



Managerial Economics

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To Maryann, John, Vincent, and Alice
— B. K.

To Ron and Eva
— J. H. W.

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Preface

Managerial Economics is for use in an *applied* microeconomics course that deals with the economics of the firm. Usually universities that offer managerial economics also offer students a more theoretical course called microeconomic theory. The difference between a course in managerial economics and one in microeconomic theory is largely a matter of emphasis. In managerial economics, applications and tools with which to apply the theory are quite important. In addition, a managerial economics course stresses *practice* in the application of those techniques and tools. *Managerial Economics* was written with an emphasis on the applications of microeconomic theory and also provides numerous examples and opportunities for practicing new economic tools and skills. This text is not only an applied microeconomic theory text but also includes tools from statistics, mathematics, operations research, and a few concepts from macroeconomic theory.

The tools and applications we have emphasized were chosen from those that businesses actually use (see Forgionne's list in Chapter 1, page 3). To help students gain an appreciation for how these applications and tools can be usefully applied, we have taken the time to show clearly the relevance of the material included in the text. Students are shown in Chapter 1 the results of studies that illustrate how widely such concepts as elasticity, forecasting, and the analysis of demand, production, and cost are used by corporate decision makers. In Chapters 2–13 many applications are cited, and representative problems are fully developed from formulation through solution and interpretation. Many applied topics are covered in enough detail so that students should feel quite comfortable using these tools in class as well as in real business situations. Consider the forecasting tools covered in Chapter 6. Time series decomposition, for example, is a commonly used technique that is explained in detail with a *completely worked-out example*. Students will feel confident of their ability to use this technique after practicing with problems 4, 9, 13, 14, 15, and 18 in the end-of-chapter problems. Likewise, the extended example presented on sales forecasting in Exhibit 6.2 (Chapter 6, pages 285–302) will further reinforce a student's facility with forecasting tools. The exhibit is actually an article

written for business forecasters with an exact description of commonly used forecasting techniques.

Economic theory is *not* sacrificed by our applied approach. We have included complete explanations of those portions of economic theory having immediate applications to business situations. Consider the discussion of price discrimination and its reliance on the economic concept of price elasticity (Chapter 10, pages 513–522). Here we explain the economic concept at length, list some representative examples of its use in the real world (see Table 10.1, page 515), and explain to students precisely how they can apply the concept. Your students will gain valuable experience in applying the concepts of price elasticity of demand and the related technique of price discrimination in the end-of-chapter problems (problems 3, 4, 5, 6, 7, and 12).

Some 208 problems, at varying levels of difficulty and many with multiple parts, are provided to help students verify their ability to apply the concepts they have studied. Many of these problems are really mini-cases based on actual decision-making situations taken from both the private and public sectors. Nearly all of these problems have been used in our own classes over the years, and we have found them to be useful not only in verifying what the students have learned, but also in stimulating their interest in the course. Students enjoy being able to apply what they have been studying to real-life situations.

For some students our appendixes will be helpful in allowing complete mastery of all the material in the book. Appendix A is a review of algebra; Appendix B is an extended treatment of calculus concepts found in Chapter 3 (Optimization); and Appendix C is a list of data sources that we have found invaluable for students completing projects that require real rather than contrived information. Appendixes that add detail and rigor, but which the instructor may choose to skip without loss of continuity, are found directly following Chapters 2, 5, 6, and 8.

Virtually all of the material in the text has been classroom tested, modified, and retested. This process has been helpful in clarifying the presentation of what is often fairly technical information. In addition we, and the text, have benefited a great deal from the thoughtful review of many of our colleagues who teach the course. They include Jack Adams, Richard Anderson, Charles Breeden, Jeff Clark, Richard Evans, David Gay, Larry Gianchetta, Harriet Hinck, John McKean, James Moser, Michael Panik, Michael Payne, R. D. Peterson, Edward Sattler, John Snyder, Len Tashman, and Richard Zuber.

A complete instructional package has been produced to augment the textbook and make its use an exciting prospect. Northwest Analytical, which supplies econometrics software to Evans Economics, has written a special microcomputer software package for students that includes all the econometric tools used in the text as well as a linear programming solution routine. In addition, Paul Hemmeter and Barry Keating have prepared

lecture demonstration software, which is available for adopters. An excellent student Study Guide has been prepared by Charles Breeden, and a Solutions Manual with complete solutions to all end-of-chapter problems is available for instructors. We believe this package of instructional materials will enhance instructors' enjoyment in teaching the course and students' interest in learning the useful concepts presented in *Managerial Economics*.

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1

Managerial Economics: An Introduction and Overview

As you begin your study of managerial economics, you may be asking yourself: How does managerial economics differ from the other economics I have studied? The difference is primarily one of emphasis. In this course, the emphasis is on the application of economic concepts to business problems. Managerial economics is a pragmatic course designed to help you apply economic models and economic reasoning in making managerial decisions. As you progress through this course of study, you will see how economic theory and mathematical and statistical tools can be applied to a wide variety of management decisions in both the private and public sectors of the economy.

1.1 ECONOMICS, MANAGEMENT, AND DECISION MAKING

Managerial, or business, economists are often employed in staff, or support, positions within a firm. It is important for them to have a good understanding of all the basic business functions—accounting, finance, marketing, production, and so on—because managerial economics crosses these functional lines, using data from throughout the firm and providing information to managers in many different functional areas.

Most students who take a course in managerial economics will never work as a business economist. However, they may well have the opportunity to work with business economists and/or hire business economics consulting services. Thus, it is worthwhile for every manager to have an understanding of what business economists do and what kinds of tools they have in their tool kits. Such an understanding helps the manager ask the right questions of business economists and helps the manager in using reports, analyses, and forecasts appropriately.

It is important for management to work closely with the firm's business economists in a cooperative effort. Business economists play an impor-

tant role in helping to interpret events in the outside world for managers and in putting those events in a perspective that helps management make better operating and planning decisions. Decisions based on the best available information and analysis are likely to lead to the best outcomes for the firm. However, good decisions do not always lead to good outcomes. A decision is good if it is based on a thoughtful evaluation of the best available information. If it turns out that the results are not as positive as were hoped for, that does not mean the decision was bad. For example, if the weather report you hear in the morning while getting dressed calls for sunny skies and warm temperatures, you make appropriate decisions regarding which clothes to wear. If during the day a sudden change brings a rainy, cool afternoon and you get wet going between classes, that does not mean you made a bad decision. You made a good decision based on the available information but happened to incur a bad outcome. Business economists can help managers avoid bad outcomes by providing good information upon which to base decisions. They cannot, however, prevent bad outcomes.

1.2 THE USEFULNESS OF MANAGERIAL ECONOMIC SKILLS

The skills you will learn about and see applied in this course are widely used in the business world. In the early 1980s, Wicander surveyed a sample of members of the National Association of Business Economists (NABE) concerning skills they thought were important for undergraduate business economics students and Master of Business Administration (MBA) students to know.¹ Seventy-five skill areas were identified, and respondents were asked to rate the importance of each.

For both student groups, oral and written communication skills were rated the most important. For undergraduate students, 14 of the 23 next most important skills included topics covered in this course, for example, simple linear regression, time value of money, economic analysis of demand, sales forecasting, and economic analysis of cost. The results for MBA students were similar. Thirteen of the skill areas rated from third to twenty-fifth for that group are included in this course. These ratings represent the thinking of professionals actively engaged in the day-to-day business world.

In 1984, Forgionne reported complementary findings.² Over 80 percent of the executives who participated in this study reported that they used regression analysis and econometric skills. Chapter 3 of this text will help

¹Linda C. Wicander, "An Inquiry into the Attitudes of NABE Members Concerning Course and Skill Attributes of Business, Economic and MBA Students," unpublished master's thesis, Central Michigan University, 1981.

²Guisseppe A. Forgionne, "Economic Tools Used by Management in Large American Operated Corporations," *Business Economics*, April 1984, pp. 5-17.

you learn to understand and use these skills. In addition, many applications of regression analysis are reported throughout the text, and in chapter-end problems, you will have the opportunity to apply these skills yourself. Statistical decision analysis was reported as being used by nearly 77 percent of the executives in Forgionne's study. Chapter 2 of this text introduces this area of decision making, along with some other tools Forgionne reported as being used frequently (e.g., net present value and risk return analysis).

Optimization tools were also reported as being used relatively frequently by corporate decision makers. Forgionne found that marginal analysis and calculus were used by about 65 percent of the executives in his study. In this text, Chapter 3 and the appendix covering differentiation introduce these concepts, and they are applied frequently throughout the text as appropriate. Linear programming—another optimization tool, developed in Chapter 8—was reported as being used by over 72 percent of the firms in Forgionne's study.

Examples of other economic tools that Forgionne found to be used in marketing, production, cost analysis, financial analysis, and pricing include the following:

Forecasting	93.8%	Cost functions	84.6%
Market share analysis	89.2	Break-even analysis	83.1
Demand curves	69.2	Economies of scale	72.3
Elasticity	66.2	Capital rationing	61.5
Input-output analysis	55.4	Full cost pricing	75.4
Marginal productivity	53.9	Marginal cost pricing	73.8
Production functions	36.9	Price leadership	61.5

The percentages following each economic tool represent the percent of executives who reported using that concept. All of these concepts are covered in this text. Many others that Forgionne also found to be used by business decision makers are included as well.

Some of the benefits of implementing economic concepts in decision making are: (1) the analysis generates useful data, (2) it forces decision makers to define problems clearly and concisely, (3) it highlights relevant policy implications and ramifications, and (4) it provides a useful laboratory for testing various policies.³ The topics you will study in managerial economics will help you to better understand how economic, statistical, and mathematical skills can be integrated into a wide range of managerial decision making situations even if you never become a practicing business economist. This understanding will enable you to better communicate with economic analysts and will enhance the benefit you receive from managerial economic analysis.

³Forgionne, p. 11.

1.3 WHAT DO BUSINESS ECONOMISTS DO?

To illustrate further the importance of the tools you will study in this course, let us look at 10 representative job descriptions from a 1983 list of employment opportunities.⁴ These job descriptions also provide a brief synopsis of how business economists contribute to the management of modern organizations. We include this set of examples, not because we expect you to look for such jobs, but because, by reading through the list, you will get some sense of the high level of corporate demand for people with business economics skills.

1. *Vice President.* Corporate planning department in major financial institution. Opportunity to use economic analysis, econometric model-based tools, statistical analysis, and financial analysis. Projects are done to advise senior management officers on major decision-making problems. Opportunity for advancement to major business areas is most likely.

2. *Chief Economist.* To advise senior bank management and board of directors on external economic conditions and their impact on corporate and bank activities; support business-unit-level activities such as market research, industry analysis, pricing and portfolio strategy, and interest rate forecasting; participate in asset-liability management; serve as bank's spokesperson on economic matters. Strong verbal and written communication skills essential. Salary commensurate with experience.

3. *Junior Economist.* For New York City investment bank. General business conditions analysis, help to estimate the next month's CPI, auto sales, etc. Some writing. Salary to \$30K.

4. *Industry Analyst.* Consumer durables, to do short-term and long-term industry sales forecasts, special market analysis, build and maintain econometric models. Quantitative undergrad with MA in economics, 2 to 5 years' experience. Mid-Atlantic. Salary to \$45K.

5. *Senior Product Planning Consultant.* Get involved in strategic marketing department, plotting corporate direction, and recommending allocation of resources into new technologies and products. Requires marketing and planning experience, including one or more of the following: forecasting, market research, pricing, economic analysis, financial, opera-

⁴Employment Opportunities for Business Economists: July 1983 (Cleveland, OH: National Association of Business Economists, 1983).

tions, or product planning. MBA in marketing or a quantitative discipline required plus minimum of two years' experience; must be fluent in APL, Fortran, or BASIC. Central-southern location. Salary commensurate with background and experience.

6. *Supervisor of Energy Demand and Econometric Forecasting.* Connecticut utility requires minimum of 7+ years' experience in econometric modeling, forecasting, and evaluation of energy demand and economy. Get involved in planning and supervising of all forecasting activities, and supervise two analysts. Should have a strong understanding of macro- and microeconomics, econometrics, probability, and statistics. Must have an MBA or master's in economics. Salary commensurate with experience.

7. *Economist.* Fortune 500 firm seeks person responsible for assisting in preparation of macroeconomic and vehicle sales forecasts. Prefer PhD in economics with strong background in macroeconomics and several years of related work experience. A broad understanding of quantitative methods is necessary.

8. *Econometricians.* For major national communications firm. PhD's and MA's to develop econometric models that will assist in the analysis and forecasting of economic developments, industry competition, supply and demand of matters affecting their industry. Excellent communicative skills mandatory.

9. *Senior Economist.* For investment research and management firm in New York City to do GNP and business cycle forecasting. Small department. Must have solid experience, including total responsibility for GNP forecasts. \$100K to \$150K.

10. *Electrical Utility Economist.* To forecast and evaluate economic and consumer energy demand conditions. The individual sought must have a demonstrated ability to plan, establish, and supervise forecasting-oriented activities and complete projects on time. MA or MBA with effective communications skills and proven capabilities in econometrics and probability statistics is particularly desirable. Firm is located in the Northeast. Salary to \$40K.

These job descriptions provide evidence of the demand for personnel with the types of skills you will study in your managerial economics course. They also give you a sense of what business economists do in their work. In addition, they reassert the desirability of good communications skills.