## **Stated Choice Methods**

## Analysis and Applications

Jordan J. Louviere

University of Sydney

David A. Hensher

University of Sydney

Joffre D. Swait

University of Florida

(with a contribution by Wiktor Adamowicz)



## **Contents**

List	of	figures	page	ix
List	of tables			хi
Ack	nowledgem	ents		XV
Cho	osing as a	way of life		1
1.1	Introduction	on		1
1.2	Decision n	naking and choice behaviour		2
1.3	Conceptua	l framework		8
1.4	The world	of choice is complex: the challenge ahead		10
App	pendix Al	Choosing a residential telecommunications bundle		19
Intr	oduction to	stated preference models and methods		20
	Introduction	-		20
2.2	Preference	data come in many forms		20
2.3	Preference	data consistent with RUT		25
Cho	oosing a ch	oice model		34
	Introducti			34
3.2	Setting ou	t the underlying behavioural decision framework		35
3.3	Random 1	utility maximisation		37
3.4	The basic	choice model - a particular model formulation		44
3.5	Statistical	estimation procedure		47
3.6	Model ou	tputs		51
3.7	Behaviour	ral outputs of choice models		57
		illustration of the basic model		62
3.9	Linking to	the later chapters		65
Ap	pendix A3	Maximum likelihood estimation techniqiie		66
Ap	pendix- B3	Linear probability and generalised least squares		
		models		72

## Contents

4	Experimental design	83
	4.1 Introduction	83
	4.2 Factorial designs	84
	4.3 Fractional factorial designs	89
	4.4 Practical considerations in fractional designs	94
	4.5 Design strategies for simple SP experiments	96
5	Design of choice experiments	1 <b>1</b> 1
	5.1 Introduction	111
	5.2 Multiple choice experiments	112
	5.3 General design principles for choice experiments	119
	5.4 Availability designs for labelled alternatives	126
	Appendix A5 Some popular choice designs	131
6	Relaxing the IID assumption - introducing variants of the MNL model	138
	6.1 Setting the context for behaviourally more plausible models	138
	6.2 Deriving the mean and variance of the extreme value type 1	
	distribution	142
	6.3 Introduction to the nested logit model	144
	6.4 Empirical illustration	154
	6.5 The nested logit model - empirical examples	162
	6.6 Tests of overall model performance for nested models	176
	6.7 Conclusions and linkages between the MNL/NL models	
	and more complex models	182
	Appendix A6 Detailed characterisation of the nested logit model	183
	Appendix B6 Advanced discrete choice methods	189
7	Complex, non-IID multiple choice designs	213
	7.1 Introduction	213
	7.2 Designs for alternatives with non-constant error variances	214
	7.3 Designs for portfolio, bundle or menu choices	215
	7.4 Summary	226
8	Combining sources of preference data	227
	8.1 Appreciating the opportunity	227
	8.2 Characteristics of RP and SP data	228
	8.3 The mechanics of data enrichment	233
	8.4 Is it always possible to combine preference data sources?	243
	8.5 A general preference data generation process	248
	8.6 Summary	251
9	Implementing SP choice behaviour projects	252
	9.1 Introduction	252
	9.2 Components of the choice process	252

	Contents	vii
	9.3 The steps in an SP choice study	255
	9.4 Summary	282
10	Marketing case studies	283
	10.1 Introduction	283
	10.2 Case study 1: preference heterogeneity vs. variance	
	heteroscedasticity	283
	10.3 Case study 2: choice set generation analysis	292
	10.4 Summary	297
11	Transportation case studies	298
	11.1 Introduction	298
	11.2 Case study 1: introducing a new alternative: high speed rail	
	and the random effects HEV model in an SP-RP context	299
	11.3 Case study 2: high speed rail and random effects HEV in a	
	switching context	301
	11.4 Case study 3: valuation of travel time savings and urban route	
	choice with tolled options in an SP context	306
	11.5 Case study 4: establishing a fare elasticity regime for urban	
	passenger transport: non-concession commuters with SP-RP	
	and HEV	315
	11.6 Conclusions to chapter	328
12	Environmental valuation case studies	329
	12.1 Introduction	329
	12.2 Environmental valuation: theory and practice	329
	12.3 Case study 1: use values - recreational hunting site choices	331
	12.4 Case study 2: passive use values	343
	12.5 The passive use value controversy: can SP help?	350
	12.6 Conclusions	352
13	Cross validity and external validity of SP models	354
	13.1 Introduction	354
	13.2 A brief review of preference model comparisons	356
	13.3 Preference regularities	357
	13.4 Procedures for testing preference regularity	363
	13.5 Empirical case studies and results	369
	13.6 Summary and conclusions	379
	References	382
	Index	399