

Conflict analysis

An actor analysis method

Simulation Lab

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30 June 2010

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Small adaptations have been made to make the original slides suitable for OpenCourseWare publication.

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Outline

- What is conflict analysis?
- Conflict analysis and its relationship to game theory
- Conflict analysis how it works
- Real world example

What is conflict analysis?

- Conflict analysis is an actor analysis method that has a close link to game theory.
- The way a conflict analysis “game” is constructed is different from game theory.
- It is a prescriptive method but the underlying assumptions are normative like in game theory. That is, the method is primarily used to strategically inform decision makers.

Game theory

Prisoner's dilemma

		Actor 2	
		Keep silent (cooperate)	Betray (defect)
Actor 1	Keep silent (cooperate)	2, 2	0, 3
	Betray (defect)	3, 0	1, 1

Conflict analysis

- Lets do a conflict analysis for the prisoner's dilemma
- There are three steps:
 - Step one: analysis of options
 - Step two: finding feasible scenarios
 - Step three: constructing a preference order
 - Step four: solving the game

Step one: Analysis of options (1)

Actors and options

- Actors: prisoner 1 and prisoner 2
- Options prisoner 1: keep mouth shut (cooperate)
betray (defect)
- Options prisoner 2: keep mouth shut (cooperate)
betray (defect)

Step one: Analysis of options (2)

Actor	Options
Prisoner 1	1. Cooperate
	2. Defect
Prisoner 2	3. Cooperate
	4. Defect

Step 2: Finding feasible scenarios

- Every possible combination of options is a potential scenario.
- Since there are 4 options held by the actors there are $2^4 = 16$ scenarios possible in total.
- Part of these scenarios will be infeasible as they are a combination of options that are not possible in reality.
- These infeasible scenarios are removed from the game.

Step 2: Finding feasible scenarios

	Scenarios															
option 1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
option 2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
option 3	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
option 4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Step 2: Finding feasible scenarios

	Scenario															
option 1 (coop)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
option 2 (def)	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
option 3 (coop)	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
option 4 (def)	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Do you see it?

- You get the same four outcomes through the analysis of options methods.
- However: This method requires less information than when you construct games as you do not need to know all possible outcomes before you do the analysis. The outcomes are generated during the analysis.

Step three: Constructing a preference order

- For each actor a preference order is constructed.
- A number of different ways exist to construct preference orderings:
 - Ask the actors themselves (e.g. pair wise comparisons)
 - Infer from literature

Preference order prisoner's dilemma

Actor	Scenario
Prisoner 1	7, 11, 6, 10
Prisoner 2	10, 11, 6, 7

Step 4 Solving the game

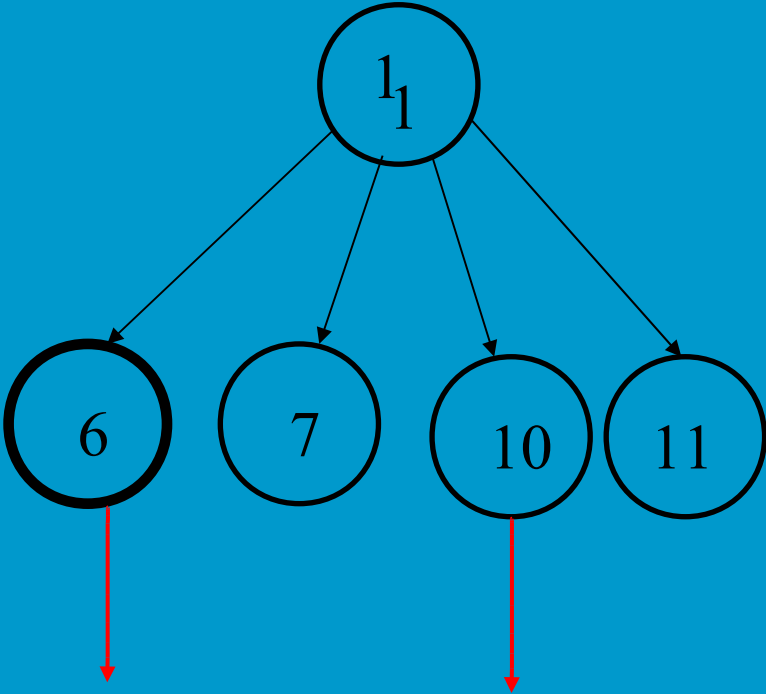
Can be done in several ways. There are different solution algorithms to solve the game that assume different types of rationality.
(e.g. Kilgour, D.M., K.W. Hipel (2005) The Graph Model for Conflict Resolution: Past Present, and Future. Group Decision and Negotiation 14(6): 441-460)

Can draw a map, solve with GMCR2 software, or logically.

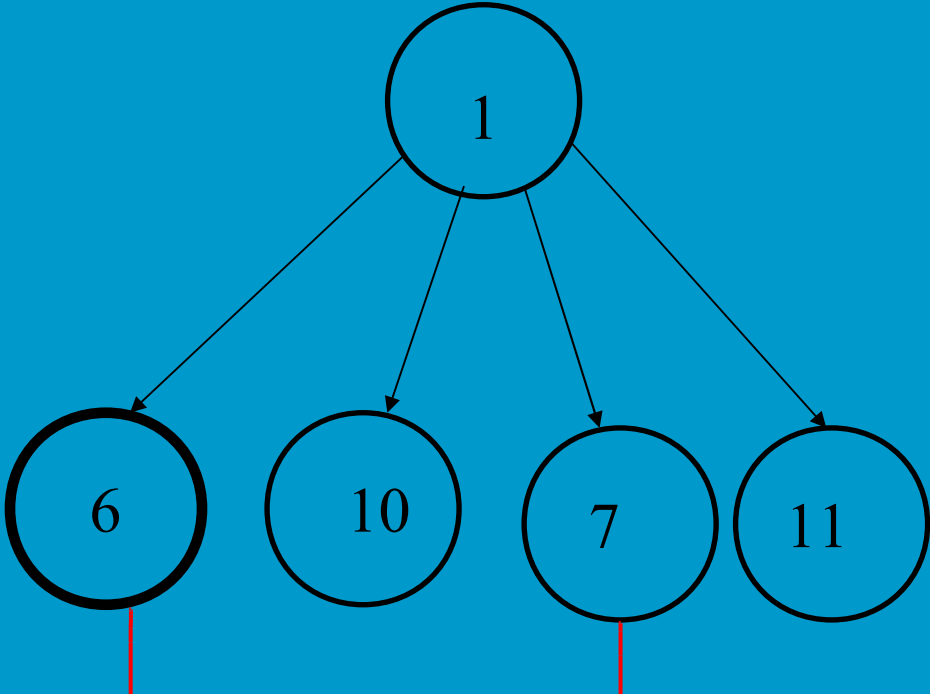
Here we solve for a Nash equilibrium.

(Here a scenario is considered an equilibrium solution when no actor except the one's perspective that is taken can play an option in such a way that the outcome would be different.)

Map



Prisoner 1



Prisoner 2

Outcome table

Actor	Scenario (6)
Prisoner 1	0
	1
Prisoner 2	0
	1

A “simpler” way of doing the analysis of options method would have been:

Actor	Options
Prisoner 1	1. Cooperate
Prisoner 2	2. Cooperate

Scenarios would then be

	Scenarios			
Option 1	0	1	0	1
Option 2	0	0	1	1
number	1	2	3	4

However

- In real life options are not always yes/no
- They might be:
 - option 1: go right
 - option 2: go left
 - option 3: go straightNot playing these 3 options would result in “stand still.”

Summarizing

- Conflict analysis is an actor analysis method related to game theory
- It is a normative method that is used for prescriptive purposes. That is, to strategically inform decision makers.
- The information demand that is needed to construct the game is (usually) lower than for game theory.

Real life example: Dutch energy industry

Case Background

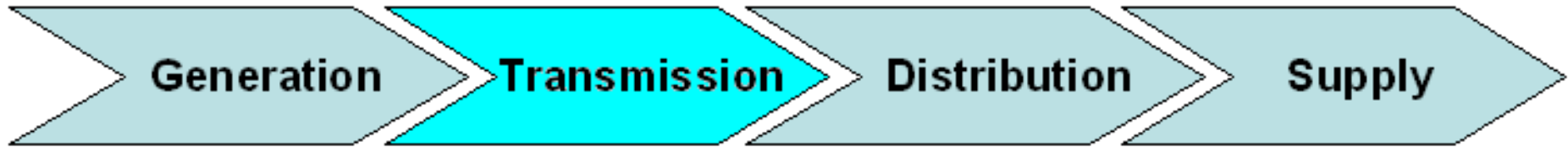


Figure: Representation of the unbundled value chain for the Dutch electricity industry.

Case Background

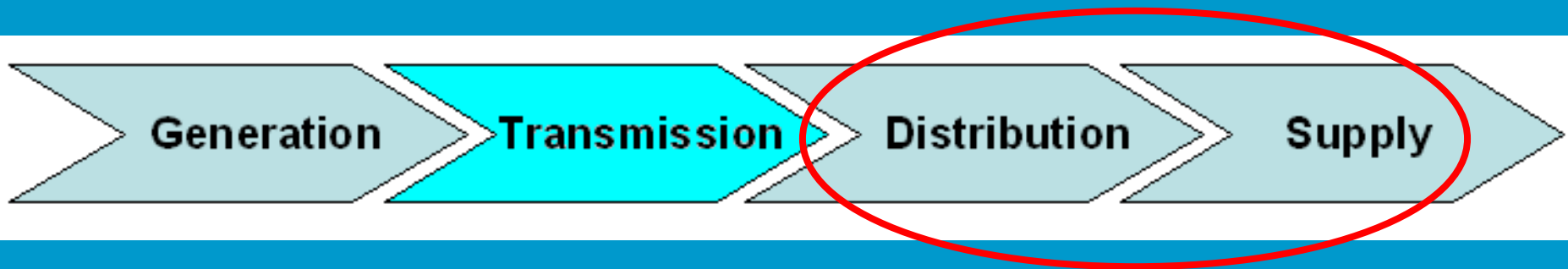


Figure: Representation of the unbundled value chain for the Dutch electricity industry.

Actors and options

Stakeholder	Options
National government	<ol style="list-style-type: none">1. Prohibition of possession of shares in both types of companies2. Prohibition of possession of shares of the network company by private parties3. Allow for the privatization of the network companies
Provincial and local governments	<ol style="list-style-type: none">4. Sell shares
Integrated power companies	<ol style="list-style-type: none">5. Lobby the provincial and local governments6. Lobby the government

Feasible scenarios

Actors	Options	Scenarios																				
		0	1	0	1	1	0	0	1	0	1	1	0	1	0	1	1	0	1	0	1	1
National government	1	0	1	0	1	1	0	0	1	0	1	1	0	1	0	1	1	0	1	0	1	1
	2	0	0	1	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0
	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Provincial and local governments	4	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
Integrated	5	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1
power companies	6	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Decimal		0	1	2	3	9	12	16	17	18	19	25	32	33	34	35	41	48	49	50	51	57

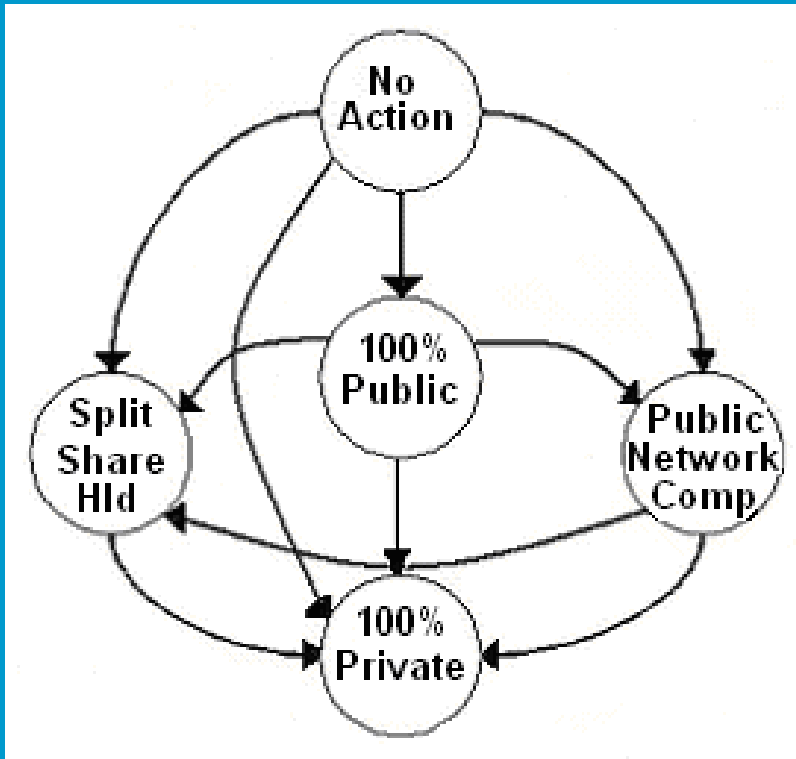
Preferences over scenarios

Actor	Preference order
National government	3, 19, 35, 51, 2, 18, 34, 50, 10, 1, 9, 17, 25, 33, 41, 49, 57, 0, 16, 32, 48, 12
Provincial and local governments	12, 9, 25, 41, 57, 10, 3, 19, 35, 51, 2, 18, 34, 50, 1, 17, 33, 49, 0, 16, 32, 48
Integrated power companies	0, 16, 32, 48, 12, 1, 17, 33, 49, 9, 25, 41, 57, 2, 3, 18, 34, 50, 10, 19, 35, 51

Results (1)

Stakeholder	Option	Scenario				
		Status quo	100 % Public	Public network companies	Split share holders	100% Private
National government	Prohibition of possession of shares in both types of companies	0	1	0	1	0
National government	Prohibition of possession of shares of the network company by private parties	0	1	1	0	0
National government	Allow for the privatization of the network companies (allow shareholders to sell shares)	0	0	0	0	1
Provincial and local government	Sell shares	0	0	0	1	1
Integrated power companies	Lobby the shareholders	1	0	0	0	0
Integrated power companies	Lobby the government	1	0	0	0	0

Results (2)



A map that shows the equilibriums and the moves the government can make between these equilibriums.

Conclusions regarding the case

- The conflict analysis shows that the government has the power to choose the scenario it prefers most as the other actors have no options that can help prevent the preferred outcome of the government.
- This holds true only if there is no credible threat of the other actors of going to court.
- The recommendation to the government based on the conflict analysis would be to aim for a 100% public control as it is the most preferred scenario of the government.

Conclusions regarding the case

- These results were contra-intuitive at the time.
- Experts thought a negotiated solution would be reached.
- In reality the network companies were unbundled and the government did choose to unbundle completely.