

COALITIONS IN OLIGOPOLIES

An Introduction to the Sequential Procedure

Murray Bro,wn, Emeritus
Slate University of New York
at Buffalo, 441: Fronczak Hall,
North Campus-, Buffalo,
NY 14260, USA .

and

Shin-Hwan Chiang
Department of Economics,
York University, Toronto,
Ontario, Canada, M3J1P3

2003



ELSEVIER
C.

Amsterdam — Boston - Heidelberg - London - New York - Oxford
, Paris - San Diego - San Francisco - Singapore - Sydney — Tokyo

Contents

<i>Preface</i>	, ; .	vv
I Symmetric Oligopoly		1
1 The Basic Oligopoly Model		3
1.1 Introduction		3
1.2 Sequential Coalition Formation (SCF)		8
1.3 Coalition Structures		9
1.3.1 Stage 1: The Coalition Subgame		10
1.3.2 Stage 2: The Cournot Market Subgame		12
1.4 Perfect Substitutes		13
1.4.1 The Stigler (1964) Result		14
1.4.2 Sequential Equilibrium		15
1.4.3 Discussion of Knowledge Effect		18
1.4.4 The General Result		19
1.5 Demand Complementarities		22
1.5.1 A Differentiated Product Model		23
1.5.2 Limits to the Monopoly Outcome		25
1.5.3 Effect on Social Welfare		29
1.6 The d'Aspremont et al. (1983) Model	"	31
1.7 Bibliographic Notes		34
1.8 Appendix: Price Leaders and Price Setting		38
1.8.1 Bertrand and Cournot Models	•	38
1.8.2 Capacity Constraints		39
1.8.3 Product Differentiation		40

Cost Savings Due to Synergies	41
2.1 Introduction	41
2.2 The Coalitional Cost Saving Model	43
2.3 Social Welfare and Cost Savings	49
2.4 Bloch's (1995) Association Model	51
2.5 Discussion	55
2.6 Bibliographic Notes	57
2.7 Appendices	58
2.7.1 Proof of Lemma 2.1	58
2.7.2 Proof of Proposition 2.1	58
II Uncertainty, Financial Decisions, and Managerial Incentives	67
3 Market Volatility and Coalitions	69
3.1 Introduction	69
3.2 SCF under Uncertainty	71
3.3 The Optimal Output	73
3.4 The Coalition Structure	77
3.4.1 Open Membership Coalitions	78
3.4.2 Unanimous Coalitions	80
3.4.3 Coalition Formation and Market Interactions .	84
3.5 Discussion	87
3.5.1 Risk Aversion	87
3.5.2 Limitations	90
3.6 Bibliographic Notes	92
3.7 Appendices	93
3.7.1 Proof of Lemma 3.1	93
3.7.2 Proof of Lemma 3.2	93
3.7.3 Proof of Proposition 3.1	94
3.7.4 Proof of Lemma 3.3	95
3.7.5 Proof of Proposition 3.2	96

4	Real and Financial Decisions	99
4.1	Introduction	99
4.2	The Model."	101
4.2.1	Demand, Cost, and Coalition Assumptions . . . ,	102
4.2.2	Capital Structure and Cash Flow.	103
4.2.3	Equilibrium in the Credit Market and the Cost of Debt	104
4.2.4	Limited Liability and the Value of Equity . . .	105
4.2.5	Utility in Stage 2	106
4.3	Main Results.	106
4.3.1	Risk Neutral. Equity Holders.	106
4.3.2	Risk Averse Equity Holders.	109
4.3.3	Discussion	112
4.4	Changes in the Capital Structure.	114
4.4.1	Simulations of a Restricted Model	115
4.4.2	Hypotheses.	117
4.4.3	Discussion	121
4.5	Bibliographic Notes	121
4.6	Appendices.	123
4.6.1	• Proof of Strategic Substitutes	123
4.6.2	The Mean-Variance Utility Function	125
5	Coalitions and Incentives	127
5.1	Introduction	127
5.2	SCF with Managerial Incentives.	128
5.2.T	Stage 3: Managers' Decisions with Regard to Outputs.	129
5.2.2	Stage 2: Owners'.Decisions with Regard to Man- agers	131
5.2.3	Stage 1: Owners'.Decisions with Regard to Coal- itions.	131
5.3	Managerial Compensation	131
5.4	Owners and Managers.	133
5.5	Social Efficiency.	137
5.6	Discussion	139
5.7	Bibliographic Notes.	141

''' 5.8 Appendices	141
5.8.1 Proof of Proposition 5.1	141
5.8.2 Proof of Corollary 5.1	142
5.8.3 Proof of Proposition 5.2	144
5.8.4 Proof of Proposition 5.3	147
5.8.5 Proof of Proposition 5.4	148
III Coalition Theory and Sequential Procedures 149	
-,- 6 Coalitions without Externalities 151	
6.1 Introduction !	151
6.2 Counting Coalitions	153
6.3 Two Representations of Coalition Games	155
6.4 Noncooperative Games	158
6.4.1 Pure and Mixed Strategies	160
6.4.2 Stationary Strategies	161
6.4.3 Discounting	162
6.4.4 Protocols and the Stability Structure	163
6.4.5 Solution Concepts	164
6.4.6 Zermelo-Kuhn's Theorem and Backward Induction	165:-
6.4.7 The Normal or Strategic Form Game	166"»
6.5 The Chatterjee et al. (1993) Model	167*
6.6 Bibliographic Notes	173 •"
-,- 7 Coalitions with Externalities 175	
7.1 Introduction	175'
7.2 Partition Functions and Share-Outs	177
7.3 A General Finite Play Game	179
7.4 Bloch's (1996) Model	183
7.5 Ray and Vohra's (1999) Model	185
7.6 Discussion	194
7.7 Bibliographic Notes	197

8 Who Moves First?	199
8.1 Introduction	199
8.1.1 Order-Independent Payoff Profiles	202
8.1.2 Notation and Assumptions for Order of Move Analysis	202
8.2 A Structural Protocol'Game	203
8.2.1 The Protocol Game	204
8.2.2 Discussion	207
8.3 Montero's Model	208
8.3.1 Random Proposers	209
8.3.2 The No-Delay Equilibrium Coalition Structure .	211
8.3.3 The Grand Coalition and Discounting	215
8.3.4 Discussion	216
8.4 Stackelberg and Uncertainty	216
8.4.1 ' A Duopoly Model with Demand Uncertainty .	218
8.4.2 • Discussion	222
8.5 Bibliographic Notes	225
<i>Bibliography-</i>	229
<i>Index</i>	239