

Joachim Inkmann

Conditional Moment Estimation of Nonlinear Equation Systems

With an Application to an
Oligopoly Model of Cooperative R&D



Springer

Contents

1	Introduction	1
----------	---------------------	----------

Part I: Estimation Theory

2	The Conditional Moment Approach to GMM Estimation	6
2.1	Estimation Principle	6
2.2	Examples	8
2.3	Two-Step Estimators	17
3	Asymptotic Properties of GMM Estimators	20
3.1	Consistency	20
3.2	Asymptotic Distribution	25
4	Computation of GMM Estimators	28
4.1	The Newton-Raphson Method	28
4.2	A Stopping Rule for Initial Estimators	30
5	Asymptotic Efficiency Bounds	36
5.1	Semiparametric Efficiency	36
5.2	Optimal Weights	40
5.3	Optimal Instruments	45
6	Overidentifying Restrictions	55
6.1	Asymptotic Efficiency Gains	55
6.2	Higher Order Moment Conditions	60
6.3	Moments of Compounded Distributions	62
6.4	Complementary Data Sources	63
7	GMM Estimation with Optimal Weights	67
7.1	Iterative Estimators	67
7.2	Small Sample Shortcomings	68
7.3	Lessons from IV Estimation	74
7.4	Application to GMM Estimation	84

7.5	Bootstrapping for GMM Estimators	92
7.6	Empirical Likelihood Approaches	98
8	GMM Estimation with Optimal Instruments	107
8.1	Parametric Two-step Estimation	107
8.2	Series Approximation	112
8.3	K-Nearest Neighbor Estimation	117
8.4	Kernel Estimation	119
8.5	Cross-Validation	121
9	Monte Carlo Investigation	123
9.1	GMM versus Maximum Likelihood Estimation	123
9.2	GMM versus Empirical Likelihood Estimation	144

Part II: Application

10	Theory of Cooperative R&D	153
10.1	Motivation	153
10.2	Intra- and Inter-Industry R&D Cooperation	157
10.3	Extension to Vertically Related Industries	161
10.4	Horizontal and Vertical R&D Cooperation	165
10.5	Empirical Implications of the Model	177
11	Empirical Evidence on Cooperative R&D	179
11.1	Data	179
11.2	Specification	183
11.3	Estimation Results	188
12	Conclusion	198
	References	200