Slide 1

lecture 13: Evidence on Reputations Effects

14.771, Fall 02

Slide 2

Can Collective Punishment be Sustained?

- Tirole's model: People are punished when they cheat, because in equilibrium cheating carries information about the individual's type.
- Can collective punishment of bad behavior be enforced in a pure moral hazard model, where nothing is learnt about the agent's type ?
- Avner Greif: Collective Strategy in the Maghribi merchant coalition "There is nothing in the evidence that justifies what is arguably the most intuitive explanation for collective punishment: that is that merchants perceived an agent who cheated to be of a "bad type" who would keep on cheating in the future if hired.".

Slide 3

Historical context

- Maghribi: 11th-century Jewish traders operating along the Mediterranean coast (mostly North Africa).
- A pile of their documents were kept in a geniza in synagogue in Fustat.
- They were shipping goods from one place to another
- They operated through *agents*: for a fee, the agents:
  - load and unload the ship
  - take care of the goods
  - decide when and under what conditions to sell them
- Working through an agent provides many benefits:
  - can work in many locations → diversification
  - can avoid the risk and cost of travel
- However, there is a fundamental commitment problem → Need for an institution which helps people *commit* ex ante to be honest ex post

Slide 4

Institutions

- No legal contracts.
- Contracts were very lengthy affairs (a letter indicates that 50 years after Nahum-al-Hazan was cheated by Hillel ben Isaac, his grandchildren were still fighting the case in court!).
- Difficulty in obtaining information reliably: reports could reach merchants several months after they had been sent → too late to verify all the claims!

However, fellow traders were exchanging information → if someone had cheated a merchant, it would be known by the entire community. This formed the basis of the institution developed by the Maghribi traders.

Slide 5

Model

- M merchant
- A agents
- discount factor β (a unit of utility tomorrow is worth $\beta < 1$ today)
- A merchant who decides to hire nobody earns $\kappa > 0$
- utility of an unemployed agent: $\overline{w} \geq 0$
- An employed merchant can decide whether to cheat or be honest. Payoffs:

	Merchant	Agent
Agent cheats	0	α
Agent is honest	γ - w	w

- The merchant can then decide whether to terminate the relationship or not.
- There is a chance of exogenous separation (ex. merchant dies, or changes region), τ in each period.

Slide 6

Assumptions

① Cooperation is efficient: $\gamma > \kappa + \overline{w}$

② Agent prefers to cheat them rather than getting its reservation utility: $\alpha > \overline{w}$

③ Cheating entails loss of welfare: $\gamma > \alpha$

④ A merchant prefers being by himself rather than being cheated: $\kappa > 0$

⑤ A merchant prefers being by himself rather than paying a wage α: $\kappa > \gamma - \alpha$

Slide 7

Efficiency wage

w^* must ensure that the agent is honest today.

- The agent compares the utility of being employed today and being honest.
- If honest today, get w^* today, and tomorrow V_h again or the utility of unemployment (V_u^h)

$$V_h = w^* + \beta(1-\tau)V_h + \beta\tau V_u^h$$

- If dishonest get$V_c = \alpha + \beta V_c^u$
- V_h^u is the utility of an honest unemployed, V_c^u is the utility of a cheater unemployed.
- $V_i^u = \overline{w} + \beta[h_i V_h + (1-h_i)V_i^u]$
- w^* must be such that $V_h > V_c$
- w^* is a function of h^h (-) , h^c (+) β (-), $\overline{w}$ (+), α (+),τ (+)

Slide 8

Maghribis: Multilateral punishment strategy

- Strategy:
  - Pay a wage w^*
  - If the merchant is honest, reemploy him (unless the forced separation occurs)
  - If he cheats, do not reemploy him.
  - Never employ a merchant who has cheated anybody.
  - Never fire an honest agent.
- What is the condition for the merchant to participate?

$$w^* < \gamma - \kappa$$

- Compare individual vs collective strategies:
- How does the collective strategy effect:h_c, h_h, w^*?
  $\rightarrow$ it makes cooperation more likely in a collective punishment than in an individual punishment

Slide 9

Why is the strategy self-enforcing?

- ➜ Would a merchant want to employ an agent who has cheated once? Nobody else does.
  wage honest: $w^*(h_h, 0, \beta, \overline{w}, \alpha, \tau)$
  wage cheater: $w^*(?, 0, \beta, \overline{w}, \alpha, \tau)$
  - ➜ What is h_h for a cheater?
  - ➜ Who gets the higher wage?
  - ➜ Will the merchant want to hire a cheater?
- ➜ Would a merchant want to employ a non-network member?
  wage network member: $w^*(h_h^N, 0, \beta, \overline{w}, \alpha, \tau)$
  wage outsider: $w^*(h_h^o, h_c^o, \beta, \overline{w}, \alpha, \tau)$
  - ➜ $h_c^o > 0$ why?
  - ➜ $h_h^o < h_h^N$ why?

  $\rightarrow$ Who gets the higher wage?
- ➜ Would the merchant ever want to call someone a cheater if he has not cheated? $\rightarrow$ The strategy was self reinforcing.

Slide 10

Evidence from the Maghribi

- ➜ "Cultural belief": rational expectation of the strategy that the other players will adopt. Based on history, that were different in both communities:
- ➜ Maghribi: Jews ("All Israel is responsible for its members"), of muslim customs ("umma"), immigrants.
- ➜ Maghribi traders traded only with Maghribi traders.
- ➜ They collectively punished cheaters .
- ➜ Cheaters were rare (only 5% of the contracts mention a suspicion of cheating).
  $\rightarrow$ This enabled trade.
- ➜ The "merchant law" was a code of conduct which helped to determine whether an agent had cheated or not.
- ➜ Not the only possible equilibrium: cf Genoa. Genoa: Christians, rapid growth in their numbers (hence, less integrated): no evidence of collective strategies

Slide 11

Evidence from Marwaris cloth merchants in Calcutta

Marwaris: Business community originally from Rajasthan, established throughout India, and in particular in Calcutta.

Marwaris cloth merchants the main source of credit for the entire domestic garment industry in Calcutta.

Credit is purely informal, entirely in the form of trade credit (93% of the transaction volume is done on credit, interest rate vary between 0% and 20%, average range of "normal" repayment period is 47 to 60 days).

Transaction are never secured by any formal contracts.

Merchants are trading in very small shops in several storied buidings (haats) on the north of Calcutta, they know each other and are from the same communities. (2 sub-communities: agarwal and oswald).

Slide 12

Collective Strategies?

We conducted a survey of 150 cloth merchants in the summer and fall 2001. We chose a few haats and seek to interview every active cloth merchants in these haats.

We asked merchants about their business in general (how woud they describe their system, their experience, their background, their relationships with other merchants) and then to tell us more about the last 2 clients they met today.

Merchants are willing to share the information "if a client has defaulted, do you inform other merchants on the market?"
-12% say yes, always
-45% say some times but not always
-41% say "if asked"?
-1% say "never".

Slide 13

... But it is not used systematically "when another merchant inform you that a cient has defaulted, are you still willing to extend credit to this client?":
-45% say "never"
-48% say "yes, if they have a good relation with the client"
-8% say "normally yes".

In 53% of the cases, merchants are not aware of the record of a particular client.

Slide 14

Individual reputation

Fixed effect regressions, comparing clients of the

Merchants are more likely to impose a credit limit on a client if:

- ➜ He has been late once in the past
- ➜ He has been in a relationship for a shorter period of time
- ➜ He is not from the same community

Individual strategy. However: Default are frequent (merchant report 20% of the loan amount is never recovered!), merchant continue to deal with clients who have been late, or even have defaulted, even though those who have been late in the past are more likely to be late today as well.

Collective strategy not really in place even though the social fabric is here and the individual strategy does not work very well: pressure of the competition!

Slide 15

Reputation and Contractual Outcome: Software Industry in India

- ➜ Question: Does reputation influence contractual outcomes ?
- ➜ Setting: Indian Customized software industry.
- ➜ Contracts play a vital role: Production process takes time, relationship specific investments are important.

  item However: Contracts have a limited power of protection:
  - ➜ End product is difficult to describe ex-ante.
  - ➜ Overrun are frequent, and court cannot adjudicate between claims.

Slide 16

- ➜ Contracts which target the source of the overrun cannot be enforced.
  → Contracts are specified in terms of total overrun: Fixed cost, Time and materials.
- ➜ Reputation plays a role because of this limitation in the contracts.
- ➜ Client and Firms both know who is responsible for the overrun.
- ➜ We model reputation for *reliability*: reliable agents pay for the overrun they generate.
- ➜ Contracts protect client (firm) against unreliable firms (clients).
- ➜ Only one side can be protected.
- ➜ The probability that each party is reliable determines which side gets protected.

Slide 17

REPUTATION

- Reliability: Reliable firms or clients pay for overrun generated by them if the other person has behaved reliably. Otherwise they maximize current profits.
- Unreliable firms and clients maximize current profits.
- Reliability is unobserved: when F and C are matched, C puts a probability θ_F on the firm's reliability.
- Leaves out opportunists (Tirole (1996)) who mimic reliability for strategic reasons. Can be modelled: positive probability of being found out when someone behaves unreliably. This leads to a reputational equilibrium like the one we model here.

Slide 18

PREDICTIONS

- Focus on contract that maximize the joint welfare of reliable types.
- Contract is a fixed-price contract when most clients are reliable while firms are more likely to be opportunists, and a time and material contract in the reverse situation.
- If two firms are matched with clients who have the same reputation, the firm with the higher reputation bears less of the overrun.
- Total overrun declines with the reputation of the firm.

Slide 19

REPUTATION FORMATION

- Age
  Unreliabe firms are driven out of the market.
- ISO 9001 Certification
  Certify the process: less room for opportunism
- Past client
  Both client and firm have positive private information about the other.
- Internal vs external contracts

Slide 20

DESCRIPTIVE EVIDENCE: PROJECTS, ESTIMATES, OVERRUN

- **Project:** a piece of software, the functions are described in the RFP.
- **Estimate:** The firm's best guess about how many man hours will be needed to complete the project, based on
  - The description given by the client.
  - The productivity parameters of the firm.
  - Estimate is not an unbiased estimate of project cost.
  - Is the estimate strategically manipulated?
- **Overrun:**
  - Actual effort minus estimate
  - Overruns are frequent, large, variable
  - Due to the firm or the client.

Slide 21

DESCRIPTIVE EVIDENCE: CONTRACTS

- ➜ Types of contracts: FC, TM,TM/FC.
- ➜ Contracts are renegotiated, but they matter.
- ➜ The party responsible for the overrun pays more of it.

Slide 22

DESCRIPTIVE EVIDENCE– REPUTATION

- ➜ Young: more FC, firm's share is higher
- ➜ ISO: no difference
- ➜ New client: more FC (not significant), firm's share is higher
- ➜ External: more FC, firm's share is higher.

Slide 23

CONCLUSION

Reputation effect matters!! This may contribute to limit the growth of the software industry.

More generally, this bring us back to the point on how developing countries can propose high quality goods to the world market.

The industry itself has an interest in establishing a "reputation bureau" to facilitate reputation