

Contents

Preface	vii
Introduction: Partial Identification and Credible Inference	1
1	
Missing Outcomes	6
1.1. Anatomy of the Problem	6
1.2. Means	8
1.3. Parameters that Respect Stochastic Dominance	11
1.4. Combining Multiple Sampling Processes	13
1.5. Interval Measurement of Outcomes	17
Complement 1A. Employment Probabilities	18
Complement 1B. Blind-Men Bounds on an Elephant	21
Endnotes	23
2	
Instrumental Variables	26
2.1. Distributional Assumptions and Credible Inference	26
2.2. Some Assumptions Using Instrumental Variables	27
2.3. Outcomes Missing-at-Random	29
2.4. Statistical Independence	30
2.5. Mean Independence and Mean Monotonicity	32
2.6. Other Assumptions Using Instrumental Variables	36
Complement 2A. Estimation with Nonresponse Weights	37
Endnotes	38

3	
Conditional Prediction with Missing Data	40
3.1. Prediction of Outcomes Conditional on Covariates	40
3.2. Missing Outcomes	41
3.3. Jointly Missing Outcomes and Covariates	41
3.4. Missing Covariates	46
3.5. General Missing-Data Patterns	49
3.6. Joint Inference on Conditional Distributions	53
Complement 3A. Unemployment Rates	55
Complement 3B. Parametric Prediction with Missing Data	56
Endnotes	58
4	
Contaminated Outcomes	60
4.1. The Mixture Model of Data Errors	60
4.2. Outcome Distributions	62
4.3. Event Probabilities	63
4.4. Parameters that Respect Stochastic Dominance	65
Complement 4A. Contamination Through Imputation	68
Complement 4B. Identification and Robust Inference	70
Endnotes	72
5	
Regressions, Short and Long	73
5.1. Ecological Inference	73
5.2. Anatomy of the Problem	74
5.3. Long Mean Regressions	76
5.4. Instrumental Variables	81
Complement 5A. Structural Prediction	84
Endnotes	85
6	
Response-Based Sampling	87
6.1. Reverse Regression	87
6.2. Auxiliary Data on Outcomes or Covariates	89
6.3. The Rare-Disease Assumption	89
6.4. Bounds on Relative and Attributable Risk	91

Contents	xi
6.5. Sampling from One Response Stratum	94
Complement 6A. Smoking and Heart Disease	97
Endnotes	98
7	
Analysis of Treatment Response	99
7.1. Anatomy of the Problem	99
7.2. Treatment Choice in Heterogeneous Populations	102
7.3. The Selection Problem and Treatment Choice	105
7.4. Instrumental Variables	108
Complement 7A. Identification and Ambiguity	110
Complement 7B. Sentencing and Recidivism	112
Complement 7C. Missing Outcome and Covariate Data	114
Complement 7D. Study and Treatment Populations	117
Endnotes	118
8	
Monotone Treatment Response	120
8.1. Shape Restrictions	120
8.2. Monotonicity	123
8.3. Semi-monotonicity	127
8.4. Concave Monotonicity	132
Complement 8A. Downward-Sloping Demand	136
Complement 8B. Econometric Response Models	138
Endnotes	139
9	
Monotone Instrumental Variables	141
9.1. Equalities and Inequalities	141
9.2. Mean Monotonicity	143
9.3. Mean Monotonicity and Mean Treatment Response	145
9.4. Variations on the Theme	149
Complement 9A. The Returns to Schooling	149
Endnotes	153

10	
The Mixing Problem	154
10.1. Within-Group Treatment Variation	154
10.2. Known Treatment Shares	157
10.3. Extrapolation from the Experiment Alone	160
Complement 10A. Experiments Without Covariate Data	161
Endnotes	165
References	167
Index	175