## Contents

1	Intro	duction	1	
	1.1	Background	1	
	1.2	Review of Qualitative Variables	1	
	1.3	Overview of the Book	4	
2	The Simple Dichotomy		6	
	2.1	Why not Use a Linear Model?	6	
	2.2	Modeling the Simple Dichotomy	8	
	2.3	Examples	10	
	2.4	Estimation by the Maximum-Likelihood Method	11	
	2.5	Numerical Solution of the Likelihood Function	16	
	2.6	Grouped Data	20	
	2.7	Example: Pass Rates of First-Year Medical Students		
		in France	23	
	2.8	Specification Error	24	
3	Modelling		38	
	3.1	Grouping	38	
	3.2	Models with Interpretable Quantitative Variables	41	
	3.3	Individual Preferences: One Decision-Maker	44	
	3.4	Individual Preferences: Several Decision-Makers	52	
	3.5	Importance of the Sampling Method	58	
	3.6	Variations on the Basic Models	60	
Apj	pendix	3.1 Existence of a Utility Function	65	
Appendix 3.2 Compatibility Conditions				
	A2	.1 Necessary Condition	70	
	A2	2 Sufficient Condition	70	

4	Estimation Methods and Tests		72
	4.1	The General Model	72
	4.2	Estimation Methods	74
	4.3	The Maximum-Likelihood Method	77
	4.4	The Minimum Chi-Squared Method	83
	4.5	The Generalized Berkson Method	85
	4.6	Asymptotic Properties of the Estimators	88
	4.7	Limited Information Maximum Likelihood (LIML)	91
	4.8	Principal Test Procedures	94
	4.9	Goodness of Fit	98
	4.10	Omitted and Irrelevant Variables	100
	4.11	A Test for the Polychotomous Logit Formulation	102
5	The Log-Linear Model and its Applications		
	5.1	Introduction	107
	5.2	The Case of Two Dichotomous Variables	109
	5.3	The Case of Three Dichotomous Variables	115
	5.4	Two Polychotomous Variables	126
	5.5	General Analysis of a Contingency Table	128
	5.6	The Log-Linear Model	135
	5.7	Applications	140
6	Qualitative Panel Data		
	6.1	Definition of a Markov Chain	145
	6.2	Independent Observations on a Markov Chain	
		(Micro Data)	147
	6.3	Independent Observations on a Markov Chain	
		(Macro Data)	152
	6.4	Transition Probabilities Depending on the	
		Explanatory Variables	159
	6.5	Applications	164
7	The Tobit Model		
	7.1	Censored Observations	170
	7.2	The Simple Tobit Model	172
	7.3	Least Squares Estimation	173
	7.4	The Likelihood Function of the Simple Tobit Model	175
	7.5	The Maximum-Likelihood Method	177
	7.6	Two-Stage Estimation	181
	7.7	The Method of Asymptotic Least Squares	184
	7.8	The Generalized Tobit Model	186

## Contents

	7.9	Estimation with the Generalized	100			
	7 10		190			
	7.10	Robustness of the Estimation Methods	193			
	7.11	Generalized Residuals and lests	196			
Ap	pendi	x 7.1 Moments of the Truncated Norman Distribution	203			
Ap	pendi	x 7.2 Moments of the Truncated Norman Bivariate				
		Distribution	206			
8	Mod	lels of Market Disequilibrium	208			
	8.1	Observations on the Quantity Exchanged	208			
	8.2	Observation on the Regime and the Quantity				
		Exchanged	215			
	8.3	Predetermined Evolution of the Price	216			
	8.4	Endogenous Evolution of Prices	218			
9	Tru	Truncated Latent Variables Defined by a System				
	of Si	imultaneous Equations	224			
	9.1	The General Model	224			
	9.2	Estimation Methods	226			
	9.3	Some Applications	230			
	9.4	The Maximum-Expectation (M.E.) Algorithm	239			
	9.5	Lagrange Multiplier Tests	242			
	9.6	Models with Serial Correlation	245			
Ap	pendi	x 9.1 A Model with Price Floors – The Recursive Case	249			
10	Sim	ultaneous Equation Systems with Truncated				
	Late	ent Variables	252			
	10.1	The General Model	252			
	10.2	Some Examples	257			
	10.3	A Disequilibrium Model of Two Markets	260			
	10.4	Aggregation of Disequilibrium Markets	263			
11	The Econometrics of Discrete Positive Variables:					
	the I	Poisson Model	270			
	11.1	Introduction	270			
	11.2	The Simple Poisson Model	271			
	11.3	The Poisson Model with Stochastic Coefficients	272			
	11.4	The Bivariate Poisson Model	278			

12	Dura	tion Models	284
	12.1	The Basic Models	284
	12.2	Discrete vs. Continuous Time	306
	12.3	Explanatory Models	308
	12.4	Estimation	313
	12.5 12.6 12.7 12.8	Models with Heterogeneity Renewal Processes Optimal Search Strategy Non-Parametric and Semi-Parametric Approaches	325 336 341 350
Арт	oendix	12.1 Asymptotic Properties of ML under Neglected	
		Heterogeneity	360
	A12.	1 The Case of Sampling $(d = 0)$	360
	A12.	2 The Case with Explanatory Variables $(d \neq 0)$	360
	A12.	3 Direction of the Bias of the Constant Term	361
Bibliography			363
Inde	ex		367