Issues in Economic Systems and Institutions: Part II: Social Norms

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Contract Enforcement by Maghribis (Greif 1993)

- Maghribis: a tight-knit community of medieval Jewish merchants.
- Had to employ agents to accompany shipments overseas.
- Agents could cheat: misrepresent prices, embezzle funds.
- Maghribis shared information about misbehaviour of agents—they were not hired by other traders in the network.
- Multilateral punishment strategy: one player punishes on another's behalf.
- Where does the incentive to punish come from?
- What is the economic value of a social network spread across several countries?

A Simple Model

- Infinite periods: $t = 0, 1, 2, ...$
- All players have discount factor $= \delta$.
- M merchants and A agents; $M < A$ (scarcity of merchants).
- If merchant supervises his own ships, payoff $= \kappa$.
- Merchant can hire an agent offering wage W. Payoffs:
  - $(\gamma - W, W)$ if agent acts honestly.
  - $(0, \alpha)$ if agent cheats.
- Agent's reservation wage $= \overline{w}$.
- Exogenous termination probability $= \tau$.

Assumptions

1. Cooperation is efficient:

$$\gamma > \kappa + \overline{w}$$

2. Cheating is tempting but creates deadweight loss:

$$\gamma > \alpha > \overline{w}$$

3. Paying enough to stop cheating outright is too costly:

$$\kappa > \gamma - \alpha$$

Equilibrium

- Merchant strategy: hire only agents who have never cheated (anyone) before at some wage W^*.
- Agent strategy (when record is unblemished): act honestly iff wage is at least W^*.
- Example of **multilateral punishment** strategy (MPS) as opposed to **bilateral punishment** strategy (BPS).
- h_h = probability that an unemployed honest agent is rehired.
- h_c = probability that an unemployed cheater is rehired.
- V_h, V_h^u, V_c^u = lifetime utility of employed honest agent, unemployed honest agent and unemployed cheater.

Efficiency Wage

- Recursive values:

$$V_h = W^* + \delta(1-\tau)V_h + \tau V_h^u$$

$$V_i^u = \delta\left[h_i V_h + (1-h_i)\left(\overline{w} + V_i^u\right)\right]$$

- Can be solved to obtain V_h, V_h^u, V_c^u in terms of primitives.
- Agent's no-cheating (incentive) constraint:

$$V_h \geq \alpha + V_c^u$$

Efficiency Wage

- Partially rewrite:

$$V_h = \frac{W^* + \tau V_h^u}{1 - \delta(1 - \tau)}$$

- Binding incentive constraint defines the lowest wage that will prevent cheating:

$$W^* = [1 - \delta(1 - \tau)] \left(\alpha + V_c^u\right) - \tau V_h^u$$

- In terms of primitives:

$$W^* = W^* \left(., h_c, h_h\right) > \overline{w}$$

Efficiency Wage: Properties

- The agent must be paid a "premium" $W^* - \overline{w}$ to prevent cheating.
- The agent is honest because
  - he fears losing the wage premium $W^* - \overline{w}$.
  - his rehiring prospect dimishes by $(h_h - h_c)$ once he cheats.
- $W^*(., h_c, h_h)$ is decreasing in h_h and increasing in h_c.
- A rogue agent (past cheater) lacks the second reason to be honest. Therefore he needs a higher wage premium.
- Under MPS, merchants will not hire branded cheaters out of **self-interest**, not some desire to offend other members of the community.

Hiring A Cheater is Costly

- Let V_h^c be the lifetime utility of a past cheater who has been hired at wage W_c^* and who chooses to be honest:

$$V_h^c = W_c^* + \delta(1-\tau)V_h^c + \tau V_c^u$$

$$\text{or, } V_h^c = \frac{W_c^* + \tau V_c^u}{1-\delta(1-\tau)}$$

- The incentive constraint is:

$$V_h^c \geq \alpha + V_c^u$$

- Making this bind, we get the efficiency wage for a cheater:

$$W_c^* = W^* = [1-\delta(1-\tau)](\alpha + V_c^u) - \tau V_c^u > W^* \text{ since } V_c^u < V_h^u$$

Social Capital: Value of Information Sharing

- Under MPS

$$h_h = \frac{\tau M}{A-(1-\tau)M}; \quad h_c = 0$$

- Under BPS

$$h_h = h_c = \frac{\tau M}{A-(1-\tau)M}$$

- Therefore, efficiency wage is lower under MPS:

$$W^*_{MPS} < W^*_{BPS}$$

- $\Delta = W^*_{BPS} - W^*_{MPS}$ is the Maghribi's **social capital**.

Endogenous Partnerships (Ghosh-Ray 1996)

- In standard repeated games, players are in **exogenous** long term partnerships.
- **Bilateral punishment** strategies can sustain cooperation.
- In **random matching** games, players play with exogenously changing partners.
- If there are **information flows** within the community (e.g., Maghribi traders), **multilateral punishment** strategies can sustain cooperation.
- In many environments:
  - players endogenously seek new partners or stick with old ones.
  - players only know about personal interactions—information flows are absent.
- Examples: informal credit, small business partnerships, romantic relationships, friendships.

A Simple Model

- The stage game is a prisoners' dilemma:

	Cooperate (C)	Defect (D)
Cooperate (C)	$3, 3$	$0, 4$
Defect (D)	$4, 0$	$1, 1$

- Players are initially randomly matched. Thereafter, they can continue playing each other or unilaterally break up and seek a new partner (exogenous break-up prob $= 0$).
- Two types (private information):
  - myopic or short run players (discount factor 0).
  - non-myopic or long run players (discount factor δ).
- In the pool of unmatched players, a fraction π are non-myopic (new players are born every period).

A Cooperative Equilibrium

- Myopic players have a dominant strategy: always play D.
- Assume non-myopic players
  - start by playing C against strangers
  - continue the partnership and keep playing C as long as the other does
  - seek a new partner if the other plays D
- Let V_S and V_F denote expected lifetime payoff in the "stranger phase" and "friendship phase".

$$\begin{aligned} V_F &= 3 \\ V_S &= \pi V_F + (1-\pi)\delta V_S \Rightarrow V_S = \frac{3\pi}{1-\delta(1-\pi)} \end{aligned}$$

Incentives

- Playing C is optimal in the friendship phase if:

$$3 \geq 4(1-\delta) + \delta V_S$$

- Using the value of V_S:

$$\delta \geq \frac{1}{4(1-\pi)}$$

- Playing C is optimal in the stranger phase if:

$$V_S \geq (1-\delta)(4\pi + 1 - \pi) + \delta V_S$$

- Using the value of V_S:

$$\delta \geq \frac{1}{(1-\pi)(1+3\pi)}$$

Condition for Existence

- Since $4 > 1 + 3\pi$, the second constraint is tighter. A cooperative equilibrium exists iff:

$$\delta \geq \frac{1}{(1-\pi)(1+3\pi)}$$

- For a given fraction of patient agents (π), higher patience (δ) helps cooperation.
- For a given degree of patience (δ), cooperation is possible if π is neither too high nor too low: $\pi_1 \leq \pi \leq \pi_2$ where

$$\pi_1 = \frac{1}{3}\left[1 - \sqrt{\frac{4\delta - 3}{\delta}}\right]$$

$$\pi_2 = \frac{1}{3}\left[1 + \sqrt{\frac{4\delta - 3}{\delta}}\right]$$

Intuition

- When "good guys" are scarce (π is low), players do not want to initiate cooperation with strangers because it is too risky.
- When "good guys" are abundant (π is high), players are tempted to cheat because termination is not costly enough.
- The existence of cheaters helps patient players cooperate!
- The model has two kinds of incomplete information:
  - lack of information about new partner's past behaviour
  - lack of information about new partner's trustworthiness (discount factor)
- The second kind of ignorance helps mitigate the first.
- The general model: continuous actions. Shows "rising cooperation" as players "get to know each other better".