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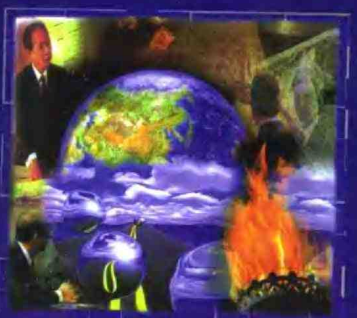
QUANTITATIVE BUSINESS ANALYSIS

TEXT AND CASES



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出版者的话

但凡成事，均缘于势。得势则事成，失势则事不顺。顺势而行，如顺水行舟；借势而动，如假梯登高；造势而为，如太空揽月。治学、从政、经商、置业，均不可一日失势。势者，长处、趋势也。

今日中国，是开放的中国；当今世界，是开放的世界。改革开放，大势所趋，势不可挡。经济开放、文化开放、政治开放，世界需要一个开放的中国，中国更要融入开放的世界。借鉴国际惯例，学习他人之长，已经到了不可不为之时。

借鉴国际惯例，学习他人之长，已属老生常谈，但学什么、如何学、以何为蓝本为众多志士仁人所关注。可喜的是，由赤诚图文信息有限公司精心策划，ITP、McGraw-Hill 及 Simon & Schuster 等国际出版公司特别授权，东北财经大学出版社荣誉出版的“世界财经与管理教材大系”现已隆重面世！她以“紧扣三个面向，精选五大系列，奉献百部名著，造就亿万英才”的博大胸襟和恢弘气势，囊括经济学、管理学、财务与会计学、市场营销学、商务与法律等财经、管理类主干学科，并根据大学教育、研究生教育、工商管理硕士（MBA）和经理人员培训项目（ETP）等不同层次的需要，相应遴选了具有针对性的教材，可谓体系完整，蔚为大观。所选图书多为哈佛、斯坦福、麻省理工、伦敦商学院、埃维商学院等世界一流名校的顶尖教授、权威学者的经典之作，在西方发达国家备受推崇，被广为采用，经久不衰，大有“洛阳纸贵”之势。

借鉴国际惯例，毕竟只是因势而动；推出国粹精品，才是造势而为。在借鉴与学习的同时，更重要的是弘扬民族精神，创建民族文化。“民族的，才是国际的”。我们提倡学他人之长，但更希望立自己之势。

势缘何物，势乃人为。识人、用人、育人、成人，乃人本之真谛。育人才、成能人，则可造大势。育人、成人之根本在教育，教育之要件在教材，教材之基础在出版。换言之，人本之基础在书本。

凡事均需讲政益，所谓威事，亦即有效。高效可造宏基，无效难以为继，此乃事物发展之规律。基于此，我们崇尚出好书、出人才、出效益！

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To our families, for the patience and support they offer our professional lives, for the pleasure and purpose they add to the rest of our lives.

This book contains the text and cases forming the core of what has been and continues to be a highly successful MBA-level course in quantitative business analysis. The course represents an alternative to the traditional technique-driven, compartmentalized, quantitative methods course. Instead, it is a course that is

- decision and action oriented, not technique and numbers driven;
- integrated in both form and pedagogy within a business curriculum, not compartmentalized;
- managerially exciting, not methodologically dull.

It contains all of the usual topics of existing quantitative courses. Students develop the skill and the perspective to use quantitative techniques artfully to gain insight into the resolution of practical business problems. They not only master the specific techniques, but also develop the ability to garner information from commonly available sources and to recognize when a particular technique is appropriate, when additional analysis is called for, and when to end the analysis and make the decision. The most widely applicable methodologies of decision and risk analysis, probability and statistics, competitive analysis, and management science are thus integrated with personal judgment and intuition in a way that is meaningful to MBA and executive learners alike.

Two key components of the course are: (1) field-based (i.e., they actually happened) cases drawn from all functional areas of business, and (2) clearly-written, pragmatically-focused text explaining technical concepts and the strategic frameworks of quantitative analysis. The cases feature realistic, unstructured business settings wherein the methodologies of the course can be usefully and creatively applied to the decisions of the practicing manager. They thus provide vivid answers to the questions, Why is this stuff useful?

The text, which has its origin in "technical notes" used for years in the course, gives the background theory and technical details necessary to perform solid, insightful quantitative analysis of business issues. It thus provides answers to the questions, What do I do now?, which are triggered by the complex issues raised in the cases.

The Cases

Just what is a case? The answer must recognize that cases play a variety of roles in a course. They may be focused on understanding core tools and concepts, on applying methodology appropriately, on defining the limits of good practice, or on inventing new methods and adapting existing ones for the problem at hand.

Some cases in this book are highly structured, focused on a single issue, with needed data laid out. These cases can be used to develop methodology; the cases are not intended merely to present institutional information and provide practical enrichment. Such a case is more than a problem or exercise; it requires some initial assumptions, which may lead to alternative answers, and the analysis must be explained by the student in the case context.

Some of the cases are appraisal cases, where the analysis is partly or wholly done. The student will evaluate the work, applying what has been learned about good practice, and perhaps push the analysis further.

Finally, and more commonly in this book, many cases are unstructured, with multiple issues and data challenges (missing or incomplete data, choices among data, or data preparation needed). In these cases, the student must diagnose the situation, perform the analysis, and explain the use of the analysis and its limits. The intent here is not to produce apprehension, but to show that skills can be confidently applied to realistic situations. Some of the student's fear that may arise when using cases comes from concern that there is a single right answer and that the student will be unable to find it. If students can see that many reasonable assumptions may be made (some more reasonable than others, to be sure) and that they can do a variety of analyses (some more insightful than others), they will find their own way and complement their efforts with ideas that emerge in class.

A common theme cutting across all cases, and indeed across the entire course, is the need to make real *decisions*. The cases thus avoid being academic exercises, but assume the vitality of business itself. Thus, *decision analysis* becomes an accurate descriptor of all the cases in this book and is a critical framework from which this new type of quantitative methods course hangs.

What makes a strong case? A leading characteristic is the aforementioned *decision orientation*. *Relevance* is key; students recognize that the resolution of the situation matters to them. A strong case demonstrates *a need to know* something not currently known. It involves the *practice of skills*, including new and recently acquired skills. And it requires some *internaliza-*

tion of concepts and the *articulation* of the reasoning process. Students will see that they are involved in situations that can be key to their careers.

In addition to these characteristics, these cases provide integration with other courses. Issues come up from other disciplines that provide bridges to other courses. If these issues are not immediately put aside in class and built upon, the course is not pigeon holed: "That's *quant*, not management, and therefore not for me." These cases provide many opportunities for joint class sessions, where the regular instructor can be joined by a professor of accounting, ethics, economics, finance, marketing, operations, or human resources to bring together two streams of concepts and to solidify the role of quantitative analysis in each of the business functions.

The Text

The course's dedication to student-centered learning places both responsibility and ownership of the learning process squarely on the shoulders of the student. The cases force the student to confront tricky issues and complex situations. The text provides a readily-available source of guidance on how to structure and resolve the issues and situations. The general flow of learning embraced by the course and supported by this book is then: analyze a case and draw on the text as the need arises. The cases challenge; the text prescribes how to address those challenges.

The text is organized as follows: Chapter 1 is an overview of the process of quantitative business analysis, using a simple but realistic example. The four major components of good analysis are introduced: *alternatives, assumptions, assessment,* and *performance*. Each of these components is the topic of one of the following four chapters, which together with Chapter 1 comprise Part I, the core of the text.

The remaining chapters build on the four basic components of analysis, each representing a more advanced treatment of one (or more) of the components. Chapter 6 addresses the issue of how to restructure *assumptions* in a way that helps mitigate risk. Chapters 7–10 address complications arising from how to evaluate *performance*. Chapters 11–14 address issues of how to calibrate *assessments* of uncertainty in key assumptions. Chapters 15–17 address complications associated with having a large number of *alternatives* to consider (Chapter 15 also addresses complications associated with how performance is assessed, when assumptions are difficult to structure).

Concluding remarks

The cases are organized alphabetically, not according to particular methodological approach. This organization allows flexibility in the use of the cases and preserves student responsibility to determine what should be done with each case. Of course, the cases are not to be taught in alphabetical order. The *Instructor's Manual* describes the typical use of each case, refers to the appropriate text for each case, and provides sample course outlines. (Many of

the cases have also been used in executive education in short, non-degree programs. They would fit nicely in courses more narrowly focused in decision analysis, management science, or forecasting and regression. For short courses, any subset of these cases can be selected for custom publishing by Irwin/McGraw-Hill.)

The course based on this book assumes virtually no prerequisites. Although calculus is not needed, some algebra is assumed, but rarely getting as far, for example, as solving two equations in two unknowns. Although no prior probability or statistics is presumed, some familiarity can help the student. The principal requirements are clear thinking, the ability to conceptualize, and the ability to cut to the core of an issue.

Even though this book of texts and cases is software neutral, the electronic spreadsheet is assumed to be a fundamental tool available to the student. The spreadsheet is a very helpful way for instructors to provide the right amount of help to students. Spreadsheets containing data from case exhibits and, sometimes, the setup for analysis are available with the *Instructor's Manual.* They may also be downloaded from the QBA home page accessible through the Darden School's home page (http://www.darden.virginia.edu/) on the Internet. It will be necessary to use @Risk or Crystal Ball, and the Solver within Excel or What'sBest! to do some of the cases. Other software tools, such as TreePlan Precision Tree, or DPL, may be useful to students in the course but are not necessary.

A complete instructor's manual, with sample course outlines and an extensive teaching note for each case, is available from Irwin/McGraw-Hill. To the instructor's advantage the authors have put as much effort and time into teaching notes as the cases. Each note is the product of many teaching meetings and discussions of pedagogy.

The production of this book reaffirms our commitment to what we have been doing in our quantitative analysis course for many years. We are glad to see that others in our discipline are also interested in this approach, as evidenced by many sessions on the topic at the meetings of such professional societies as the Institute for Operations Research and Management Sciences, and the Decision Sciences Institute. We welcome the interest and hope that our experience may be found useful elsewhere.

Please provide feedback (especially about successes and failures with these cases), new case ideas, and innovative ways of teaching. Write to any of the authors at Darden Graduate Business School, University of Virginia, Box 6550, Charlottesville, VA 22906-6550, or send e-mail.

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We thank the many companies and individuals who willingly cooperated with the field research needed for the cases. We are pleased to note that there are many managers who recognize the educational value of field-based course materials and, as a result, who generously contributed their time and experience. Some of the companies are named in the cases; others for a variety of reasons chose to have their material disguised. Although the cases in this book are written as fact, almost all of them have some facts disguised. In some, individual names have been changed; in others, some of the numbers are changed. Some are written from general experience, without a specific sponsoring company. We are pleased if the cases appear to be totally realistic, but the reader should be aware that names, numbers and situations are not all real.

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