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Seminar:

Institutional and Evolutionary
Economics

(Evolutionary-Institutional Economics)

3) Institutional Emergence (3): Games That Play People – The Example of the “Tragedy of the Commons”

(2-lbs-”Technology”, 10 Shepherds à 10 Sheep à 100 lbs, *‘large’ group*, many defectors; no PD!)

		Alle anderen Schäfer /All other Shepherds	
		c	nc
Schäfer X Shepherd X	c	<p>90 Schafe à 100 Pfd= 1000 Pfd/Schäfer</p> <p>10 Schafe à 100 Pfd= 1000 Pfd</p>	<p>99 Schafe à 82 Pfd = 902 Pfd/Schäfer</p> <p>10 Schafe à 82 Pfd= 820 Pfd</p>
	nc	<p>90 Schafe à 98 Pfd= 980 Pfd/Schäfer</p> <p>11 Schafe à 98 Pfd= 1078 Pfd</p>	<p>99 Schafe à 80 Pfd= 880 Pfd/Schäfer</p> <p>11 Schafe à 80 Pfd= 880 Pfd</p>

1) Institutional Emergence (3): ‘Games That “Play People”’ – The Example of the “Tragedy of the Commons”, Cont’d.

(**2-lbs-**“Technology”, 2 Shphrds à 10 Shp à 100 lbs, ‘*small*’ group: 2, no PD!)

	1,000 lbs	11 sheep à 98 lbs = 1,078 lbs
1,000 lbs		10 sheep à 98 lbs = 980 lbs
	980 lbs	11 sheep à 96 lbs = 1,056 lbs
1,078 lbs		11 sheep à 96 lbs = 1,056 lbs

- ***no PD*** so far, the common resource is **not ‘rivalrous’ yet**
- depends on the “**technology**”, i.e. the “production function” of the common-pool resource ...

3) Institutional Emergence (3): ‘Games That “Play People”’ – The Example of the “Tragedy of the Commons”, Cont’d.

(**5-lbs-**“Technology”, 2 Shepherds à 10 Sheep à 100 lbs, **‘small’ group: 2, PD!**)

		Shepherd II	
		c	nc
Shepherd I Schäfer I	c	<p>10 Schafe à 100 Pfd. = 1000 Pfd. (3)</p>	<p>11 Schafe à 95 Pfd. = 1045 Pfd. (4)</p>
	nc	<p>10 Schafe à 95 Pfd. = 950 Pfd. (1)</p>	<p>11 Schafe à 90 Pfd. = 990 Pfd. (2)</p>

3) Institutional Emergence (3): ‘Games That “Play People”’ – The Example of the “Tragedy of the Commons”, Cont’d.

- conditions: the *“technological” conditions* of the *ecology* (the capacity of the commons, or its *“production function”*) determines at how many sheep (or shepherds defecting) the *collective good* becomes *“rivalrous”*, i.e. a competitive interaction generates a *social dilemma* (a prisoners’ dilemma)
- e.g., *10-lbs-technology* yields: 11sheep x 90lbs = 990lbs, *no PD!*
- suggestion for definitions:
 - “externalities”* = *redistribution* + *“social costs”*
 - example for one free rider, one “sucker”:
 $50 \text{ ext.} = 45 \text{ redistrib.} + 5 \text{ sc.}$
- the wider ecological perspective with *global commons*: complex externalizations, redistributions, and *social costs on a global spatial scale and on a long-run inter-generational time scale.*

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Evolutionary-Institutional Economics

Part IV:

“Institutional Emergence”

as ‘Meso’-Economics.

The Process and a Simple Logic of “Meso” Economics

1) The Question

- What is the *locus, level, or size* dimension of *institutional* production and reproduction, 'culture' *generation* and *regeneration*?
- Are *basic informal* social rules generated and retained at the *micro* or conventional '*macro*' (or *nation-state*) levels?
- Have evolutionist and institutionalist socio-economists always presumed some *medium-sized 'platforms'* of cultural emergence, such as any *sub-populations*, social groups and milieus, regions, communities, industries, agglomerations, clusters, networks, professional groups, etc.?
- → This paper is an exploration in the *process, logic* and *explaining factors* of structural emergence and 'meso' size.

2) Approaches to ,Meso' so far (1)

- K. Dopfer, J. Foster, J. Potts, 'Micro – meso – macro', JEE 2004, Dopfer/Potts (2007), etc.:
 - origination, adoption/diffusion, and retention of an institution is predominantly a 'meso' phenomenon;
 - a 'generic' rule plus a population of its actualizations in a 'carrier group' = *meso unit*;
 - origination, adoption/diffusion, and retention of a meso unit is a *meso trajectory*;
 - the source and first user of the generic rule is the inventing entrepreneur;
 - 'our approach is *ontological*' (DFP).
- But: *Why* and *how* 'meso'? What is the problem solved by a meso unit? And how is it solved?

2) Approaches to ,Meso' so far (2)

- T.C. Schelling, Micromotives and Macrobehavior, 1978:
(1) attendance problem, (2) segregation (clustering) model:
emerging consistent *mutual expectations* and interdependent
behaviors → an *implicit group size* problem, minimal and
maximal *critical masses*.
- W.B. Arthur, (on The El Farol Problem), AER 1994:
attendance problem, emerging consistent mutual
expectations and behaviors → an implicit group size problem.
- R. Axelrod, 'Effective Choice in the PD', J of Conflict Resolution
(1980), The Evol of Cooperation (1984/2006):
(1) deterministic *single-shot* condition for PD supergame;
(2) stochastic *evolutionary stability* of institutionalized
cooperation: minimal *critical masses*; (3) spatial *segregation*
dynamic: maximal *critical masses*; (4) role of *expectations* to
'meet again': *discount factor* δ indicative of *group size*.

4) This Approach to ,Meso‘

- Perspective of *institutional emergence* (origination and diffusion)
- building on and exploring the *single-shot* logic of a *social-dilemma* type supergame problem, its relevance and properties
- exploring the roles of *past experience*, *future expectations*, *interests/incentives*, and also of individual creativity/agency
- ‘instrumental’ perspective: individual and collective *problem-solving*
- exploring the *deterministic* and the *stochastic* perspectives
- building an *evolutionary ‘process story’* (Dosi/Winter) that integrates that logic
- exploring *minimal critical masses*, the *maximum critical mass*, and the ‘*relevant cooperating group*’ being below the size of the whole population
- making use of Axelrod’s formalisms and Schelling’s graphical representations.

5) The Coordination Problem, Institutional Emergence, a Formal Solution, and a Process Story (1)

- **the complex structure**: direct interdependence and a coordination and social dilemma problem structure, generate complexity and strong uncertainty
- **'fallacy of aggregation'**: '*unintended consequences*' inverted
- **the evolutionary process**: recurrence, sequentiality, interaction, cumulativity, learning, institutionalization of coordination.
- **Relevance**: the dilemma approach in every-day decision-making
- **'surface' structures**: institutionalizations, either problem-solving or ceremonial, locked in or mutual blockages/non-action/non-innovation, perceived or not.
- **The pros and cons**: of an evolutionary interpretation of a game: simplistic or complex, reflexive behavior, networked individuals.

5) The Coordination Problem, Institutional Emergence, a Formal Solution, and a Process Story (2)

a, a d, b

b, d c, c

with $b > a > c > d$, and $a > (d + b)/2$.

$$P_{C/C} = P_{TFT/TFT} = a + \delta a + \delta^2 a + \dots$$

$$= \frac{a}{1 - \delta}$$

$$P_{ALL D/TFT} = b + \delta c + \delta^2 c + \dots$$

$$= \frac{c}{1 - \delta} + b - c.$$

$$P_{TFT/TFT} > P_{ALL D/TFT}.$$

$$\underline{\delta > (b - a) / (b - c)}, \text{ the 'single-shot' solution.} \quad (1)$$

5) The Coordination Problem, Institutional Emergence, a Formal Solution, and a Process Story (3)

Explaining factors and their evolutionary embedding:

- *incentive structure* and the common future, the probability to 'meet again', i.e. the discount factor, indicating group size → the static deterministic *logical condition* for emerging institutions
- *cooperation* emerges as a *coordinating institution* including a *sanction* mechanism, requiring a sacrifice
- a process of *habituation*, cannot be short-run rational, but 'semi-conscious', a *different rationality*, possibly *motivated/supported* by a '*favorable*' *logical condition* [inequality (1)]
- possibly also *motivated* from *repeated frustration*, *search for improvement*, *experimentation*, instinct of workmanship, idle curiosity, ...random *diversification of behavior*, probabilistic app.

5) The Coordination Problem, Institutional Emergence, a Formal Solution, and a Process Story (4)

- imagination, creativity, intentionality, reflexivity, innovation, *agency* ... required
- *cumulative* interaction, path dependence in different directions ...
- 'attractor' points ... including *destabilizing* incentives to defect while the institution emerges
- *risk taking* and *not being too envious* ... (s. traveler's dilemma, K. Basu 1994/2007)
- *agency* assumption: co-determining *group size* through *active partner selection* (maximum number of partners), establishing a 'neighborhood', a segregation...
- → *group size* becomes *cause and effect*, δ a variable, a *co-evolutionary* three-sided interrelation of *group constitution* (size determination), *incentive structure* and *institutional emergence*.

5) The Coordination Problem, Institutional Emergence, a Formal Solution, and a Process Story (5)

Figure 1: A Simple Logic of the Co-Evolution of the Problem Structure, the Efforts of Agents for Problem-Solving, and Group Size.

