Resource Management:
INSTITUTIONS AND INSTITUTIONAL DESIGN

Erling Berge

A grammar of institutions

NTNU, Trondheim
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Literature

Ostrom, Elinor 2005, *Understanding Institutional Diversity*, Princeton University Press, Princeton, Ch 5

- A grammar of institutions

Institutional statements

- Shared strategies, norms, rules: what is the difference?
- Rules-in-force vs Rules-in-use
- Institutional statements as attributes of a community (norms, shared strategies)
- Institutional statements as rules
- Changing rules is often easier than changing the bio-physical world
- Two ways of expressing rules:
  - Generative rules: “Let there be an X”
  - Regulative rules: regulative rules will be the focus …

The Syntax of a Grammar of Institutions

- ADICO
- A: attribute
  - Any value of a participant level variable that distinguishes to whom the institutional statement applies
- D: deontic (déon= that which is binding or proper)
  - One of three modal verbs may (permitted), must (obliged), must not (forbidden)
- I: aim
  - Describes particular actions or outcomes of actions to which the AD is assigned
- C: conditions
  - Variables describing where and when the ADI applies
- O: or else
  - Consequences of not following the ADIC stipulations

Shared strategies, Norms, Rules

There are 5 elements of ADICO

- Shared strategies contains 3 elements: AIC
- Norms contain 4 elements: ADIC
- Rules contain all 5 elements: ADICO

- All rules can be rewritten as [attributes] [deontic] [aim] [conditions] [or else]

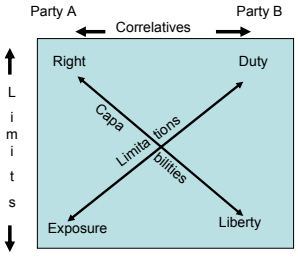
Attributes

- Defines how an institutional statement applies to all or to a subset of the participants/ positions in an action situation
- Default: if nothing is said all participants/ positions are included
- The attribute component maps the authority or prescription of an institutional statement to particular positions or to all positions
- This implies that there are other institutional statements assigning participants to positions

Deontic logic

- D (= Deontic operators) = (P, O, F)
  - P (=permitted) = tillate (noko kan gjerast om aktøren vil)
  - O (=obliged) = påbode (noko må eller skal gjerast)
  - F (forbidden) = forbode (noko kan ikkje gjerast av nokon aktør)
- Deontic operators are logically interrelated (symbols are to be read: ⋃ = or, ⋂ = and, Ø = empty set, ~ = negation)
  - D = P ⋃ O ⋃ F
  - F ⋂ P = Ø; O ⋂ P = O; and F ⋂ O = Ø
  - If O then P
- Deontic operators relate to the physically possible (e.g. in actions, outcomes, communication channels, …)
- Deontic operators are interdefinable

Deontic "permitted"



Source: V.Ostrom and E.Ostrom 1999:46

- Authorised relationships: authority to act
1. Permission rules establish conditions
2. Permission rules may constitute an action
3. If permission is defined as a right it implies that others have duties

Deontic: limits and correlatives

- Correlatives –means reciprocity in relations
  - If something is permitted for A it implies that some ~A has an obligation or duty to ~F this something for A
- Limits – of a right defines the area of decision making where a claimant stands exposed. Non-claimants are at liberty to inspect and verify that the claimant is within the bounds of his rights. If that is verified they have the duty to not interfere with the exercise of the right. If the claimant is not within the bounds of his rights he exposed, and the non-claimant is at liberty to act on that information

Rights: The "Hohfeldian" conception

Defining the relation (jural correlates)		its limit (jural opposite)
OWNER	NON-OWNER	
claim-rights	duties	exposure
liberty	exposure	duties
authority/ (powers)	liability	disability/ (no authority)
immunity	disability/ (no authority)	liability

Deontics in formal game analysis

- Institutional statements including deontics imply that payoffs are seen as different from situations where there just is a shared understanding of the situation
- This is captured by adding a **delta parameter** representing the rewards or costs of obeying (o) or breaking (b) a prescription:
  - $\Delta = \delta^o + \delta^b$
  - Δ = sum of all the delta parameters
  - δ^o = the change in expected payoff from *obeying* a prescription
  - δ^b = the change in expected payoff from *breaking* a prescription
  - The changes can further usefully be divided into externally and internally generated payoffs, indexed by e and i: e.g. $\delta^o = \delta^{oe} + \delta^{oi}$
  - Internal (breaking: shame, guilt; obeying: pride, warm glow)
  - external (breaking: fine, exclusion, ostracism, physical punishment; obeying: pride, warm glow)

AIM, CONDITIONS, OR ELSE

- The aim part of an institutional statement specifies the actions or outcomes to which the action is directed (process, formula, state of the world, outcome). It must be physically possible, more than one outcome must be possible and both action and inaction must be allowed.
- Conditions defines when and where the institutional statement applies
- OR ELSE specifies what happens in case of non-compliance

Rules defined by “or else”

1. **Requires a sanction** that is decided in a collective choice situation, often sanctions are graduated depending on some conditions
2. Must be backed by another rule or norm that changes the DEONTIC assigned to some AIM for at least one actor if individuals fail to follow the rule: the **sanctioning prescription**
3. Require a norm or rule that affects the constraints and opportunities facing an actor or actors to take the responsibility to monitor the conformance of others to the prescription: the **monitoring prescription**

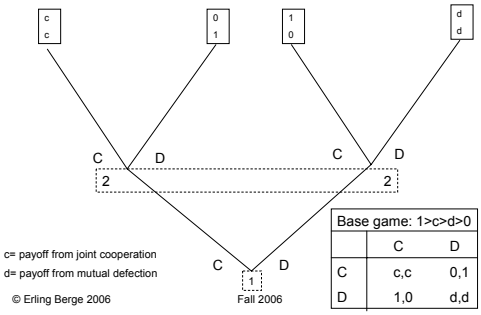
Using the grammar in game-theoretic analysis

- In games without norms or rules the analysis uses the concept of strategy conforming to AIC
- To analyse games with norms or rules delta parameters need to be included
- Including enforcing players requires a delta parameter assigned to the action “not sanctioning”
- Using enforcement players also requires a monitoring rule and a monitor
- Costly sanctioning/ monitoring may require that
  - Monitors/ sanctioners face the possibility of being subject to sanctions
  - There is a large and salient pressure to monitor/ sanction (large external deltas)
  - Monitors/ sanctioners hold strong moral commitment (large internal deltas)
  - Payments to monitors/ sanctioners create prudent awards high enough to offset costs
- When an “or else” clause is backed by norms, the monitoring and enforcement rests solely on normative delta parameters and payment schemes for monitors and sanctioners

Collective action problems

- Two person prisoner dilemma
  - Base game: No institutional statements
  - Shared strategies game: AIC Statements:
    - [All players] [] [Cooperate] [first round] []
    - [All players] [] [Cooperate] [if all C in previous round] []
    - [All players] [] [Defect] [all rounds after a D] []
  - Norms game: ADIC statement:
    - [P1 and P2] [must] [Cooperate] [always] []
  - Rules game: ADICO statements:
    - [P1 and P2] [must] [Cooperate] [always] [f]
    - ADIC statements:
      - [P3] [must] [monitor] [always] []
      - [P4] [must] [impose f on defector] [when P3 reports a D] []

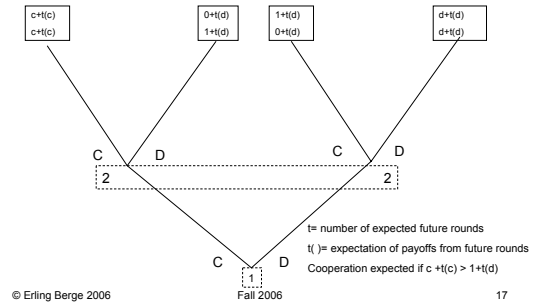
Base game payoff



Base game: 1>c>d>0		
	C	D
C	c,c	0,1
D	1,0	d,d

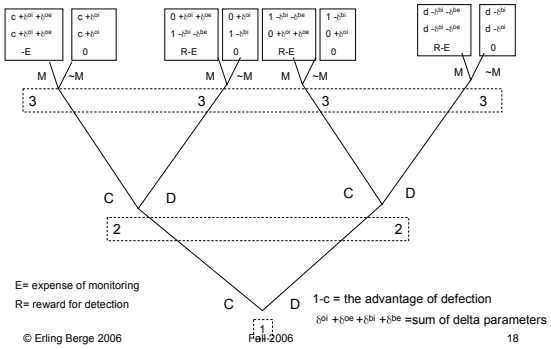
c= payoff from joint cooperation
d= payoff from mutual defection

Shared strategies payoff



t= number of expected future rounds
t( )= expectation of payoffs from future rounds
Cooperation expected if c +t(c) > 1+t(d)

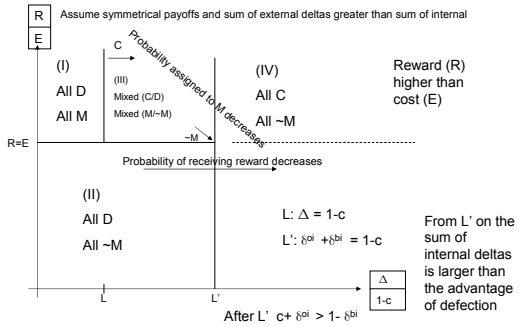
Game with a norm and monitoring



E= expense of monitoring
R= reward for detection

1-c = the advantage of defection
$\delta^{oi} + \delta^{oe} + \delta^{bi} + \delta^{be}$ =sum of delta parameters

Equilibrium diagram in game with norm and monitoring

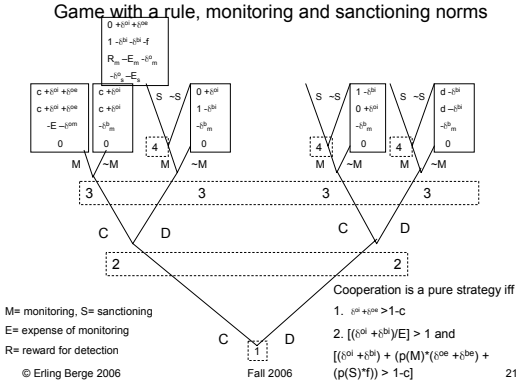


Rules changing a PD base game

Predictions of cooperation must be based on

- Changes in payoffs due to at least one delta parameter
- Addition of institutionally assigned consequences for breaking a rule: e.g.
  - Rule: [Players 1&2] [must] [cooperate] [always] [OR ELSE f]
- The possibility of detection
- At least one player has the authority to monitor: e.g.
  - Norm: [Players 3] [must] [monitor] [always]
- At least one player has authority to impose the OR ELSE: e.g.
  - Norm: [Players 4] [must] [impose f on a player] [when player 3 reports that player has defected]
- The base game payoffs

Game with a rule, monitoring and sanctioning norms



M= monitoring, S= sanctioning
E= expense of monitoring
R= reward for detection

Cooperation is a pure strategy iff

1. δoi +δoe >1-c
2. [(δoi +δbi)/E] > 1 and
   [(δoi +δbi) + (p(M)*(δoe +δbe) + (p(S)*f)) > 1-c]

Using the grammar

- Disentangling formal laws and informal institutions
- Legitimacy and compliance
- Basic normative assumptions
  - Sign, size and interpretation of deltas
  - Types of players reflected in deltas
  - Creation and maintenance of deltas
- Freedom and constraint
- Institutional configurations
- Field studies:
  - Listen for normative discourse
  - The “know and use” condition
  - Precision of institutional statements and scale of problem

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