

QUANTIFYING CONSUMER PREFERENCES

DANIEL J. SLOTTJE

*FTI Consulting & Department of Economics,
SMU, Dallas, USA*



United Kingdom – North America – Japan
India – Malaysia – China

Contents

Introduction	xiii
List of Contributors	xv
List of Figures	xvii
List of Tables	xix
CHAPTER 1	
MEASURING CONSUMER PREFERENCES AND ESTIMATING DEMAND SYSTEMS	1
<i>William A. Barnett and Apostolos Serletis</i>	
1. Introduction	1
2. Demand systems without utility reference	2
3. Neoclassical consumer theory	4
3.1. Marshallian demands	5
3.2. Indirect utility	6
3.3. Hicksian demands	7
3.4. Elasticity relations	9
4. Demand system specification	12
4.1. The differential approach and the Rotterdam model	12
4.2. The parametric approach to demand analysis	13
4.3. Asymptotically globally flexible functional forms	19
5. Engel curves and the rank of demand systems	20
5.1. Exact aggregation	20
5.2. The rank of demand systems	21
6. Estimation issues	28
6.1. Theoretical regularity	29
6.2. Elasticity calculations	30
7. Conclusion	30
Acknowledgment	31
References	31

CHAPTER 2	THE ALMOST IDEAL AND TRANSLOG DEMAND SYSTEMS	37
	<i>Matthew T. Holt and Barry K. Goodwin</i>	
1.	Introduction	37
2.	Specification of the almost ideal demand system	38
3.	Specification of the translog demand system	41
4.	Issues in applying the AIDS and translog models	42
	4.1. Aggregation properties	42
	4.2. Flexibility and model extensions	43
	4.3. Seasonality, demographics, and structural change	45
	4.4. Imposing curvature	46
	4.5. Stochastic specification and autocorrelation	48
5.	An empirical example	50
	5.1. Data	50
	5.2. AIDS and translog estimates of US meat demand	51
6.	Concluding remarks	56
	References	57
CHAPTER 3	THE DIFFERENTIAL APPROACH TO DEMAND ANALYSIS AND THE ROTTERDAM MODEL	61
	<i>William A. Barnett and Apostolos Serletis</i>	
1.	Introduction	61
2.	Neoclassical consumer theory	63
3.	The differential approach to demand analysis	65
	3.1. A differential demand system in relative prices	67
	3.2. A differential demand system in absolute prices	68
4.	The Rotterdam parameterization	69
	4.1. The relative price version of the Rotterdam model	69
	4.2. The absolute price version of the Rotterdam model	72
5.	Estimation	73
	5.1. An example	74
6.	Regularity	76
	6.1. Theoretical regularity	76
	6.2. Econometric regularity	77
7.	Conclusion	78
	Acknowledgment	78
	References	78
CHAPTER 4	THE GENERALIZED QUADRATIC EXPENDITURE SYSTEM	83
	<i>Jeffrey T. LaFrance and Rulon D. Pope</i>	
1.	Introduction	83
2.	A unique representation	85

3.	The role of symmetry	86
4.	The role of homogeneity	91
5.	The role of adding up	94
6.	Deflated income systems	96
7.	The common structure of Gorman and Lewbel systems	97
	7.1. Gorman systems	99
	7.2. Lewbel systems	107
8.	Conclusions	113
	References	113
CHAPTER 5 THE GFT UTILITY FUNCTION		119
	<i>Robert L. Basmann, Kathy Hayes, Michael McAleer, Ian McCarthy and Daniel J. Slottje</i>	
1.	Introduction	119
2.	The GFT utility function	136
3.	The data	139
4.	The empirical results	141
5.	Conclusion	144
	References	145
	Appendix A. Data used	147
CHAPTER 6 THE NORMALIZED QUADRATIC EXPENDITURE FUNCTION		149
	<i>W. Erwin Diewert and Kevin J. Fox</i>	
1.	Introduction	149
2.	The definition of a flexible functional form	151
3.	The generalized Leontief unit cost function	156
4.	The normalized quadratic unit cost function	158
5.	The estimation of consumer preferences: The general framework	164
	5.1. The generalized Leontief expenditure function for homothetic preferences	165
	5.2. The normalized quadratic expenditure function for homothetic preferences	166
6.	The problem of cardinalizing utility	168
7.	Modeling nonhomothetic preferences	169
8.	The use of linear spline functions to achieve greater flexibility	171
9.	Semiflexible functional forms and the normalized quadratic functional form	173
10.	Conclusion	176
	Acknowledgment	177
	References	177

CHAPTER 7	EASI MADE EASIER	179
	<i>Krishna Pendakur</i>	
1.	Introduction	180
2.	An extended example	181
3.	The EASI demand system	185
4.	EASI estimation	186
	4.1. Approximate models	188
	4.2. Iterated linear estimation	188
	4.3. Instrumental variables estimation	189
	4.4. Imposing symmetry with linear system estimation	190
5.	EASI extensions	191
6.	EASI-to-use	192
7.	Conclusions	194
	References	194
	Appendix. STATA code	195
CHAPTER 8	COST OF LIVING INDEXES AND EXACT INDEX NUMBERS	207
	<i>W. Erwin Diewert</i>	
1.	Introduction	208
2.	Konüs true cost of living indexes	209
3.	The true cost of living index when preferences are homothetic	215
4.	Wold's identity and Shephard's lemma	218
5.	Superlative indexes I: The Fisher ideal index	219
6.	Superlative indexes II: Quadratic mean of order r indexes	223
7.	Superlative indexes III: Normalized quadratic indexes	227
8.	Nonhomothetic preferences and cost of living indexes	233
9.	Allen quantity indexes	239
10.	Conclusion	242
	Acknowledgment	242
	References	242
CHAPTER 9	THE REVEALED PREFERENCE APPROACH TO DEMAND	247
	<i>Laurens Cherchye, Ian Crawford, Bram De Rock and Frederic Vermeulen</i>	
1.	Introduction	248
2.	The basic model: GARP	250
	2.1. Testing	250
	2.2. Recoverability	253
3.	Empirical issues	256
	3.1. Goodness-of-fit	256
	3.2. Power	258
	3.3. Measurement error	261

4.	Some extensions of the basic model	263
4.1.	Characteristics model	263
4.2.	Habit formation	267
4.3.	Collective model	271
5.	Conclusion	274
	Acknowledgments	275
	References	275
	Appendix	278
CHAPTER 10	DEVELOPMENTS IN NONPARAMETRIC DEMAND ANALYSIS: HETEROGENEITY AND NONPARAMETRICS	281
	<i>Stefan Hoderlein</i>	
1.	Introduction	281
2.	Models and literature	282
3.	Linear models in a heterogeneous population – nonparametric estimation of the density of random coefficients	288
4.	Nonlinear models in a heterogeneous population – the implications for testing rationality restrictions	289
5.	Nonparametric tests of rationality restrictions	293
6.	Conclusion	294
	References	295
CHAPTER 11	MODELLING INTERNATIONAL TOURIST ARRIVALS AND VOLATILITY: AN APPLICATION TO TAIWAN	299
	<i>Chia-Lin Chang, Michael McAleer and Daniel J. Slottje</i>	
1.	Introduction	300
2.	Data	301
3.	Unit root tests	304
4.	Conditional mean and conditional volatility models	304
5.	Estimated models and discussion	308
6.	Concluding remarks	312
	Acknowledgments	313
	References	313
CHAPTER 12	ESTIMATING THE DEMAND FOR QUALITY WITH DISCRETE CHOICE MODELS	317
	<i>Daniel J. Phaneuf and Roger H. von Haefen</i>	
1.	Introduction	317
2.	Conceptual basis	319
2.1.	Assumptions	319
2.2.	Models for micro data	321

3.	Discrete choice RUM models: basics	323
3.1.	Model setup	323
3.2.	Estimation	324
3.3.	Identification	326
4.	Discrete choice RUM models: additional topics	329
4.1.	Identifying attribute effects	329
4.2.	Elasticities and welfare effects	333
4.3.	Notes on advanced models	335
5.	Practical considerations	337
6.	An empirical illustration	339
7.	Conclusions	343
	References	345

CHAPTER 13 THE CONSTRUCTION AND ESTIMATION OF EQUIVALENCE SCALES AND THEIR USES 349
Carsten Schröder

1.	Introduction	349
2.	Econometric approach	351
3.	The survey approach	353
4.	Applications	356
4.1.	Inequality and poverty	356
4.2.	Income taxation	357
4.3.	Indexing social security payments	357
4.4.	Insurance economics	357
4.5.	Psychological and medical studies	357
5.	Conclusion	358
	References	358

CHAPTER 14 THE USE OF RESTRICTED REGRESSIONS IN ESTIMATING DEMAND SYSTEMS 363
Joseph G. Hirschberg, Jeanette N. Lye and Daniel J. Slottje

1.	Introduction	364
2.	The two forms of restrictions	365
2.1.	LFUP to ROP ($\mathbf{R}\boldsymbol{\beta} = \mathbf{r}$) \rightarrow ($\boldsymbol{\beta} = \mathbf{A}\boldsymbol{\gamma} + \mathbf{d}$)	366
2.2.	ROP to LFUP ($\boldsymbol{\beta} = \mathbf{A}\boldsymbol{\gamma} + \mathbf{d} \rightarrow \mathbf{R}\boldsymbol{\beta} = \mathbf{r}$)	367
2.3.	Computational aspects of the restricted parameter estimates and the conversion of restricted forms	367
3.	Example applications	369
3.1.	The reparameterization in the case of restricted demand equations	369
3.2.	The combination of both linear restrictions and reparameterizations	371

4.	A test of linear restrictions using the reparameterized model	376
5.	Conclusions	376
	Acknowledgment	377
	References	377
	Appendix A. The derivation of the ROP from the LFUP ($\mathbf{R}\boldsymbol{\beta} = \mathbf{r} \rightarrow \boldsymbol{\beta} = \mathbf{A}\boldsymbol{\gamma} + \mathbf{d}$)	379
	Appendix B. The derivation of the LFUP from the ROP ($\boldsymbol{\beta} = \mathbf{A}\boldsymbol{\gamma} + \mathbf{d} \rightarrow \mathbf{R}\boldsymbol{\beta} = \mathbf{r}$)	380
	Subject Index	383