Preface and acknowledgements

This monograph combines research on decision making under uncertainty and research on expectations, two fields that have been moving closer together over recent decades. Current perception on expectations and their effects continues to rest to a large extent on the notion of unbounded rationality. This book takes human cognitive limitations seriously and documents many forms and effects of bounded rationality important for both the economic researcher and the economic policy maker. The text offers a solid and easily accessible introduction to the issues by blending theoretical analysis with experimental studies. The book targets researchers as well as economists working in business and government and the text is also suitable for students taking upper-level undergraduate and graduate courses on behavioural economics, the economics of uncertainty and information, forecasting and experimental economics. The text aims to achieve a balance between a textbook and a research monograph. Part I presents the basic tools and theoretical models necessary to understanding rational and boundedly rational expectations and their role in economic life. Every chapter in the first part of the book ends with suggestions for further reading. Part II of the book explores the fascinating insights behavioural economics – the study of actual human decision makers – has to offer. In this part a series of innovative experiments illustrate how bounded rationality affects economic behaviour and performance. The following provides a short survey of the various chapters:

Chapter 1 acquaints the reader with the reasons why forecasting – the formation of expectations – is essential to economic life. Using the Arrow-Debreu model of complete markets we identify production lags as one among several decisive factors. Chapter 2 introduces the concept of expected utility maximization and its applications. Expected utility maximization is shown to be a flexible and powerful tool for the analysis of decision making under uncertainty. Chapter 3 clarifies the effects of heterogeneity in agents' expectations on market outcomes. In particular, it is shown that individuals' forecasting errors even matter when these errors average out in the population. Chapter 4 investigates the conditions under which forecasting should be replaced by other strategies of dealing with uncertainty. When expectations are costly to form, behavioural alternatives like diversification of projects may supersede forecasting. Chapter 5 presents time series models with expectations. Here goods and asset markets are studied under various forms of expectations heuristics and under rational expectations.

Chapter 6 starts the analysis of human behaviour in experimental settings. Here, people's difficulties with expectations formation based on costly information are documented. Chapter 7 shows how the form of bounded rationality documented in Chapter 6 can be incorporated into cost–benefit analysis: we apply the finding of underacquisition of costly information to the public policy question of who should finance satellite-based information. Chapter 8 turns to pattern recognition as an important behavioural tendency in time series extrapolation. The patterns of runs and zigzag movements turn out to be the most important patterns subjects rely on when forming expectations. Chapter 9 describes a more advanced experiment designed to elicit pattern-based expectations in a more general setting. These expectations data are applied to model financial markets where pattern extrapolation drives prices and we assess how well this model fits data of exchange rates and stock prices. Chapter 10 turns to the study of coordination of activities when decisions are decentralized and anticipation-based. Under such circumstances coordination functions poorly and centralized decision making has advantages way above what theorizing based on perfect rationality would suggest. Chapter 11 analyses an important issue in monetary economics. In this final chapter a model of a monetary economy is developed to investigate the role played by expectations in the determination of the general level of prices. The laboratory study shows that the quantity theory of money appears to be an economic relationship that is robust to agents' deviations from perfect rationality.

Five of the chapters appearing in this book are revised and extended versions of articles previously published. Chapter 3 is based on 'Price and output effects of heterogeneous expectations' (published in *Swiss Journal of Economics and Statistics*, **132** (2), 1996, pp. 207–22, Swiss Society of Economics and Statistics). Chapter 4 is based on 'Forecasting among alternative strategies in the management of uncertainty' (published in *Managerial and Decision Economics*, **19** (3), 1998, pp. 179–87, John Wiley & Sons). Chapter 6 is based on 'Acquisition of costly information: an experimental study' (published in *Journal of Economic Behavior and Organization*, **46** (2), 2001, pp. 193–208, Elsevier). Chapter 7 is based on 'Applied welfare economics with bounded rationality: public policies toward remote sensing' (published in *International Advances in Economic Research*, **11** (1), February 2005, pp. 39–47, International Atlantic Economic Society). Chapter 8 is based on 'Pattern recognition and procedurally rational expectations' (published in *Journal of Economic Behavior and Organization*, **37** (1), 1998, pp. 71–90, Elsevier).

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