

Contents

Preface	v
1 Preliminaries	1
1.1 Introduction	1
1.2 Basic definitions and concepts	2
1.3 Examples	3
1.3.1 Expected utility bargaining situations	3
1.3.2 A division problem	4
1.3.3 Bimatrix games	5
1.3.4 A wage-employment bargaining model	8
1.4 Outline of this book	9
2 Nash bargaining solutions	13
2.1 Introduction	13
2.2 The bargaining problem	14
2.3 Nonsymmetric Nash solutions	17
2.4 Alternative characterizations of nonsymmetric Nash solutions	26
2.4.1 Introduction	26
2.4.2 Independence of irrelevant expansions	26
2.4.3 Multiplicativity	30
2.4.4 Replications of 2-person bargaining	32
2.4.5 The utility of playing a bargaining game	34
2.5 Disagreement point axioms	37
2.5.1 Introduction	37
2.5.2 Disagreement point convexity	38
2.5.3 Related literature	44
2.6 Nash bargaining solutions: further results	45
3 Independence of irrelevant alternatives and revealed preferences	47
3.1 Introduction	47
3.2 The role of IIA	48
3.3 (A)cyclicity of revealed preference without continuity	50
3.4 (A)cyclicity of revealed preference with continuity	53
3.5 Representation of revealed preference	56
3.6 Concluding remarks and related literature	59

3.7	Violation of SARP for $n > 2$	59
4	Monotonicity properties	63
4.1	Introduction	63
4.2	Individual Monotonicity	64
4.3	Replication invariance of bargaining solutions	70
4.4	Global individual monotonicity	73
4.5	Proportional solutions	76
4.5.1	Strong monotonicity	76
4.5.2	Disagreement point concavity	78
4.5.3	Strong transfer responsiveness	81
4.6	The equal-loss solution	82
4.7	The lexicographic egalitarian solution	84
4.8	The lexicographic equal-loss solution	88
4.9	Further literature	92
5	Additivity properties	93
5.1	Introduction	93
5.2	The super-additive solution of Perles and Maschler	94
5.3	Simultaneity of issues and additivity in bargaining	96
5.4	Partial super-additivity and proportional solutions	98
5.5	Restricted additivity and nonsymmetric Nash solutions	101
6	Risk properties	107
6.1	Introduction	107
6.2	Risk properties of bargaining solutions	107
6.3	Risk properties, independence of irrelevant alternatives, individual monotonicity	112
6.4	Risk behavior in "risky" situations	115
6.5	Improvement sensitivity of bargaining solutions	116
6.6	Risk sensitivity, twist sensitivity, and the slice property	118
7	Bargaining with a variable number of players	125
7.1	Introduction	125
7.2	The variable population bargaining model	126
7.3	Population monotonicity and the Raiffa-Kalai-Smorodinsky solution	127
7.4	Stability and the Nash solution	129
7.5	The egalitarian solution, weak stability and population monotonicity	133
8	Alternative models and solution concepts	135
8.1	Introduction	135
8.2	Multivalued solutions	135
8.2.1	Independence of irrelevant alternatives	136
8.2.2	Restricted monotonicity	139
8.3	Probabilistic solutions	142
8.3.1	Finite probabilistic solutions with the IIA property	143

8.3.2	Conditional independence of irrelevant alternatives	147
8.4	Nonconvex bargaining games	152
8.4.1	An axiomatic extension of the Nash solution	153
8.4.2	A geometric extension of the Nash solution	156
8.4.3	Nash points and dynamics	158
8.5	Bargaining on economic environments	163
8.5.1	Monotonicity properties and fair division	163
8.5.2	Axiomatic bargaining on economic environments	164
8.5.3	Strategic bargaining on economic environments	165
8.6	Axiomatic bargaining over time	166
8.6.1	Continuation of bargaining solutions	166
8.6.2	Axiomatic bargaining over shrinking pies	167
8.7	Ordinal bargaining	167
8.8	Continuity of bargaining solutions	168
9	Noncooperative models for bargaining solutions	169
9.1	Introduction	169
9.2	The Harsanyi-Zeuthen procedure	170
9.3	The Nash demand game	171
9.4	Perfect equilibrium in an alternating Nash demand game	174
9.5	A one-shot bargaining problem	180
9.6	Consistency and subgame perfectness for the RKS solution	180
9.7	Noncooperative comparison of solutions	186
9.8	Arbitration games	191
10	Solutions for coalitional bargaining games	193
10.1	Introduction	193
10.2	Coalitional bargaining games and solutions	194
10.3	The Shapley solution	198
10.4	The Harsanyi solution	201
10.5	The proportional solutions	203
10.6	Related literature	205
11	Elements from utility theory	207
11.1	Introduction	207
11.2	Von Neumann-Morgenstern utility functions	207
11.2.1	An axiomatic approach to measurable utility	208
11.2.2	Von Neumann-Morgenstern utility functions	209
11.3	Risk aversion	210
11.4	A criterion for comparing strength of preference	214
11.5	Additive utility	216
11.6	Multiplicative utility	218
	References	221
	Author index	231

Subject index	233
Notation and symbols	237