

VU Research Portal

Topics in Trans-boundary River Sharing Problems and Economic Theory

Zeng, Y.

2016

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Zeng, Y. (2016). *Topics in Trans-boundary River Sharing Problems and Economic Theory*. Tinbergen Institute.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

Contents

1	Introduction	1
2	Some concepts in Game Theory	7
2.1	Asymmetric Nash Bargaining Solution	7
2.1.1	Formal description of the two person bargaining problem	7
2.1.2	Nash bargaining solution	7
2.1.3	Asymmetric Nash bargaining solution	8
2.2	Coalitional Bargaining Game	9
2.2.1	The Coalitional Bargaining Game	9
2.2.2	Markov Perfect Equilibria	11
2.2.2.1	Strategies and Equilibria	11
2.2.2.2	Immediate Formation of the Grand Coalition	13
2.3	Internal Stability	16
2.4	Appendix with proofs of Chapter 2	18
3	Asymmetric Nash Solutions in Trans-boundary River Sharing Problems	21
3.1	Introduction	21
3.2	Model specification	24
3.3	Legal principles defining property rights	27
3.3.1	Absolute Territorial Sovereignty	28
3.3.2	Unlimited Territorial Integrity	28
3.3.2.1	Strict UTI	29
3.3.2.2	Individual aspiration levels	30
3.4	The ANBS in the river sharing problem	31
3.4.1	The bargaining solution	31
3.4.2	Decomposition of the computation of the ANBS	34
3.4.3	The political economy of property rights	37
3.5	The asymmetric Nash rationing solution	38
3.6	Two numerical examples	40
3.6.1	Example 1: two agents	41
3.6.2	Example 2: three agents	41
3.7	Conclusion	43
3.8	Appendix with proofs of Chapter 3	45

CONTENTS

4	International Environmental Agreements for Trans-boundary River Sharing Problems	49
4.1	Introduction	49
4.2	The Model	52
4.2.1	The River Sharing Problem	53
4.2.2	Streams of payoffs	54
4.2.3	The Three-agent Coalitional Bargaining Game	55
4.3	Markov Perfect Equilibrium	57
4.4	Main results for the V-shaped river sharing problem	61
4.5	Concluding Remarks	67
5	Damming Trans-boundary River Basins: A welfare analysis	69
5.1	Introduction	69
5.2	The model	72
5.3	The disagreement and joint cooperation scenarios	75
5.4	Partial cooperation scenario	76
5.5	A case study: Mekong River	79
5.5.1	Background	79
5.5.2	The disagreement scenario	83
5.5.3	The joint cooperation scenario	83
5.5.4	The partial cooperation scenario	83
5.6	Concluding remarks	84
5.7	Appendix of Chapter 5	87
6	Competition in two-sided market	93
6.1	Introduction	93
6.2	Monopoly platforms	94
6.3	Duopoly platforms with single-homing agents	96
6.3.1	The duopoly model	97
6.3.2	An example	98
6.4	Competitive bottleneck platforms	99
6.4.1	Linear within-group externalities	102
6.4.2	Quadratic within-group externalities	102
	Bibliography	106
	A Derivations of Chapter 4	113
	Samenvatting (Summary in Dutch)	127
	Acknowledgements	131