

Contents

Abbreviations	xiii
Nomenclature	xv
1 Introduction	1
1.1 Motivation and Goals of This Work	1
1.2 Methodology	2
1.3 Outline	2
2 Supply Chain Planning and Coordination	5
2.1 Supply Chain Planning	5
2.1.1 Definitions and Overview	5
2.1.2 Master Planning	8
2.2 Model Formulations for Master Planning	9
2.2.1 Generic Master Planning Model	10
2.2.2 Extension to Lot-Sizing	12
2.3 Decentralized Planning and Coordination	20
2.3.1 Basic Definitions	20
2.3.2 Decentralized Supply Chain Planning	24
2.3.3 Upstream Vs. Collaborative Planning	30
3 Coordination Mechanisms for Supply Chain Planning	35
3.1 Symmetric Information	35
3.1.1 Non-cooperative Game Theory	36
3.1.2 Cooperative Game Theory	41
3.2 One-Sided Information Asymmetry	43
3.2.1 Signaling	43
3.2.2 Screening	45
3.3 Multilateral Information Asymmetry	48
3.3.1 Auctions and Their Application to Supply Chain Coordination	48
3.3.2 Mechanisms with Focus on Proposal Generation	51

4	New Coordination Schemes	63
4.1	Generic Scheme for Linear Programming and Analytical Results	64
4.1.1	Version with Iterative, Unilateral Exchange of Cost Information	64
4.1.2	Version with One-Shot Exchange of Cost Information	80
4.2	Scheme for Uncapacitated Dynamic Lot-Sizing and Analytical Results	82
4.3	Application to Master Planning	99
4.3.1	Linearization	99
4.3.2	Adaptation to Master Planning	103
4.3.3	Generic Modifications	111
4.3.4	Modifications for Master Planning	114
4.4	Customizations	120
4.4.1	Master Planning with Lot-Sizing	120
4.4.2	Voluntary Compliance	122
4.4.3	Lost Sales	123
4.4.4	Multiple Suppliers	126
5	New Coordination Mechanisms	129
5.1	Surplus Sharing Determined by the Informed Party	130
5.2	Surplus Sharing Determined by Lump-Sum Payments	133
5.3	Surplus Sharing by a Double Auction	141
5.4	Comparison of Mechanisms and Discussion	149
5.5	Application with Rolling Schedules	151
6	Computational Tests of Coordination Schemes	155
6.1	General Master Planning Model	155
6.1.1	Generation of Test Instances and Performance Indicators	155
6.1.2	Analysis of Solutions for the Generic Scheme	162
6.1.3	Analysis of Solutions for the Modified Scheme	164
6.2	Uncapacitated Lot-Sizing Problem	169
6.2.1	Generation of Test Instances	169
6.2.2	Analysis of Solutions	171
6.3	Multi-level Capacitated Lot-Sizing Problem	174
6.4	Models for Campaign Planning	179
6.4.1	Generation of Test Instances	179
6.4.2	Analysis of Solutions	180
6.5	Real-World Supply Chain Planning Problems	184
6.5.1	Planning Problems and Model Formulation	185
6.5.2	Analysis of Solutions	192
7	Summary and Outlook	197
	References	201



<http://www.springer.com/978-3-642-02832-8>

Supply Chain Coordination Mechanisms
New Approaches for Collaborative Planning

Albrecht, M.

2010, XXII, 211 p. 54 illus., Softcover

ISBN: 978-3-642-02832-8