

Erling Berge: Social dilemmas Fieldwork and experiments

Land Tenure and Social Capital in
Malawi

Trondheim, May 2007

Literature

- Camerer, Colin F. 2003 Behavioural Game Theory. Experiments in strategic interaction, New York: Sage
- Gintis, Herbert 2000 Game Theory Evolving. A Problem-Centered Introduction to Modeling Strategic Interaction, Princeton: Princeton University Press
- Landa, Manuel de 1997 A thousand years of non-linear history, New York: Zone Books/ MIT Press

Big monkey and Little monkey

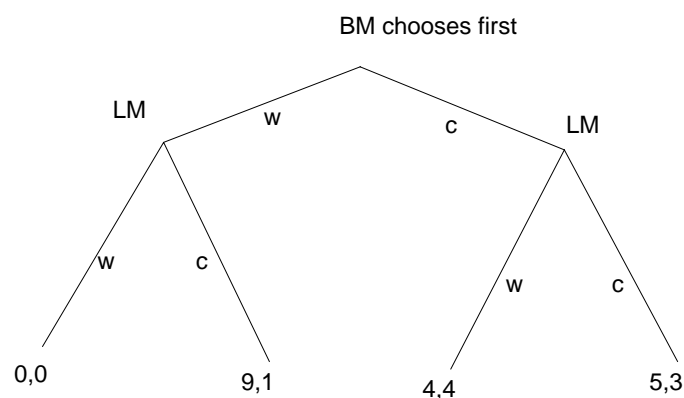
- Warifruit from waritree give 10Kc
- Costs
 - Big M needs 2Kc to harvest
 - Little M needs almost nothing
- Payoffs
 - Both climb: BM gets 7 LM gets 3
 - BM climbs LM waits: BM gets 6 LM gets 4
 - LM climbs BM waits: BM gets 9 LM gets 1
 - Boh waits: both get 0
- What is the optimal strategy?

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Game in extensive form



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Nash equilibrium

- The Nash Equilibrium of a game is the set consisting of those strategies defined by each person choosing his/ her best strategy given that all other players choose their best strategy

Strategies of BM and LM

- Strategies: a series of actions that fully define the behaviour of a player
- If BM moves first
 - BM: strategies
 - c=climb
 - w=wait
 - LM: strategies
 - cc= clim if BM climbs first
 - ww= wait if BM waits
 - cw= wait if BM climbs
 - wc= climb if BM waits

Game in normal form

Big Monkey chooses first

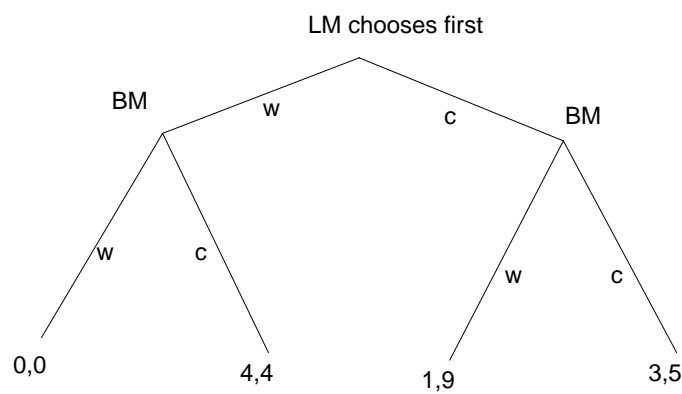
		Little Monkey			
		cc	cw	wc	ww
Big Monkey chooses first	W	9,1	9,1	0,0	0,0
	C	5,3	4,4	5,3	4,4

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Order of decision (extensive form)



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Order of decision (game in normal form)

Big Monkey

	cc	cw	wc	ww
W	4,4	4,4	0,0	0,0
C	3,5	1,9	3,5	1,9

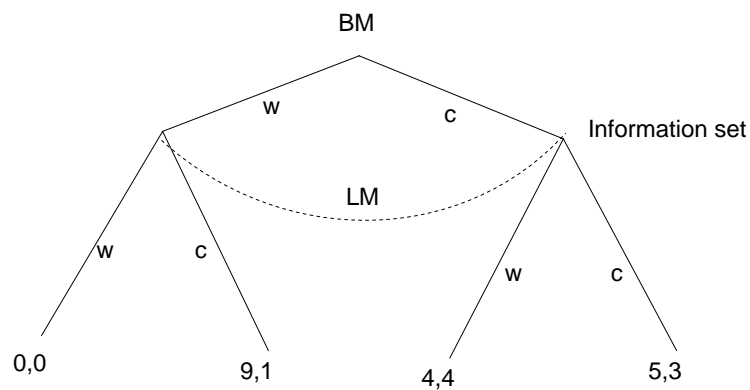
Little Monkey chooses first

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Simultaneous decision (extensive form)



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Simultaneous decision (normal form)

Nash equilibria

W,C

C,W

Mixed strategy?

Little Monkey

Big
Monkey

	C	W
C	5,3	4,4
W	9,1	0,0

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A public good experiment

- 10 students
- Each gets USD1
- Each deposits between USD0 and USD1 anonymously in a public account,
- Whatever is not deposited is theirs
- Whatever is in the public account is multiplied by 5 and divided equally
- What is the extensive form and normal form?

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Designing experiments (1)

- Variables:
 - Control: can the value of the variable be manipulated?
 - Measure: can the value of the variable be determined
 - Assumption: can the the variable be assumed to have some fixed value
- Instructions: what do subjects need to know?
 - Public knowledge
 - Explaining how payoffs depend on decision sequences?
 - Framing the play: what to tell about the environment

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Designing experiments (2)

- Anonymity
 - Knowing the identity of a direct partner in the play may confound players internal preferences with ideosyncratic characteristics
 - In larger groups it is difficult to identify exactly whom one is interacting with
- Matching protocols and reputation building
 - If reputation building is not a variable we want to study then we should use protocols of
 - No-repeat matching or stronger no-contaigion matching
 - Random rematching
 - Mean-matching where all play all and get the mean of all payoffs

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Designing experiments (3)

- Incentives
 - Real money or point scores? (assume that people like more money and will not tire of getting more)
 - Size of money reward has a rather small impact on behaviour
- Order effects: the order of treatments may induce learning effects
- Risk taste: personalities affect propensity take risks. Best advice is to measure risk taste independently of the experiment

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Designing experiments (4)

- Within subjects design vs between subjects design: within subjects designs are seldom used in economics
- Experimentics: use of econometric tools such as optimal endogenous experimental design (prior hypotheses, computation of information value of different parameters, leading to choice of optimal information parameters)

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Running the game:

- Literacy and numeracy cannot be assumed
 - Read instructions
 - Run through examples
 - Avoid abstract reasoning
- Assigning roles may bias assumptions
 - Do people believe in luck and random events?
- Attributes of participants
 - Are experimenters and games scripts credible?
 - How to recruit participants? Non-randomness and non-representativeness is a constant worry. Record separately basic demographic and family/ lineage characteristics, including relationships
- Possibility for framing effects must be looked into
- Impact of "cross-talk" if several experiments are conducted on the same site over time

Next section

- Takes a look at dynamic non-linear processes shaping social development, some models are formalised by game theory and rely on various assumptions about human behaviour

Designing institutions: models of genesis

- Problem: genesis of form from immanent causes.
- Self-organising processes.
 - Such as attractors
- From here to there: the adjacently possible
- Norms, languages, rules and bureaucracies

Evolutionary dynamics Herbert Gintis (2000:188-219) Ch 9

Some preliminaries from biology

- Strategies are held by species, not individuals
- By analogy cultures have strategies not individuals
- Instead of a Nash equilibrium, Meynard Smith uses the concept of an evolutionary stable strategy. A strategy is evolutionary stable if a population which is using it, cannot be invaded by a small group with a mutant genotype.
- A body of law may be seen as evolutionary stable, if no group of players have to power to change the body of law for their own benefit.

On history and evolution

- Meynard Smith introduces repeated random pairings of agents with particular strategies inherited from their genome. The history of the play does not matter in these biology games.
- But in culture history will matter.

The replicator dynamic

- A replicator is an entity capable of making approximate copies of itself. A replicator can be a gene, an organism, a strategy in a game, a belief, a technique, a convention, or a more general institutional form.
- A replicator system is a set of replicators in a particular environmental setting with a structured pattern of interaction among agents.

Evolutionary dynamic

- An evolutionary dynamic of a replicator system is a process of change over time in the frequency distribution of replicators (and in the nature of the environment and the structure of interaction), in which strategies with higher payoff reproduce faster in some appropriate sense.

Evolution of human societies

- When payoffs represent individual reproductive fitness, the replicator equation is a natural first cut at modelling evolutionary dynamics.
- But when payoffs are less directly related to reproductive fitness, as is usually the case in human cultural evolution, the replicator dynamic is rarely a plausible model of behavioural change.

Human behaviour

- In many decision making and strategic settings people do not behave like the self-interested “rational” actor depicted in neo-classical economics and classical game theory
- But human behaviour can be modelled using game theory and optimisation subject to constraints
- There are plausible models of human cultural and genetic evolution that explain how we have gotten to be the way we are.
- Our models, however, can be improved considerably

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Different rationality models

- Homo Economicus
- Homo Equalis
 - Inequality aversion
- Homo Reciprocans
 - Strong reciprocity: propensity to cooperate and share with others similarly disposed even at personal cost, and a willingness to punish those who violate cooperative and other social norms
- Homo Parochius
 - Discrimination between insiders vs. outsiders at a personal cost

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Non-Linear History? Manuel de Landa 1997

Looking for generative macro-models

- In the dynamic of urban societies
 - Hierarchies and meshworks
- In the dynamic of the biosphere
 - Evolution, the probe head, the selector
- In the dynamic of languages
 - Constructing social institutions

Hierarchies and meshworks

- Urban development
 - Self-grown by decentralized decision making
 - Planned by centralized decision making
- Bureaucracy vs market
 - Markets imply bureaucracies (property rights)
 - Bureaucracies imply a political market where a stable sets of contracts are negotiated
- Abstract machines

Hierarchies: the machine diagram

- Sorting process + Consolidation process
- Ex:
 - Geology: rivers as sorting machines and sedimentation as consolidation
 - Biology: genetic accumulation as sorting machine and reproductive isolation as consolidation
 - Society: role differentiation as sorting machine and power institutionalisation as consolidation

Meshworks: Self sustained dynamics

- Self sustaining dynamics
 - Catalyst's lock-in property makes it "mesh" with its key target changing the target's properties to become receptive to a third substance. The product of this reaction may serve as catalyst in another process producing the catalyst for the first.
- Auto-catalytic loops
 - Links a series of mutually stimulating pairs into a structure that reproduces as a whole

Meshworks: Closed loops

- Dynamic self-sustained systems
 - Endogenously generating stable states (attractors, eigenstates)
 - Grow and evolve by drift
 - The chain may be extended as long as new nodes added to the mesh do not jeopardise the internal consistency. The loop becomes more complex.

Meshworks: the machine diagram

Self-consistent aggregate with

- Articulation of super-positions of heterogeneous elements (dissimilar elements “mesh”)
- Intercalary elements as operators for the articulation (catalysts, intensifiers, densifiers, reinforcers, injectors, showerings)
- The interlocked elements must generate internally stable patterns of behaviour

Examples

	Hierarchy	Meshwork
geology	Sandstone	Granite
biology	Gene pool	Ecosystem
society	Social Classes	Markets

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Feedback: negative and positive

- Negative: deviation counteracting
- Positive: deviation amplifying

Affecting

- Heterogeneity
 - Localisation
 - Interweaving

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Evolution - the machine diagram

- Hierarchies and meshwork are found also in species and ecosystems
- The evolutionary dynamic (or the “probe head”) of biological systems is a new machine
 - The variable replicator
 - The selector
- The same machine is also found in memes and genetic algorithms

Cultures and genes interact

- As sorting devices
- As constraints
- Cultural values becoming institutionalised may form a self-selecting dynamic enhancing or counteracting genetic adaptations
- Autonomy of culture may render some elements maladaptive relative to biological constraints

Types of cultural replicators

- Imitation (analogous to memes)
- Enforced repetition (adoption as norms or repetition as rules)
- Vertical flow
 - Parent to offspring
- Horizontal flow
 - One-to-one (person to person)
 - One-to-many (leader to follower)

Languages

- Replicators: sounds (vowels, consonants), semantic labels, syntactic patterns
- They are transmitted to offspring and new members as norms or social obligations
- Group pressures sort the replicators
- Other social processes “cement” them into more or less stable structures

Language: the machine diagram

- Statistical regularities of language use is transformed through standardisation into required constraints on combinations of words
- Requires norm enforcement, that is it requires a self-conscious group, with power over its members
- Douglas on group-grid dynamics generating different world views