

Preface

Since the 1970s, the field of finance has evolved rapidly, driven by the advances in information technology and the introduction of financial innovations involving new financial products and services. Nowadays, investors have a wide range of options suitable for different investment policies (e.g., equity, different types of funds, fixed income products, derivatives, etc.), managers of firms use a variety of products for corporate financing and risk management, and policy makers face new challenges in choosing the best policies and measures for monitoring and controlling the markets in an effective way. Despite the significant progress that has been achieved, in today's globalized and increasingly volatile environment, modern financial theory still faces a number of challenging issues, including but not limited to:

- the management of different types of financial risks,
- understanding of the factors that affect the global markets,
- analysis of the performance of firms and organizations,
- regulatory issues related to the implementation of effective supervision practices.

In this context, the decision-making process in the “new era” of finance is becoming more and more difficult, thus making the development and implementation of effective operational decision support tools a critical requirement. Toward this direction multidisciplinary, integrated, and operational approaches are needed to cover the complex and multidimensional nature of the financial decision-making process.

To this end, three different levels of analysis can be considered. The first is focused on building models that describe the characteristics of financial problems and phenomena. Mainstream areas such as financial economics, mathematical finance, and financial engineering employ stochastics, probability theory, statistical and optimization models, among others, for financial modeling purposes. At the second level, empirical studies are required to test the theoretical models and identify new unobserved explanatory factors. This is usually done through statistical and econometric methods that facilitate the analysis of panel and cross-sectional financial data related to the operation of financial markets and the actions of firms, investors, and policy makers. Finally, the third level of analysis is

related to the construction of possible solutions and the selection of the most appropriate ways of action. Originating from the work of Markowitz on portfolio selection, optimization methods have been widely used for formulating solutions in many financial decision problems.

At the decision-making level, it is now widely acknowledged that financial decisions require the consideration of multiple factors, variables, and criteria, in a framework that needs to be flexible and customizable to the requirements of a particular situation. Financial decision makers combine statistical estimates and forecasts, domain knowledge derived from the theory of finance, and constraints imposed by the external environment, with their own expertise, judgments, and decision-making policy. In this process, multiple perspectives, goals, and decision criteria are involved. Financial modeling is often based on the assumption that financial decisions are driven by a wealth maximization objective, but this single objective is often not well-defined, thus requiring a broader description through multiple subobjectives or alternative factors.

Multiple criteria decision aid (MCDA) is well suited in this context. MCDA provides a wide range of analytic methodological tools for decision aiding under multiple conflicting criteria and it is particularly well suited for financial decision support. MCDA contributes at several levels of the financial decision-making process, covering both the problem structuring stages and algorithmic issues related to the construction and assessment of satisfactory solutions.

This book intends to provide a comprehensive overview of the applications of MCDA approaches to financial decisions. The book is organized into seven chapters. [Chapter 1](#) starts with an introduction to the main aspects of the financial decision-making process, including an overview of different types of financial decisions and a discussion of the connections between financial modeling, risk management, and financial engineering. The multicriteria aspects of financial decisions are also analyzed in detail, from different perspectives. [Chapter 2](#) covers the founding principles, main concepts, and techniques in the area of MCDA, including multiobjective optimization, multiattribute value theory, outranking relations, and disaggregation methods. The remaining chapters [Chaps. 3–6](#) focus on particular areas of financial decisions, including banking, credit granting, portfolio, management, investment appraisal, and country risk assessment. Each chapter presents the contributions and applications of different MCDA methods in these areas. Illustrative applications are also presented to demonstrate the applicability and results of MCDA methods. The book closes with a discussion of some important open issues that pose challenges for the future development of the MCDA paradigm and its application in financial decision aiding.

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