Economists, psychologists, and marketers are interested in determining the monetary value people place on non-market goods for a variety of reasons: to carry out cost-benefit analysis, to determine the welfare effects of technological innovation or public policy, to forecast new product success, and to understand individual and consumer behavior. Unfortunately, many currently available techniques for eliciting individuals’ values suffer from a serious problem in that they involve asking individuals hypothetical questions about intended behavior. Experimental auctions circumvent this problem because they involve individuals exchanging real money for real goods in an active market. This represents a promising means for eliciting non-market values. Lusk and Shogren provide a comprehensive guide to the theory and practice of experimental auctions. It will be a valuable resource for graduate students, practitioners, and researchers concerned with the design and utilization of experimental auctions in applied economic and marketing research.

**Jayson L. Lusk** is Professor and Willard Sparks Endowed Chair in the Department of Agricultural Economics, Oklahoma State University.

**Jason F. Shogren** is Stroock Distinguished Professor of Natural Resource Conservation and Management, and Professor of Economics and Finance, University of Wyoming.
Researchers and practitioners in applied economics and business now have access to a much richer and more varied choice of data than earlier generations. *Quantitative Methods for Applied Economics and Business Research* is a new series aimed at meeting the needs of graduate students, researchers and practitioners who have a basic grounding in statistical analysis and who wish to take advantage of more sophisticated methodology in their work.

Forthcoming titles
Stewart Jones and David Hensher (eds.), *Credit Risk Modelling: A Primer*
Experimental Auctions

*Methods and Applications in Economic and Marketing Research*

Jayson L. Lusk and Jason F. Shogren
Acknowledgments

Participating in an auction is a collective process and so is conducting one. We have had the good fortune of learning about experimental auctions with a number of colleagues and students including: Todd Cherry, Keith Coble, Tom Crocker, Scott Daniel, Ty Feldkamp, Sean Fox, Sara Gunnersson, Dermot Hayes, Lisa House, Darren Hudson, Wally Huffman, Sara Jaeger, Jim Kliebenstein, Cannon Koo, Muhammad Koohmarai, John List, Christy Lusk, Dana Marcellino, Michael Margolis, Darrell Mark, Chris McIntosh, Bryan Melton, Jim Mintert, Melissa Moore, Burt Morrow, Bailey Norwood, Greg Parkhurst, Matt Rousu, Ted Schroeder, S.Y. Shin, Lucine Tadevosyan, Abe Tegene, Bruce Traill, Carlotta Valli, Bob Wilhelm, and Christine Wilson. Sara Jaeger provided helpful comments on a number of the chapters. Seminar participants at the Journées d’Économie Expérimentale at Bureau d’Economie Théorique et Appliquée, Université Louis Pasteur, Strasbourg provided helpful comments on the material in chapters 9 and 10.

This book is dedicated to our families their support and patience during the writing of this book.
Contents

List of figures  ix
List of tables  x

1 Introduction 1
  1.1 Introduction 1
  1.2 Why experimental auctions? 3
  1.3 What is an experimental auction? 5
  1.4 Purpose of this book and boundaries of coverage 17

2 Incentive compatible auctions: theory and evidence 19
  2.1 Introduction 19
  2.2 Theory of incentive compatible auctions 20
  2.3 Evidence from induced value auctions 27

3 Value theory 34
  3.1 Introduction 34
  3.2 Valuation under certainty 34
  3.3 Valuation under uncertainty 37
  3.4 Valuation in a dynamic environment with uncertainty, limited information, and irreversibility 43
  3.5 Summary 44

4 Conducting experimental auctions: some preliminaries 46
  4.1 Introduction 46
  4.2 Experimental design 47
  4.3 Sample size determination 55
  4.4 Experiment setting and context: field versus laboratory 57
  4.5 Conclusions 61

5 Conducting experimental auctions 62
  5.1 Introduction 62
  5.2 Training and practice 62
  5.3 Endowment versus full bidding 65
  5.4 Choosing an auction mechanism 69
  5.5 Multiple good valuation, demand reduction, and field substitutes 76
  5.6 Learning and affiliation in repeated bidding rounds 80
  5.7 Negative values 92
  5.8 Conclusions 94

© Cambridge University Press  www.cambridge.org
# Contents

## 6 Data analysis 95

6.1 Introduction 95  
6.2 Censored regressions with auction bids 95  
6.3 Quantile regression with auction bids 100  
6.4 Panel data regression with auction bids 103  
6.5 Other types of data analysis with auction bids 106  
6.6 Conclusions 112

## 7 Valuation case studies 113

7.1 Introduction 113  
7.2 Informing Policy I: beef tenderness grading system 113  
7.3 Informing Policy II: valuing safer food 121  
7.4 Informing Policy III: tolerance for genetically modified food 129  
7.5 Marketing I: forecasting market share of a new product 137  
7.6 Marketing II: preferences for fresh food with multiple quality attributes 141  
7.7 Marketing III: the value of farm financial records 149  
7.8 Controversial goods I: demand for genetically modified food in three countries 154  
7.9 Controversial goods II: irradiation 163  
7.10 Controversial goods III: food from animals treated with growth hormones 169  
7.11 Concluding comments 174  
Appendices 175

## 8 Auction design: case studies 196

8.1 Introduction 196  
8.2 Preference learning 196  
8.3 Willingness to pay, willingness to accept, and the auction mechanism 199  
8.4 Second price auction tournaments 209  
8.5 Preferences: fixed or fungible? 217  
8.6 Gift exchange 225  
8.7 Calibration of real and hypothetical auction bids 229  
8.8 Hybrid auctions and consequential bidding 239  
8.9 Concluding remarks 245

## 9 Validity of experimental auctions 247

9.1 Introduction 247  
9.2 Auction bids and economic theory 248  
9.3 Reliability 252  
9.4 Convergent validity 255  
9.5 Anomalies 261  
9.6 Summary 267

## 10 The future of experimental auctions 269

10.1 Introduction 269  
10.2 Ten questions worthy of future research 270  
10.3 Concluding remarks 278

References 279  
Index 297
Figures

1.1 Experimental auctions as a balance of control and context

5.1 Expected cost of sub-optimal bidding for $v_i = 3$, $N = 8$, and values/prices are drawn from a uniform distribution on [0, 10]

5.2 Expected cost of sub-optimal bidding for $v_i = 7$, $N = 8$, and values/prices are drawn from a uniform distribution on [0, 10]

5.3 Second price auction bids for five beef steaks across five bidding rounds

5.4 Bid functions and the determination of winner, loser, and market price

6.1 Distribution of fifth price auction bids for a non-genetically modified cookie in France

6.2 Hypothetical path model where six auction bids are represented by two latent factors

7.1 The three types of labels used for the vegetable oil

7.2 Distribution of round five auction bids by location

7.3 Effect of information on bids for irradiated pork

7.4 Average willingness to pay for “non-BST” milk in Iowa, Arkansas, Massachusetts, California (rural) and California (urban)

B7.1 Financial records inventory sheet

B7.2 Financial records bid sheet
Tables

1.1 Examples of experimental auctions in action .......................... page 7
2.1 Payoffs from bidding strategies ........................................... 22
2.2 Payoff from bidding true value instead of under- or over-bidding .......................................................... 23
2.3 Results of studies testing incentive compatible mechanisms in induced value experiments ....................... 31
4.1 Four experimental treatments .................................................. 48
4.2 Treatments in a $2^3$ design .................................................... 49
4.3 Higher order effects in a $2^3$ design ........................................ 50
4.4 A comparison of two fractional factorial designs ....................... 51
4.5 Sample size correction table for 95% level of confidence ............. 57
5.1 Some incentive compatible auctions ........................................ 69
5.2 Summary of panel data categories in List and Shogren (1999) ...... 83
5.3 Two-way fixed effects estimation results for bid equation .......... 84
5.4 Second price auction bids for beef steak across five bidding rounds .......... 87
5.5 Aggregate and individual models of the effect of posted prices on bidding behavior ............................ 88
6.1 Comparison of tobit to double hurdle model ............................ 99
6.2 Conditional mean and quantile regressions ............................... 103
7.1 Summary statistics of auction bids and the value of tenderness ($n = 116$) ................................................... 119
7.2 Price and probability assumptions used in welfare calculations .......... 120
7.3 Consumer welfare changes from a tenderness grading system (all units in $ per choice occasion; $n = 116$) .......... 120
7.4 Subjective and objective risk and a comparison of naïve and informed option price ($R^2$) of five pathogens .......... 127
7.5 Summary statistics of tests within each additional salmonella treatment ............................ 128
7.6 Bids on non-genetically modified food with differing tolerance levels .......................................................... 135
List of tables

7.7 Comparison of bids for non-GM foods with and without GM tolerance levels 136
7.8 T-test on null hypothesis that consumers value foods with a 1% tolerance the same as for a 5% tolerance 137
7.9 Market share simulations ($n = 119$) 140
7.10 Means of subjective evaluation scores of pork chop characteristics and auction bids by presentation format (scale = 1 to 100) 147
7.11 Ordinary least squares regressions: effect of pork chop characteristics on market prices and bids in three evaluation formats 148
7.12 Distribution of bids for farm records and characteristics of farmers in four bid ranges 153
7.13 Summary statistics of willingness to accept distribution by location and auction round 158
7.14 Effect of attitudes and nationality on willingness to accept: median regression estimates 160
7.15 Effect of information on relative safety assessments 166
7.16 Effect of new information 168
7.17 Frequency distribution of bids at trial 20 173
8.1 Fixed-effects estimation results of bid function 198
8.2 Summary of experimental design parameters 202
8.3 Summary statistics of the Becker-DeGroot-Marschak Mechanism 204
8.4 Summary statistics of the second price auction 205
8.5 Summary statistics of the random $n$th price auction 208
8.6 Descriptive statistics (all rounds) 211
8.7 Panel data estimation results (two-way) 212
8.8 On margin/off margin panel data estimation results (two-way) 214
8.9 Efficiency in the tournament and standard second price auction 215
8.10 The impact of arbitrage on preference reversal rates (%) 221
8.11 Random-effects estimates for treatment 1 (Real arbitrage/real no-arbitrage) 222
8.12 Random-effects estimates for treatment 2 (Real arbitrage/real no-arbitrage) 223
8.13 Random-effects estimates for treatment 3 (Real arbitrage/hypothetical no-arbitrage) 224
8.14 Experimental design 226
8.15 Experimental results 228
8.16 Experimental results – across gifts 230
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Table Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.17</td>
<td>Selected characteristics of auction participants</td>
<td>234</td>
</tr>
<tr>
<td>8.18</td>
<td>Top two hypothetical and auction bids</td>
<td>235</td>
</tr>
<tr>
<td>8.19</td>
<td>Calibration functions</td>
<td>236</td>
</tr>
<tr>
<td>8.20</td>
<td>Summary of experimental design</td>
<td>240</td>
</tr>
<tr>
<td>8.21</td>
<td>Descriptive statistics (all rounds)</td>
<td>242</td>
</tr>
<tr>
<td>8.22</td>
<td>Panel data estimation results (7 outliers excluded)</td>
<td>242</td>
</tr>
<tr>
<td>8.23</td>
<td>Wald test results</td>
<td>243</td>
</tr>
<tr>
<td>8.24</td>
<td>Winners and price-setters in second price auction treatments</td>
<td>244</td>
</tr>
<tr>
<td>9.1</td>
<td>Correlation coefficients between auction bids for Certified Angus Beef steaks across five bidding rounds ($n = 70$)</td>
<td>253</td>
</tr>
<tr>
<td>9.2</td>
<td>Correlation coefficients between mean bids for five beef steaks across four auction institutions ($n = 5$)</td>
<td>255</td>
</tr>
</tbody>
</table>