

Contents

Preface	<i>page vii</i>
Chapter 1 Motivation	1
1.1 Introduction	1
1.2 The instrumental variables estimator: a first approach	10
1.3 Historical review	16
Annex: choice of the weighting matrix	20
Chapter 2 The spherical linear model	22
2.1 Introduction	22
2.2 The minimand and the estimator	23
2.3 Instrumental variables and canonical correlations	29
2.4 Minimal instruments	32
2.5 The choice of instruments	37
2.6 Applications: a self-selection problem	39
2.7 Testing regressor–disturbance independence	48
2.8 The errors-in-variables model	58
2.9 Mixed OLS and IV minimands: the k -class estimators	62
2.10 Testing against serial correlation	63
2.11 Summary	65
Chapter 3 Instrumental variables and nonspherical disturbances	67
3.1 Introduction	67

vi	Contents	
	3.2	IV and generalized least squares 68
	3.3	IV and time series regressions 77
	3.4	Second-round estimators 86
	3.5	Heteroscedasticity 90
	3.6	Summary 96
Chapter 4	Linear simultaneous equations	98
	4.1	Introduction 98
	4.2	Formalization and notation 102
	4.3	The limited-information model 105
	4.4	The full-information model 115
	4.5	Second-order efficiency of estimators 124
	4.6	Identification 126
	4.7	Estimation of the reduced form 135
	4.8	Small-sample theory 137
	4.9	Serially correlated disturbance structures 144
	4.10	Summary 152
	Annex: the derivative $\mathbf{q}(\delta_i)$	152
Chapter 5	Nonlinear estimation with instrumental variables	156
	5.1	Introduction 156
	5.2	A taxonomy of equations 157
	5.3	LIP equations: limited information 163
	5.4	Essentially nonlinear models: limited information 173
	5.5	Systems estimation: three-stage least squares 184
	5.6	Full-information maximum likelihood 190
	5.7	Summary 194
	Annexes: A5.1	The Cramer–Rao lower bound for the nonlinear simultaneous-equation model 196
	A5.2	Second-round efficiency 200
Appendix	Some background notes	202
	A1	Stochastic convergence of estimators 202
	A2	Central limit theorems and BAN estimators 205
	A3	Convergence of minima and maxima and related matters 207
	A4	Matrix operations 209
References		211
Notes		219
Index		223