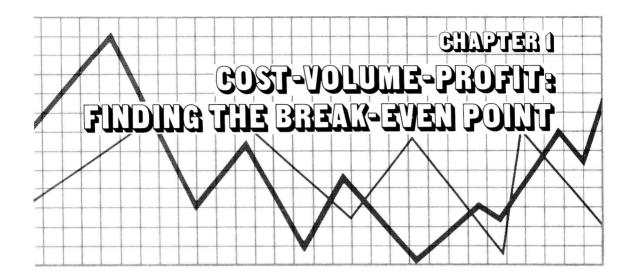
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THE METHOD

Break-even point analysis is a management financial tool that supplies a clear picture of the relationship between fixed costs, variable costs, and the potential profits from an investment project. Break-even point analysis indicates the level of production at which the income from sales exactly covers the total production costs.

The calculation of the break-even point is characterized by the fact that some costs are fixed and others are variable; a company must operate at a loss until a certain level of production (and thus of sales) is achieved. The break-even point can be defined as the cost-volume-profit ratio giving both a profit and a loss of zero.

THE PROGRAM

The break-even point program offers the user two different calculation options. The first, based on the *maximum production capacity*, is used for a specific product or for a specific production department. The second, based on sales, might generally be applied to all the activities of the company.

The advantage of the second method over the first is that it allows calculation of a break-even point for an entire organization that sells several products at different prices.

The first method is implemented in program lines 190 to 300 and 430 to 530. The break-even point formula is defined in line 220. Since the business manager is, in principle, free to determine the production volume (which might well vary from zero to the maximum capacity), it is useful to know how the profit changes for different levels of production. Lines 470 to 520 create a tabular presentation of this function.

Lines 310 to 410 calculate the break-even point for the second method. Line 340 contains the basic formula. Since this method is based on sales forecasts, the program also derives the expected profit (lines 390 to 410).

The program also performs some simple error checking. Line 140 reminds the user that the selling price of a product must be greater than its variable cost per unit. Lines 230 and 350 check that the input data do not conflict with the break-even point model.

APPLICATION EXAMPLE

The Problem

Jones, Inc., is a medium-sized company. In order to decrease production bottle-necks, the company is considering the purchase of an additional assembly machine. With the new machine, the variable costs per unit will be decreased by 25%, specifically due to a reduction in turn-around time. The new machine will *increase* the total fixed costs by \$1500. Supposing that no other cost elements enter into the analysis, Jones wants to find out whether or not the new machine will be an advantage.

The Data

The following table summarizes the cost, sales, and production data for Jones, Inc.:

	Before Purchase of Second Machine	After Purchase of Second Machine
Total fixed costs	3000	4500
Variable costs per unit	10	7.50
Unit sales price	20	20
Expected unit sales	500	500
Maximum production capacity	500	1000

The Results

The results of the two break-even point methods are shown in the output to the program. From the point of view of production, introducing a new machine would reduce the break-even threshold by 24% (60% - 36%). From the point of view of immediate sales the purchase of the new machine would mean a decrease of \$250 from profits. This assumes, however, that sales will not increase in proportion to increased production capacity.

```
The Output -
  BREAK-EVEN POINT ANALYSIS
 BASED ON PRODUCTION CAPACITY (1)
 BASED ON SALES FORECASTS (2) 21
  TOTAL FIXED COSTS? 3000
  UNIT VARIABLE COSTS? 10
 UNIT SELLING PRICE? 20
 MAXIMUM PRODUCTION CAPACITY? 500
  BREAK-EVEN POINT = 60%
  OF THE MAXIMUM PRODUCTION CAPACITY
  (OR 300 UNITS)
  CORRESPONDING TO SALES REVENUES
    OF $6000
  CONTINUE? Y
  COST-VOLUME-PROFIT ANALYSIS TABLE
  -----
  UNITS SALES TOTAL COSTS
                            PROFIT
  -----
  50
      $1000 $3500 $-2500
                $4000
$4500
  100 $2000
                          $-2000
  150 $3000
                          $-1500
  200 $4000
                $5000
                          $-1000
  250
       $5000
                $5500
                          $-500
  300
       $6000
                $6000
                          $0
  350
     $7000
                $6500
                          $500
  400
       $8000
                $7000
                          $1000
       $9000 $7500
$10000 $8000
  450
       $9000
                          $1500
  500
                           $2000
  ANOTHER ANALYSIS? Y
  BASED ON PRODUCTION CAPACITY (1)
  BASED ON SALES FORECASTS (2) ?1
  TOTAL FIXED COSTS? 4500
  UNIT VARIABLE COSTS? 7.5
  UNIT SELLING PRICE? 20
  MAXIMUM PRODUCTION CAPACITY? 1000
```