

# Contents

<i>List of Contributors</i>	<i>xiii</i>
<i>Preface</i>	<i>xvii</i>
<i>Acknowledgments</i>	<i>xxi</i>

## Part I GENERAL ISSUES

<b>1 Some Design Issues in Sample Surveys</b>	<b>3</b>
D. G. HORVITZ	
1. Introduction	3
2. Background	5
3. Total Survey Design	6
4. Total Survey Error Models	6
5. Some Examples	7
6. A Sample Survey Design Information System	8
7. Conclusion	10
References	11

<b>2</b>	<b>On the Future of Survey Sampling</b>	<b>13</b>
	LESLIE KISH	
1.	Introduction	13
2.	NE—Needed and Expected	14
3.	NW—Needed but Waiting	20
4.	SE—Superfluous and Expected	21
5.	SW—Superfluous and Waiting	21
	 Part II SPECIFIC METHODOLOGICAL PROBLEMS	
<b>3</b>	<b>Variance Estimates for Complex Statistics from Multistage Sample Surveys</b>	<b>25</b>
	B. V. SHAH	
1.	Introduction	25
2.	Notation	26
3.	Application of Central-Limit Theorem	28
4.	Taylorized Deviation	29
5.	Independent Replications	29
6.	Pseudoreplications	30
7.	Jackknife	30
8.	Computations	31
9.	Other Issues	31
10.	Comparison of Techniques	31
11.	Further Research	32
	References	33
<b>4</b>	<b>Estimation of Nonsampling Variance Components in Sample Surveys</b>	<b>35</b>
	H. O. HARTLEY AND J. N. K. RAO	
1.	Introduction	35
2.	Assumptions Made	36
3.	Model Formulation	37
4.	Complete Specification of Survey Design	38
5.	Conditional Estimation of Variance Components	39
6.	Linear Estimates of Target Parameters and Their Variances	40
7.	Summary	43
	References	43
<b>5</b>	<b>Some Statistical Problems Associated with Continuing Cross-Sectional Surveys</b>	<b>45</b>
	A. L. FINKNER AND HAROLD NISSELSON	
1.	Introduction	45
2.	Problems Associated with Sampling Frames Arising from Changes over Time	47

3. Problems in Sample Design and Estimation	49
4. Measurement Problems in Continuing Surveys	51
5. Problems in Data Collection Techniques	60
6. Some Sampling Problems Associated with the Analysis of Time Series	62
7. Concluding Comments	65
References	67
<b>6 A Survey of Surveys: Some Sampling Frame Problems</b>	<b>69</b>
C. MICHAEL LANPHIER AND BARBARA A. BAILAR	
1. Introduction	69
2. Background	69
3. Sample Frame Problems	73
4. Problems Requiring Further Attention	83
5. Conclusions	85
References	85
 <b>Part III PROBLEMS IN THE ANALYSIS OF SURVEY DATA</b>	
<b>7 Victimization and the National Crime Survey: Problems of Design and Analysis</b>	<b>89</b>
STEPHEN E. FIENBERG	
1. Introduction	89
2. Recording Crime	92
3. Design of the NCS	94
4. Published Analyses of the NCS Data	98
5. Modeling Victimization	100
6. Discussion	105
References	106
<b>8 Some Problems of Inference from Economic Survey Data</b>	<b>107</b>
JAN KMENTA	
1. Introduction	107
2. Pooling of Survey and Aggregate Time Series Data	108
3. Estimation of Disequilibrium Models from Survey Data	114
4. Simultaneous Equation Models Based on Sample Survey Data	117
References	119
<b>9 The Role of Covariance Matrix Estimation in the Analysis of Complex Sample Survey Data</b>	<b>121</b>
DANIEL H. FREEMAN, JR., AND DWIGHT B. BROCK	
1. Introduction	121
2. A Framework for Survey Analysis	122
3. Examples	129
References	139

## Part IV NONRESPONSE, UNDERCOVERAGE, AND RELATED PROBLEMS

<b>10</b>	<b>A Two-Phase Sample Design for Estimating the Finite Population Mean When There Is Nonresponse</b>	<b>143</b>
	BAHADUR SINGH AND J. SEDRANSK	
	1. Introduction	143
	2. Sample Design and Analysis	145
	3. Optimal Sample Design	148
	4. Nonresponse Problem	150
	References	155
<b>11</b>	<b>Adjustment for Nonresponse in Surveys</b>	<b>157</b>
	R. PLATEK, M. P. SINGH, AND V. TREMBLAY	
	1. Introduction	157
	2. Methods of Compensation for Nonresponse	158
	3. Formulation of the Nonresponse Bias	160
	4. An Alternative Approach to the Nonresponse Problem	162
	5. Some Empirical Results	169
	References	174
<b>12</b>	<b>A Comparison of Some Adjustment and Weighting Procedures for Survey Data</b>	<b>175</b>
	BARBARA A. BAILAR, LEROY BAILEY, AND CAROL CORBY	
	1. Introduction	175
	2. Adjustment Procedures for Selected Demographic Surveys	177
	3. A Comparison of Variances for Two Imputation Procedures for Item Nonresponse	186
	4. A Research Project to Permit Comparison of Alternative Procedures for Adjusting Data	190
	5. Conclusion	198
	References	198

## Part V TIME SERIES ANALYSIS

<b>13</b>	<b>Principles and Problems in the Analysis of Repeated Surveys</b>	<b>201</b>
	T. M. F. SMITH	
	1. Introduction	201
	2. Some Examples	202
	3. The Traditional Sampling Approach	205

4. The Time Series Approach	208
5. Examples Using the Time Series Approach	211
References	216
<b>14 Estimation of Changing Seasonal Variations in Economic Time Series</b>	<b>217</b>
ESTELA BEE DAGUM	
1. Introduction	217
2. Seasonal Models	219
3. Basic Assumptions of the X-11-ARIMA Method of Seasonal Adjustment	221
4. Conclusions	225
References	227

## Part VI APPLICATIONS OF SURVEY DATA AND METHODS

<b>15 Use of Sample Surveys in National Planning in Developing Countries</b>	<b>231</b>
M. N. MURTHY	
1. Introduction	231
2. Types and Sources of Data	232
3. Data Requirements	234
4. Strategy for Data Planning	236
5. Role of Sampling	240
6. Quality of Survey Data	245
7. Problems of Use of Survey Data	247
8. Concluding Remarks	250
References	251
<b>16 Models and Multidimensional Sampling with Applications in Geological Surveys</b>	<b>255</b>
P. VUAGNAT	

## Part VII THE GAP BETWEEN THEORY AND PRACTICE

<b>17 Relevance of Randomization in Data Analysis</b>	<b>267</b>
D. BASU	
1. Introduction	267
2. Likelihood	271
3. A Survey Sampling Model	274

4. Why Randomize?	275
5. Randomization Analysis of Data	279
6. Randomization and Information	280
7. Information in Data	282
8. A Critical Review	285
References	291
<b>18 An Empirical Study of Prediction Theory in Finite Population Sampling: Simple Random Sampling and the Ratio Estimator</b>	<b>293</b>
RICHARD M. ROYALL AND WILLIAM G. CUMBERLAND	
1. Introduction	293
2. Background	294
3. The Study Populations	297
4. Results	300
5. Discussion	301
Appendix. Computing Considerations	308
References	308
<b>19 Comments on Papers by Basu and Royall and Cumberland</b>	<b>311</b>
V. P. GODAMBE	
<b>20 Comments on Papers by Basu and Royall and Cumberland</b>	<b>315</b>
WILLIAM G. MADOW	
1. Summary	315
2. Use of Superpopulations in Probability Sampling Design and Analysis	316
3. Prediction Theory	318
4. Specific Comments on the Paper by Royall and Cumberland	320
5. Specific Comments on the Paper by Basu	321
References	321
<b>21 Comments on Papers by Basu and Royall and Cumberland</b>	<b>323</b>
J. N. K. RAO	
1. Some Remarks on the Paper by Royall and Cumberland	323
2. Some Remarks on the Paper by Basu	326
References	328
<b>22 Reply to Godambe, Madow, and Rao</b>	<b>331</b>
RICHARD M. ROYALL AND WILLIAM G. CUMBERLAND	

<b>23</b>	<b>Reply to Godambe, Madow, and Rao</b>	<b>337</b>
	D. BASU	
<b>24</b>	<b>Estimation and Inferences from Sample Surveys: Some Comments on Recent Developments</b>	<b>341</b>
	MORRIS H. HANSEN AND WILLIAM G. MADOW	
	1. Introduction	341
	2. A Probability Sampling Model	345
	3. Criticisms of the Probability Sampling Model in Recent Research: Comments on the Criticisms	347
	4. Some Summary Remarks	355
	References	357
	<i>Index</i>	359