Introduction to the *Handbook of Experimental Finance*

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1. INTRODUCTION

It has been our great pleasure organizing and editing this book. We believe it is a much-needed collection of research that outlines vital topics and approaches in experimental finance for academics in finance and economics and practitioners alike. We invited most of the chapters. Some other chapters were presented in our three Virtual Experimental Finance meetings in Winter 2020–21.

Experimental Finance and Experimental Economics share common roots. While Smith (1962) is widely recognized as a seminal article that opened up the field of experimental economics, Smith (1962) makes it very clear in the third sentence of this celebrated article that the article’s focus is on financial markets: ‘*Since the organized stock, bond, and commodity exchanges would seem to have the best chance of fulfilling the conditions of an operational theory of supply and demand, most of these experiments have been designed to simulate, on a modest scale, the multilateral auction-trading process characteristic of these organized markets.*’ (Smith, 1962, p. 111).

Subsequently, several seminal articles in the 1980s on asset markets (for example Smith et al. 1982; Smith et al., 1988; Forsythe et al. 1982; Friedman et al. 1983; Plott and Sunder, 1982, 1988; Smith et al. 1988) are credited with setting up the foundations for asset market experiments in both experimental economics and experimental finance. Despite these common origins, by the time of publication of the leading Experimental Economics book by Davis and Holt (1993), financial market experiments were only one of seven applications (along with price competition, auctions, bargaining, public goods, games and decision making under uncertainty). By the date of publication of the *Handbook of Experimental Economics*, vol 1, (Kagel and Roth, 1995), asset markets was only one of seven chapters (excluding the introduction). In the subsequent volume of the *Handbook of Experimental Economics*, vol 2, (Kagel and Roth, 2016), out of ten chapters, none involved experimental finance.

As experimental financial/asset market studies were gradually shrinking in importance in experimental economics, they were finding a somewhat receptive audience in finance (summarized in some detail by Charles Noussair in this Handbook). Noussair (this Handbook) also details the diversity in topics of experimental finance, which goes beyond the original focus on asset market experiments. As of today, despite some overlap in topics and adherence to some of the same methodological principles, the two fields are growing increasingly distinct in the array of topics they represent. One aim of this Handbook is to showcase the diversity of experimental finance topics and solidify the distinctiveness of experimental finance as a stand-alone ‘field’ from experimental economics.

One can define experimental finance by (1) methods (see Bloomfield and Anderson, 2007) and (2) objectives (Smith, 1989; Sunder 2007). The primary class of *methods* of experimental finance comes from experimental research—especially, but not exclusively, rooted in the experimental economics tradition of incentivized experimentation.
Methodologically, experimental finance mainly relates to three primary forms of experimentation (Bloomberg and Anderson, 2010): (1) Between-treatment experimental investigations—comparing the behavior of subjects between treatments by changing one or more variables (for example, asset markets with or without short selling). (2) Demonstrations—comparing the behavior of subjects to a theoretical benchmark (for example, within a market, do prices match the fundamental value?). (3) Quasi-Experiments—comparing the behavior of different subject types (for example, trading of females vs. trading of males).

The objective of experimental finance is to understand human behavior and market behavior in financial settings. Oftentimes, this translates to a focus on particular finance topics. For example, Sunder (2007) asserts that experimental asset markets make up an important part of experimental finance (see overviews in Sunder, 1995; Noussair and Tucker, 2013).

In its essence, experimental finance studies human decision makers in controlled environments, typically the physical or virtual lab. Human behavior generally guides the design and leads to the findings, but the objective of experimental finance research is not limited to human behavior. Rather, some implication for financial markets is necessary. This dual objective of understanding what makes humans tick and what makes markets—with humans in them—function is an essential defining characteristic of experimental finance and a guiding principle in the organization of this Handbook.

While this dual objective may seem straightforward, it packs both human behavior and market behavior, which may be at odds with one another. Humans are boundedly rational at best: They use heuristics, take shortcuts, and have cognitive limitations, biases, predispositions and limited computational power. They are emotional, habitual, social, reactive and reductive. Markets need not be reflective of some human average. A market consisting of many lesser informed individuals and only a few informed individuals may nevertheless reflect fundamental pricing based on (unlimited) arbitrage. Conversely, a market with a few influential agents (that is, managers, insiders, institutional investors, opinion leaders) can exhibit significant distortions. Market behavior is guided by the mechanisms that allow different information pieces to be integrated into the whole and minimize distortions due to human behavioral factors. However, the link between human behavioral factors and their aggregation into market price formation is yet to be established. In fact, establishing and quantifying such a link would be impossible without experimental finance.

In compiling this collection, we wanted to provide adequate representation to both human and market considerations, to balance them and to integrate them, so that the final product is a coherent and cohesive collection where the different parts add up to a workable understanding of historical context, methods, topics, goals, directions and possibilities in experimental finance. We are aware that we did not include all research strands or technologies. However, we addressed a substantial part of experimental finance research.

The aim of this Handbook is twofold: To educate and to influence. As educators, the Handbook is meant for researchers and graduate students who want to learn from leading experts in the field and are interested in pursuing an experimental approach to studying financial markets. Each chapter forms a starting point, helping students and researchers navigate the rich literature of finance experiments. Educators and students will also find the Handbook useful as a companion book to the Handbook of Behavioral Finance (Bruce, 2010), Handbook of Experimental Economics (Kagel and Roth, 2016), Handbook of
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Judgement and Decision Making (Koehler and Harvey, 2008), Handbook of Experimental Game Theory (Capra et al. 2020), Handbook of Experimental Economic Methodology (Fréchette and Schotter, 2015) as well as textbooks on Behavioral Finance and Experimental Economics. Researchers and non-specialists will find in this Handbook valuable examples of experiments that test theoretical constructs in finance and suggest new ways of navigating and structuring financial markets.

As influencers, we possess a compelling set of tools that can help answer many key questions in finance, which are often not amenable to investigation with archival data analysis. Based on our discussions in the three meetings and beyond, there appears to be a consensus that this set of tools is either unfamiliar, misunderstood, or viewed with scepticism in some circles. It is the collective desire of the field to integrate broadly into mainstream finance research, and just as importantly, into mainstream finance practice. In particular, the Handbook aims to encourage academic collaboration with finance practitioners and institutions in posing new questions and establishing new directions. Such collaboration requires both familiarity and acceptance of the methods and approaches detailed in this Handbook.

2. ORGANIZATION

We’ve organized the Handbook’s 31 chapters into two parts: Basic Research and Applied Research. This is a common dichotomy in experimental research on human choices in economic settings (for example Fisher and Mazur, 1997). Basic research involves investigations into human behavior in financial decision making (Chapters 1–14). Applied research involves specific applications that drive the investigation (Chapters 15–31). Since all chapters in this Handbook are related to finance applications, the classification into basic or applied is a matter of degree and involves subjective judgment on our part.

There are chapters relating to methodological questions, for example, subject pool choice, physical measurement, and research directions; chapters related to behavioral finance topics, for example, cognitive finance and market anomalies; chapters related to market experiments; and chapters related to various applied topics such as bank runs, financial accounting or nudging. It was important to both stress the dual nature of experimental finance and to maintain a flow from behavior to markets which illustrates the power of experimental finance and its complementarity with related fields. This structure allows the Handbook to be used alongside a traditional textbook on experimental economics or behavioral finance (the two closest complementary fields) but also financial economics, as well as a stand-alone volume. Each part includes chapters that offer new directions and cutting-edge topics of research in experimental finance. In the following, we briefly introduce the chapters.

2.1 Part One: Basic Research

Within the basic research portion, we organized the chapters into three subareas: Experimental Methodology (Chapters 1–6), Behavioral Finance Research (Chapter 7–11) and Special Topics (Chapters 12–14).
2.1.1 Experimental methodology
In Chapter 1, ‘Current and possible future research directions in experimental finance,’ Charles Noussair takes stock of developments over the last several years in experimental finance to propose two directions for the future. Two emerging growth areas are (1) the interaction between human and artificial agents (addressed in Chapter 24) and (2) the consideration of virtual reality to create a life-like experience. Chapter 2, ‘Experiments in finance: from no to maybe to yes!’ by Pascal Kieren and Martin Weber, elaborates on why we need experiments in finance research. They propose three approaches for tackling criticism of experimental finance methodology: (1) complementing experiments with field studies, (2) using professionals as participants (addressed in Chapter 6) and (3) using experiments to study naturally occurring market features inherent in field data. In Chapter 3, ‘The complementarity of experimental and archival finance research,’ Lucy Ackert and Hong Qu differentiate between experimental finance methodology and archival data analysis, showing that both methodologies add relevant pieces to the puzzle of financial decision making. Chapter 4, ‘Physiological measures in experimental finance’ by Eyal Ert, Abigail Hurwitz and Sven Nolte, elaborates on physiological measurement in laboratory experiments and specifically addresses how tracking physiological activity can offer insights regarding the cognitive and emotional processes in financial decision making. In Chapter 5, ‘Ambiguity, experience and unforeseen events in experimental finance,’ Stefan Trautmann discusses methodological issues in the design of experiments that study situations typified by strong uncertainty. Chapter 6, ‘Experimental finance and financial professionals’ by Sascha Füllbrunn, Christoph Huber and Christian König-Kersting, considers the issue of using financial professionals as subjects in finance experiments. They showcase recent studies with financial professionals and elaborate on design elements unique to this subject pool.

2.1.2 Behavioral finance research
Chapter 7, ‘Cognitive finance’ by Ciril Bosch-Rosa and Brice Corgnet, considers how individual cognitive skills affect financial decision making and market outcomes. In Chapter 8, ‘The perils of a blanket model: Financial anomalies and loss aversion,’ Eldad Yehiam details the limitations of using the theory of loss aversion in financial markets. Specifically, he questions the generality of past findings, challenges the experimental methodology used in loss aversion experiments, cautions on the applicability of loss aversion in real markets and shows that loss aversion may be confounded with other behavioral phenomena. Chapter 9, ‘Testosterone and financial risk taking’ by John Dinsmore, Eric Stenstrom and Marcelo Vinhal Nepomuceno reviews the literature on testosterone and its role in human evolution, competition and financial risk taking. The chapter emphasizes moderating factors such as context and trait differences and highlights the importance of the experimental method in measuring testosterone’s effect on financial risk taking. However, the experimental evidence usually results from correlational studies and does not allow for a clear relationship between testosterone and financial risk taking, mostly due to underpowered studies. In Chapter 10, ‘On attention to information: The checking paradox,’ Yefim Roth and Ofir Yakubo discuss the phenomenon of under- and overreaction to information and relate such behavior to regret minimization. Chapter 11, ‘The double-channeled effects of experienced payoffs in investment decisions’ by Peiran Jiao, uses an experiment to study the influence experiences have on subsequent decisions.
2.1.3 Topics
In Chapter 12, ‘Investing other people’s money,’ Sascha Füllbrunn, Ola Kvaløy and Wolfgang Luhan review the recent experimental literature on how decision makers take investment decisions for other people. They find that in contrast to orthodox principal-agent theory, social preferences might play a role beyond pure monetary incentives. Chapter 13, ‘From the field to the lab: Professionals and bidding aggression’ by Timo Heinrich and Matthew James Walker, links trading behavior to bidding aggression in auctions, discussing a new channel through which price bubbles might be attenuated. In Chapter 14, ‘Coordination games: Escaping the straitjacket,’ Christos Ioannou tackles coordination problems in financial markets by considering global games and Poisson games related to financial environments.

2.2 Part Two: Applied Research

In the Applied Research part, we have organized the chapters into two sub-areas: Market Experiments (Chapters 15–24) and Topics (Chapters 25–31).

2.2.1 Market experiments
In Chapter 15, ‘Perishable goods versus re-tradable assets: a theoretical reappraisal of a fundamental dichotomy,’ Sabiou M. Inoua and Nobel laureate Vernon L. Smith elaborate on the differences between relatively stable markets for non-durable or perishable goods and the instability of durable re-tradable asset markets. Chapter 16, ‘Pairing multi-market theory with experiments’ by Elena Asparouhova, Peter Bossaert and Sean Crockett, argues that experiments are an underutilized resource in evaluating market theory. Using the Rothschild–Stiglitz model of adverse selection, the authors showcase problems with interpreting archival data analysis when applying equilibrium assumption for which parameters are filled by guesses. In Chapter 17, ‘The effect of favorable and unfavorable information on asset prices,’ Charles Noussair, Steven Tucker and Mark Ryan show experimentally how prices in asset markets respond to positive and negative information to the asset’s fundamental value. The authors report a relatively slow reaction to shocks related to the underreaction of information. Chapter 18, ‘Market experiments with multiple assets: A survey’ by John Duffy, Jean Paul Rabanal and Olga Rud, recapitulates the recent literature on multiple asset markets. Technical innovations allow for implementing multiple asset markets quite easily into experimental designs. However, the question is whether subjects can cope with the increased complexity.

In Chapter 19, ‘Individual evolutionary learning and zero-intelligence in the continuous double auction,’ Jasmina Arifovic, Anil Donmez, John Ledyard and Megan Tjandrasuwita test two theories of trading in continuous double auction: zero-intelligence (ZI) and individual evolutionary learning (IEL). Generally, they find IEL to outperform ZI in explaining the efficiencies and prices generated. Their consideration includes experimenting and simulations. Chapter 20, ‘Using results from learning to forecast laboratory experiments to predict the effect of futures markets on spot market stability’ by Johan de Jong, Joep Sonnemans and Jan Tuinstra, recalls the learning to forecast experiments and elaborates on how they relate to
futures market environments. In Chapter 21, ‘Are you experienced? How the time spacing of traders’ market experience impacts bubble formation in experimental asset markets,’ Jason Shachat and Hang Wang deal with the question of how the experience of subjects in asset market experiments shapes price performance. The authors argue that how the researcher chooses to cultivate and control experience can influence studies that repeat the same environment. Chapter 22, ‘Monetary policy and cash flow irregularity as drivers of asset price bubbles: An experimental study’ by Dragana Draganac and Miloš Božović, investigates the relationship between interest rates, dividend patterns and the formation of asset market bubbles. They find that asset market bubbles are more likely to be detected when assets pay more irregular dividends. They also find that bubbles are more likely to occur with high nominal interest rates. In Chapter 23, ‘Algorithmic trading in experimental markets with human traders: A literature survey,’ Te Bao, Elizaveta Nekrasova, Tibor Neugebauer and Yohanes Eko Riyanto provide an excellent overview of the nascent experimental research on the interaction between humans and algorithmic traders in experimental markets. The chapter introduces the types and performances of algorithmic traders that interact with human subjects in the laboratory, including zero-intelligent traders, arbitragers, fundamentalists, adaptive algorithms and manipulators. Chapter 24, ‘Asset market experiments with diverse information’ by Dominik Schmidt and Thomas Stöckl, shows the advantages of using experiments to understand the effect of asymmetric information asset markets, which is the primary driver of market failure, market manipulation, and negative externalities. They first categorize information structures and afterwards review studies considering asymmetric information and heterogeneous information structures.

2.2.2 Topics
Chapter 25, ‘Experimental bank runs’ by Hubert János Kiss, Ismael Rodriguez-Lara and Alfonso Rosa-Garcia, reviews the experimental literature on bank runs and proposes promising future research avenues. In Chapter 26, ‘Experiential learning in finance education—Applying experimental finance methodology,’ Eva Kaczko and Michael Razen discuss possibilities to integrate experimental finance into education. It is easier to understand finance or financial decision-making concepts when people experience such decisions and reflect on them afterwards. In particular, the comparison between actual behavior and theory is often an eye opener for students. Chapter 27, ‘Experimental research in financial accounting’ by Daniel Reimsbach and Karen De Meyst, opens new perspectives compared to the other chapters. It introduces and reviews the area of experimental research in financial accounting. In Chapter 28, ‘Corporate governance experiments,’ Ernan Haruvy describes corporate governance and its key aspects that lend themselves to investigation in experimental finance, showcase seminal works in the field as illustrations of the power of experimental finance in shedding new light on old questions and propose open questions and new directions for research in the field. Chapter 29, ‘Nudging and RCTs in finance: A review of recent literature by Réka Heim and Jürgen Huber, addresses experiments on nudges in the form of defaults, active choice, and simplification; social norms and comparisons; and implementation intentions prompts and reminders on financial decision making. In Chapter 30, ‘A critical perspective on the conceptualization of risk in behavioral and experimental finance,’ Felix Holzmeister, Christoph Huber and Stefan Palan look at the conceptualization of risk in behavioral and experimental finance. They emphasize the interplay between
risk preferences and risk perception and the missing link between the two in the finance literature. Experimental finance can help better carve out the relationship between the two concepts. Chapter 31, ‘Stated risk preference predicts risk appetite in structured investment’ by Doron Sonsino, Yaron Lahav and Yefim Roth, considers the relevance of stated risk preferences and their usability in financial advice.

3. EDITING A HANDBOOK

First and foremost, editing a handbook is the process of idea exchange—bringing the field together to discuss important topics in experimental finance and exchange findings, ideas, opinions, approaches and methodologies. This process was accomplished, in part, through three virtual experimental finance meetings in winter 2020/2021 with about 100 participants each day to exchange ideas and talk to researchers interested in contributing. These meetings were a great success in shining light on key topics and facilitated several chapters. Most of the contributors and reviewers in this Handbook attended at least one of these three meetings.

Following the conclusion of the meetings, we asked attendees and other leading experts what topics they felt were vital in experimental finance; we tried to account for most of these topics in the Handbook. In many cases, the very people whose opinions we solicited wrote the corresponding chapters on their suggested topics. For some topics that we identified as key, we invited authors who had already published seminal pieces on these particular topics. In the course of soliciting these opinions, multiple researchers suggested similar topics. To avoid duplicity, we suggested that researchers join forces and submit co-authored chapters. We were gratified to see that researchers who had never worked together were readily willing to collaborate and jointly submit a chapter. We are particularly proud that our Handbook allowed for such joint projects with excellent and rich outputs.

The review process also involved experts in the field whose comments and feedback were instrumental in ensuring the quality and completeness of chapters. Within the review process, the editors emphasized and enforced a high contribution-to-length ratio for all chapters. To make the chapters suitable for a broad audience, authors were required to provide concise and relevant information such that an uninitiated reader would have a complete overview of the topic within a short time. The chapters were geared to provide starting points to dig deeper, inspirations for changing perspectives and opinions on future directions and methodological questions.

During the submission-feedback-and-resubmission phase in spring and summer 2021, more suggested topics naturally arose. This phase necessitated contacting additional contributors for these topics. These additional topics helped us provide a complete and comprehensive overview of the field.

4. ACKNOWLEDGMENTS

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It is with deep sorrow and shock that we have learned of the passing of one of our authors, Jasmina Arifovic, in January 2022 after a short battle with cancer. Jasmina was a pioneer of behavioral and experimental macroeconomics and finance who inspired many researchers, with an uncanny ability to connect and relate to professors and students alike.

REFERENCES


