

# Microeconomic Analyses of Old Indian Texts

Pareto optimality, general equilibrium theory, and asymmetric information

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## Part B. Game theory

- Chapter VI:  
Noncooperative games
- Chapter VII:  
Backward induction
- Chapter VIII:  
Ordeals
- Chapter IX:  
Judicial wagers
- **Chapter X:  
Indian Principal-Agent Theory**
- Chapter XI:  
The mandala theory

# Chapter XI: Indian Principal-Agent Theory

- 1 Mistrust in fable collections
- 2 Mistrust in the Arthaśāstra
- 3 Social gods
- 4 Asymmetric information
  - Hidden action versus adverse selection
  - Outwitting problem versus gains-from-trade problem
- 5 The Varuṇa clause

# Mistrust in fable collections

A wicked person's way of thinking

Hitopadeśa:

*If you have to cross an impassable ocean, you have a boat;  
when darkness comes, you have a lamp;  
if there is no breeze, you have a fan;  
and if you have to calm maddened rut-blinded elephants,  
you have a goad (Treibstock, HW).*

*Thus there is no problem in the world for which the Creator  
has not carefully invented some solution.*

*But when it comes to countering a wicked person's way of  
thinking,*

*it seems to me that even the Creator has failed in his efforts.*

# Mistrust in fable collections

## Money incentives I

Hitopadeśa:

*“Wherever the king is, there too must the treasury be; there is no kingship without the treasury. And the king should give some of it to his servants. For who would not fight for a generous patron?”*

*For,*

*A man is never a servant to another man, he is a servant to money, O king. Whether you are considered important or not also depends on money or lack of it.”*

*“The servants of someone greedy will not fight, for he never shares the profit. And he who has greedy servants will be killed by them once they are bought by the enemy’s gifts.”*

# Mistrust in fable collections

## Money incentives II

Panca-tantra:

*'He is my friend!'—is that any reason to trust a scoundrel?*

*'I have done him a great many favors!'—that counts for nothing!*

*'This man is my very own relative!'—that's an old folk tale!*

*People are driven by money alone, no matter how small.*

# Mistrust in fable collections

## Selecting good servants

Hitopadeśa (with respect to employing the servant Best-Hero):

*Your Majesty, employ him at this salary [an unusually high one, HW] for four days to ascertain his nature and whether he deserves the payment or not.*

*A brahmin, a warrior or a relative should never be appointed as treasurer. A brahmin would not be able to keep even the money that has already been obtained, however hard he tries. If a warrior were entrusted with money, he would surely wave his sword at you; and a relative would seize all your possessions on the grounds that they belong to the family.*

# Mistrust in the Arthaśāstra

## Sons

*The king can protect the kingdom only when he is protected from those close to him and from enemies, but first of all from his wives and sons. ...*

*One who has a keen intellect, one whose intellect needs to be prodded [anspornen, HW], and one who has an evil intellect: These are the three varieties of sons. The one with a keen intellect, when he is being taught, understands and follows Law and Success [as a translation of dharmārthau, i.e., dharma and artha, HW]. The one whose intellect needs to be prodded understands but does not follow. The one with an evil intellect constantly pursues evil and detests Law and Success.*



# Mistrust in the Arthaśāstra

## Hostages I

*Peace, pact, and hostage [Geisel, HW]; these have the same meaning, given that peace, pact, and hostage all create confidence in kings.*

*“Truth or oath constitutes an unstable pact. A surety [Bürgschaft, HW] or a hostage constitutes a stable pact,” so state the teachers. “No,” says Kauṭilya. “Truth or oath constitutes a stable pact here and in the hereafter, while a surety or a hostage, depending on strength, is of use only here.”*

# Mistrust in the Arthaśāstra

## Hostages II

*The taking of a kinsman or a chief constitutes a hostage. In this event, the one who gives a traitorous minister or a traitorous offspring is the one who outwits.*

...

*In giving an offspring as a hostage, however, as between a daughter and a son, the man who gives a daughter is the one who outwits; for a daughter is not a heir, is intended only for others, and cannot be tortured. A son has the opposite characteristics.*

*Even between two sons, the man who gives a son who is legitimate, intelligent, brave, skilled in the use of arms, or a single son is the one who is outwitted.*

# Social gods

Ṛgveda: 33 gods, 11 in heaven, earth, and water, respectively.

One of the most renowned indologist of the previous century was Paul Thieme (1905-2001). He is especially well-known for his work on (what might be called) social gods, i.e., gods that stand for social values.

Thus, while the animal fables and the Arthaśāstra stress and even value “craft and deception”, other parts of the Indian literature seem to be more modern in focusing on the advantages of telling the truth and of keeping contracts.

# Social gods

Mitra and Varuṇa I

In classical Sanskrit, *mitram* is a neuter (!) noun meaning friend.

Thieme: *mitram* = “contract” → “friendship” → “friend”

- Ṛgveda: Contract, when named, makes peoples array (arrange) themselves [with regard to each other] (=‘causes them to make mutual arrangements’)
- Ṛgveda: [Fire,] who causes people to make mutual arrangements like Contract.

Thieme: God Varuṇa = True Speech

# Social gods

Mitra and Varuṇa II

- Ṛgveda: You two (Mitra and Varuṇa, i.e., Contract and True-Speech) are of firm peace through vow (= you secure peace by seeing to it that vows are kept), you cause people to make mutual agreements through firmness (= you make contractual agreements desirable as establishing firm relations)
- Ṛgveda: You two, king Contract and king True-Speech, made firm earth and heaven by your greatness. Cause plants to grow, cause cows to swell [with milk], send down rain, you of live wetness!

Thieme: “The original motivation for their creating prosperity is, of course, that Contract and True-Speech secure peace.”  
(Contracts allow mutual gains from trade.)

# Social gods

## Mitra and Varuṇa III

- Ṛgveda: [Thou, o Indra, art] a miraculous crusher of those without contracts (who do not know or keep contracts)
- Ṛgveda: May we be without guilt against Contract and True-Speech, so that well-being prevail.
- Ṛgveda: These two (Contract and True-Speech) have many slings (in which to catch a cunning transgressor), they are fetterers of untruth, difficult for the deceitful mortal to circumvent. (Thieme, p. 52)

# Social gods

## Aryaman

Thieme:

- Classical Sanskrit: arí = enemy
- Ṛgveda: arí = “guest” (sometimes)
- “stranger” as the original underlying meaning of both enemy and, in RV, guest.

Aryaman = personified and deified hospitality = god

- who rewards the host
- protects the guest
- punishes those who act disgracefully (against guests) and
- watches over truth.

Finally, ār(i)ya (in English: aryan) was the term used by the Old Indians to describe themselves as people who are being hospitable to strangers.

# Asymmetric information

## Introduction

Microeconomic theory:

- Trust and truth are dealt with under the heading of “asymmetric information” .  
One agent knows something, the other does not.
- Contracts or agreements (are usually concluded) if they make all agents better off. Cheating may prevent these contracts.

Thus, cheating is seen as a threat to mutually beneficial contracts and to efficiency.



# Asymmetric information

## Adverse selection I

### Examples:

- the ability of a worker is known to the worker (agent) but not to the firm (principal) who considers to hire the worker
- the car driver (agent) is better informed than the insurance company (principal) about the driver's accident-proneness, and, finally,
- the owner of a used car for sale (agent) may have a very good idea about the quality of that car while the potential buyer (principal) has not (somewhat similar to the bad and good hostages in Kauṭilya).

# Asymmetric information

## Adverse selection II

Problem:

- for a given wage,
- a given insurance premium, or
- a given price for a used car,

it is

- the badly qualified workers,
- the high-risk insurees and
- the owners of bad cars

that are more eager to enter into a contract than the opposite types of agents.

# Asymmetric information

## Adverse selection III

- At first sight, the informational asymmetry is a problem for the badly informed party, the principal.
- However, the principal's problem immediately turns into a problem for the agent.
- It is the agent who needs to convince the principal that he is of a "good type".

# Asymmetric information

## Hidden action

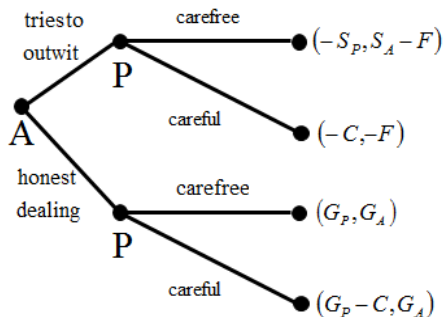
### Examples:

- the insuree (agent) is careless about the insured object once he has obtained the insurance from the insurance company (principal).
- workers (or managers) do not exert the high effort that the managers (or the owners) expect.

Thus, the asymmetry of information (has the worker exerted sufficient effort?) occurs after the agent has been employed. This constellation is called a principal-agent situation or principal-agent problem.

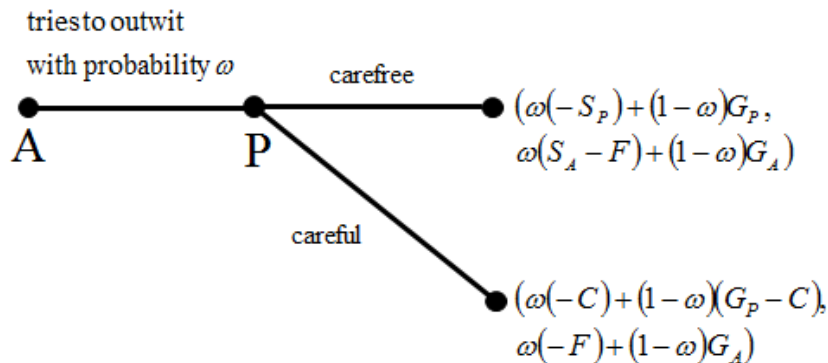
# Outwitting problem, perfect information

- $S$  : “stealing” or “scam” .
- $F$  : agent’s fine (punishment by a God or by bad karma)
- $C$  : principal’s cost of being careful
- $G$  : gains from trade
- $S_A > G_A$  and  $S_P > C$



# Outwitting problem, imperfect information

the principal's decision



Principal is carefree if

$$\omega \leq \frac{C}{S_P}$$

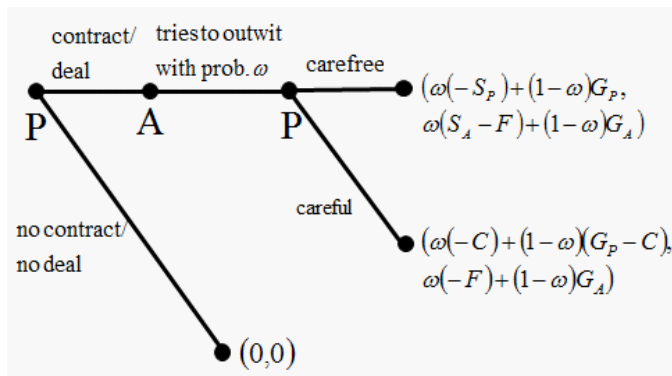
# Outwitting problem, imperfect information

## the agent's decision

- Agent should not choose an outwitting probability that makes the principal careful.
- Small fine  $F < S_A - G_A$ , i.e.,  $S_A - F > G_A$  :  
Agent chooses  $\hat{\omega} = \frac{C}{S_P}$ .
- Large fine  $F > S_A - G_A$ , i.e.,  $S_A - F < G_A$  :  
Agent chooses  $\hat{\omega} = 0$ .

# Gains-from-trade problem, imperfect information

the principal's decision





# Gains-from-trade problem, imperfect information

## the principal's decision

- Small fine and  $\hat{\omega} = \frac{C}{S_P}$ .  
Contracting with the agent pays if

$$G_P > \frac{1}{\frac{1}{C} - \frac{1}{S_P}}$$

- Large fine and  $\hat{\omega} = 0$ .  
Contracting pays by  $G_P > 0$ .

Thus, no deal if

- fine is small,
- principal's gains from trade is small,
- supervising cost  $C$  are large and the principal's scam payoff  $S_P$  is relatively small (remember  $S_P > C$ ).

# Varuṇa as chastiser of kings I

- Vedic credentials of Varuṇa (see above)
- King is responsible for punishing his subjects. Manu demands:

*The king should administer appropriate Punishment on men who behave improperly. ...*

*If the king fails to administer Punishment tirelessly on those who ought to be punished, the stronger will grill the weak like fish on a spit*

- How about the king's incentives to administer justice in the correct manner? Manu points to Varuṇa as chastiser of kings:

*Varuṇa holds the rod of punishment over kings*

- Regressus ad infinitum?

# Varuṇa as chastiser of kings II

- King is the agent (who has to punish correctly) and Varuṇa stands behind  $F$  in our model.
- The subjects are the agents who trust the king because they trust Varuṇa.
- In terms of our model in section II, the subjects “deal” with the king (the agent) by living in his realm or choosing to settle there. The king (as agent) then may outwit his subjects (the principals) by administering justice in a selfserving manner. Finally, the subjects may employ some cost and scrutinize the king’s handling of justice.

# Varuṇa as chastiser of kings III

- For the “Varuṇa the chastiser” argument to go through, it is not the king’s belief that is relevant. Rather, the subjects need to believe that the king is a believer. Thus, we need second-order beliefs which are more difficult to uphold than first-order ones.
- Belief argument too facile?
- Does it imply that the king, the most powerful agent himself, would somehow need to punish himself? Against this idea, Kane has already opined that “these prescriptions [...] were counsels of perfection and must have been futile. No king would ordinarily fine himself”.

# Varuṇa clause

Manu I

*When others [i.e., not Brahmins, HW] commit these sins [causing loss of caste, HW], however, they deserve to have all their property confiscated, if they did them thoughtlessly, or to be executed , if they did them wilfully.*

*A good king must never take the property of someone guilty of a grievous sin causing loss of caste; if he takes it out of greed, he becomes tainted with the same sin.*

# Varuṇa clause

## Manu II

*He should offer that fine to Varuṇa by casting it into water, or present it to a Brahmin endowed with learning and virtue.*

*Varuṇa is the lord of punishment, for he holds the rod of punishment over kings; and a Brahmin who has mastered the Veda is the lord of the entire world.*

*When a king refrains from taking the fines of evildoers, in that land are born in due course men with long lives; the farmers' crops ripen, each as it was sown; children do not die; and no deformed child is born.*

# Varuṇa clause

water or Brahmins?

- Strictly speaking, “casting into water” and confiscation are contradictory terms.
  - Lat. *fiscus* means treasury and confiscation hence “adjoining the treasury”.
  - Manu forbids confiscation.
  - However, we will understand confiscation as asset forfeiture or asset seizure, irrespective of how the property taken is dealt with.
- Pure waste?
- Alternative: giving to Brahmins.
- Houses or cows cannot be thrown into water.
- Varuṇa clause = another clever device by Brahmins to gain influence and wealth?

# Varuṇa clause

taking the water option seriously I

- The king likes to be reckoned a just king and enjoy the loyalty of his ministers and subjects.
- How can he, even if well-intended, convince the subjects? Just saying: “I am a just king” will generally not suffice. In game-theory parlance, this would just be “cheap talk” and hence not credible.
- The Varuṇa clause may help the king to “prove” that he is a good king, a king who would not take property as a fine in order to enrich himself or in order to fill his depleted treasury. The best way to do this would then be a ritual, with Brahmins performing the rites and many onlookers.



# Varuṇa clause

## taking the water option seriously II

- Kane: “[n]o king would ordinarily fine himself”.
- Maybe, he would not, but he would like to be able to.
  - A high fine may lead the agent to deal honestly.
  - This will often be in the agent’s own interest, earning the payoff  $G_A$  rather than zero.
  - Varuṇa, the chastiser of kings, may be of some help.
  - But, if that is not enough, the king has to incur some cost, for example by offering the confiscated property “to Varuṇa by casting it into water”.