

Game Theory and Old Indian Law: Ordeals, Judicial Wagers, and Refund for Stolen Property

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Overview

- Microeconomics, in particular decision theory and game theory
- Law and Economics
- Three Old Indian legal institutions
 - Ordeals
 - Judicial wagers
 - Compensation for stolen property
- Conclusions

Introduction

Microeconomics

- Decision making by individuals
- How these decisions interact
 - on markets,
 - in hierarchies,
 - in political institutions etc.
- Fruitful assumption of rationality
Individuals try to achieve what they consider best.
- Two important areas:
 - one agent: decision theory (prediction: best strategy)
 - several agents: game theory (prediction: Nash equilibrium)
- Instruments are applicable to many different fields.

Introduction

Law and economics

- Application of microeconomic techniques to legal problems
- Main question:
What are the consequences of legal rules for the behavior of rational individuals?

Ordeals

words used in Sanskrit

- *divya* (most common), *daiva* (showing God's involvement as does the Latin term *iudicium Dei*)
- *śapatha* (meaning both “oath” and “ordeal”)
- Manu 8.115: a defendant who successfully completed an ordeal
 - “should be judged innocent by reason of his oath”
 - *sa jñeyaḥ śapathe śuciḥ*
- *agni*, *viṣa*, ...

Ordeals

physiological explanation versus belief-based ones

- Derrett (1978) tries a physiological vindication.
- Indologist Lariviere (1981) stresses the belief of ordeal administrators and ordeal takers.
- Economist Leeson (2012):
Ordeals make innocent and guilty people behave differently.
 - Innocent people undergo the ordeal and guilty people do not.
 - Accused need to be sufficiently convinced that ordeals correctly allocate innocence and guilt.
 - Ordeal officer himself
 - does not believe in the ordeal,
 - but manipulates the ordeal so that most of them are successfully passed.
 - Ordeals credible because they produce correct verdicts most of the time

Ordeals

Leeson's theory of ordeals I

- A defendant is accused of a misdeed (not having paid back a loan).
- Choice:
 - refusal to undergo the ordeal and implicitly confess wrongdoing
 - acceptance of ordeal so that
 - his innocence may be confirmed or
 - he is found guilty
- Ordeal punishment is larger than the no-ordeal punishment

Ordeals

Leeson's theory of ordeals II

Assumption: Very strong belief on the defendant's part that ordeal can find out whether he is innocent or not.

- If innocent, he will choose to undergo the ordeal and expect to receive zero punishment rather than suffering the no-ordeal punishment.
- If the accused is guilty, he declines the ordeal because the no-ordeal punishment is smaller than the ordeal punishment which he expects for sure.

Ordeals

Leeson's theory of ordeals III

In case of weak belief on the defendant's part and depending on

- the punishments
- the strength of belief in the ordeal
- ...

it may well happen that

- the innocent defendant voluntarily submits to the ordeal
- while the guilty one does not.

The stronger the belief in the ordeal, the more likely such a “separating” outcome.

Ordeals

Leeson's theory of ordeals V

- A. **Ordeal if agreed by defendant (decision theory)**
- B. High success rate
- C. Manipulability
- D. Ordeal only for doubtful matters
- E. Ordeal strengthened by rituals
- F. Non-application for nonbelievers

Two additional points (not addressed by Leeson) gleaned from Indian sources

- G. Ordeal for serious offences, only
- H. **Ordeal if also agreed by accusant (game theory)**

- Stenzler: ... während ehemals die Unschuld durch ein Wunder gerettet wurde, später fast ein Wunder geschehen musste, wenn der Schuld die verdiente Strafe zu Theil werden sollte.
- Terms for accused:
 - Earlier texts: *abhiyukta*
 - Later texts: *śodhya*

- Nārada 20.21:

*bhayād vā pātayate yas tv adagdho yo vibhāvyate
punas tam hārayel lohaṃ ...*

*If he drops the iron ball out of fear, but appears to be
unburned, he must carry it again.”*

- Nārada 20.28, 36: Water and poison ordeals not to be inflicted on weak persons (women, sick, elderly)

- Nārada (on doubtful matters):
If payment cannot be obtained by any other means (document, witness, timely reminder, indirect proof), a creditor can try to make the debtor undergo ordeals.
- Nārada (on serious offences):
mahāparādhe divyāni dāpayet tu mahīpatiḥ
- Pitāmaha (on non-believers):
By the wise, the holy water is not to be given to liquor drinkers, women, immoral people, or players, and also not those living an atheist life (*nāstikavṛttayaḥ*).

- Nārada:
 - “with the consent of the plaintiff, not otherwise”
 - *vādino 'numatena nānyathā*
- Yājñavalkyasmṛti:
 - “The balance, fire, . . . are for serious accusations provided the accuser agrees to undergo punishment.”
 - locative absolutus *śīrṣakasthe 'bhiyoktari* where *śīrṣaka* means “head, helmet, verdict”
- Divyatattva: “The phrase “agrees to undergo punishment” refers to the head, the most important, the crown and fourth part of a legal proceeding wherein the victory, the defeat and the punishment is indicated.”

Ordeals

The extended Leeson model

- The best outcome for each agent is his agreeing to the ordeal while the other rejects the ordeal.
- Typical outcome: one agent agrees to the ordeal while the other does not. Then, the ordeal does not take place, contributing to ordeals being applied in rare cases, only.
- Both agents agree to the ordeal (which is then carried out)
 - if the ordeal punishments for the agents are relatively small
 - if the innocent party believes strongly in the ordeal
 - if the guilty party does not believe strongly.

Ordeals

Conclusions

- Many important law texts have some sections on ordeals. Notable exceptions are the dharmasūtras due to Baudhāyana and Vasiṣṭha and also the Arthaśāstra.
- Schlagintweit (1866) reports Indian and other cases of ordeals in the late 18th century and mid 19th century and Lariviere has evidence of ordeals being carried out in the 20th century.
- Alternative interpretation
 - Not: ordeals are *iudicia Dei* with some probability.
 - But: the priest may come up with the correct judgement with some probability.
- Why did the successful institution of ordeals get extinct?
 - British?
 - Non-application for nonbelievers

Judicial wagers

compared with ordeals

- Ordeals:
“I am speaking the truth; this will be revealed by God.”
- Judicial wager:
“I am speaking the truth; if found otherwise by the king, I will pay the appropriate fine, and, on top, make a payment of size x .”
- Wager procedure (according to Lariviere 1981):
 - The wager may have been placed by one or by both parties.
 - The recipient might have been the king (the court), the opponent, or even both.
 - The size of the wager seems not to have been fixed and was probably up to each party.

Judicial wagers

Yājñavalkya 2.18

*sapaṇās ced vivādaḥ syāt tatra hīnaṃ tu dāpayet
daṇḍaṃ ca svapaṇaṃ caiva dhanine dhanam eva ca*

If the dispute should be with a wager, then he should make the defeated party pay the fine and his own wager as well, but only the contested amount to its owner.

Judicial wagers

how does the king decide?

King decides on the basis of both

- the evidence available to him and
- the wagers offered by the agents. May-be, the king might think that an accusant who files a correct complaint or an innocent defendant tend to decide on a higher wager than dishonest accusants or defendants. But Lariviere: “The paṇa seems . . . not to be a factor at all in deciding the case”

Judicial wagers

results (of a formal model not discussed here)

Findings:

- If the king disregards the wagers for his decision, the players will choose zero wagers.
- If the king disregards the evidence or if the quality of evidence is very poor, the parties' wager decisions are independent of whether the defendant is guilty or not.
- A party with a small amount of money to spend on wagers will be deemed guilty more often.
- Wagers are a positive function of the probability of wager-based judgements.
- Wagers tend to be higher for the innocent defendant (the honest accusant) than for the dishonest accusant (the guilty defendant).

Judicial wagers

serious drawbacks I

Judicial wagers have serious drawbacks:

- 1 A cash-stripped party may just not be able to place high wagers. This fact would limit the institution's credibility for achieving just outcomes.
- 2 Suppose that the king decides
 - on the basis of evidence if the evidence is of good quality, and
 - on the basis of wagers, otherwise.

Would that be a good idea?

Unclear: a better quality of evidence leads to better evidence-based judgements and also to better wager-based judgements.

Judicial wagers

serious drawbacks II

3. The king might have been the recipient of the wagers. Then, the king is torn between two motives.
 - He takes high wagers as an indication for truthful behavior and tends to rule in favor of the high-wager agent.
 - Ruling against the agent with high wagers is financially profitable for him.

For these mixed motives, one may conjecture that a third party like the Brahmins, rather than the king himself, was the recipient.

Compensation for stolen property

ViDh 3.65-67

*bālānāthastrīdhanāni ca paripālayet
caurahṛtaṃ dhanam avāpya sarvam eva sarvavarṇebhyo dadyāt
anavāpya ca svakośād eva dadyāt*

He [i.e., the king, HW] should safeguard the property of children, of those without a protector, and of women. Recovering property stolen by thieves, he should give all of it to the owner, irrespective of the class he may belong to. If he is unable to re-cover, he should provide restitution from his own treasury.

Compensation for stolen property

Four-stage model

On the basis of a compensation rate γ determined in the law text:

- The king incurs some cost that allow him to apprehend a thief with some probability. These cost may stand for the size of the police force that the king entertains.
- The subject incurs some cost that thwart a thief's attempt to steal with some probability. The subject may invest in non-breakable glass or other prevention measures.
- The thief decides on whether to attempt theft or not. In the former case, he incurs some cost. He hopes to steal an object of value V , but fears to be apprehended which would lead to a fine.

If theft occurs and the thief is not apprehended, the king pays γV to the victim.

Compensation for stolen property

results

- The thief may be discouraged if the king's investment in apprehending thieves or the potential victim's effort to thwart attempted theft are sufficiently large.
- A large compensation rate can be effective in making the king exert high policing efforts.
- The larger the compensation rate and the larger the policing effort, the smaller the effort undertaken by the potential victim to protect himself against theft.
- Unusual institution, but compensation for damage to health in
 - Germany "Gesetz über die Entschädigung für Opfer von Gewalttaten"
 - Canadian province of Manitoba

for example

Conclusions

- Microeconomic theory may help to elucidate legal institutions prevailing a long time ago and sometimes for a long time (the case of ordeals) in India.
- It may also help to understand why some institutions did not survive for long (the case of judicial wagers).
- What might we learn from Old Indian law?

Publication

- Ordeals: published in the Bulletin of the School of Oriental and African Studies, 79 (2016), 513-534
- Wagers: submitted to the Journal of the Royal Asiatic Society
- Compensation for stolen property: work in progress

Introduction

This talk is concerned with the following question: can game theoretic analyses help to understand Old Indian lawtexts. Three particular topics are covered: ordeals, judicial wagers, and compensation of stolen property.

Decision theory and game theory

Microeconomics is characterized by

- **rationality**: behaviour guided by the agent's aims / maximization
- **equilibrium**: no agent has an incentive to change his behaviour, given the constraints
- **purpose of models**: parameters (input) \longrightarrow variables (output)

Decision theory and game theory

Microeconomics analyses

- the decisions of agents (buying, investing, voting, ...) and
- the interaction of these decisions on markets (via prices), in organizations (via hierarchies) or in political institutions (via voting mechanisms)

and, generally, in any situations of cooperation and/or conflict

Decision theory and game theory

- Both theories are concerned with decisions.
- Decision theory: Individual agents in an (uncertain) environment
- Game theory: interaction of decisions of several agents
 - players
 - strategies
 - payoffs

Compensation for stolen property

backward induction: third stage

The payoff for a thief who attempts to steal is

$$T^{(3)} = -C_T + \pi \cdot 0 + (1 - \pi) [\alpha (-F) + (1 - \alpha) V]$$

Thus, attempting theft is not worthwhile if

- π is large (so that theft is thwarted)
- C_T is large
- F is large
- V is small.

Compensation for stolen property

backward induction: second stage

The potential victim maximizes

$$S^{(2)}(\pi) = -c_S(\pi) + (1 - \pi) [\alpha \cdot 0 - (1 - \alpha)(1 - \gamma)V]$$

Here,

$$(1 - \gamma)V = V - \gamma V$$

is the damage that the victim suffers after being compensated.

This damage occurs

- if theft is not thwarted (probability $1 - \pi$) and
- if the thief is not apprehended (probability $1 - \alpha$).

Compensation for stolen property

backward induction: first stage

At the first stage, the king decides on the apprehending probability α in order to maximize his expected payoff.

Main results:

- The compensation rate γ positively influences the policing rate.
- The compensation rate γ negatively influences the protection rate via two mechanisms: The larger the compensation rate,
 - the smaller the potential victim's possible loss $(1 - \gamma) V$, and
 - the larger the policing rate that discourages the thief and makes the subject's protection measures less necessary.

Compensation for stolen property

backward induction: stage zero

- If several potential victims are present, “too much” protection may occur. One subject who protects his property directs the thief to his neighbour. The government can prevent this race to the top by generously providing compensation for theft.
- A second externality concerns compensation rates in neighbouring countries. If the compensation rate in country 1 is larger than in country 2, the subjects of country 1 tend to choose smaller protection rates than those of country 2. This makes country 1 attractive for international robbers, for example in Europe of the Schengen agreement.

Compensation for stolen property

Egyptian example

Compare

- Old Egyptian narrative “The voyage of Unamūn” that dates from the second half of the second millennium BCE where a similar rule is reported.
- In modern times, damage to health is (partly!) compensated for according to legislation found in several countries:
 - German "Gesetz über die Entschädigung für Opfer von Gewalttaten (Opferentschädigungsgesetz - OEG)".
 - Canadian province of Manitoba: “The Compensation for Victims of Crime Program only covers physical or emotional injury. It does not cover damaged or stolen property or belongings.”

Lekhapaddhati-Lekhapañcāśīkā:

- “O Varuṇa, you protector of people, the self of all life, o Lord. Save [me who is] innocent, o just one; make me sink [if] guilty”
- *varuṇa tvam prajāpālaḥ sarvajīvātmakaḥ prabho śuddhaṃ tāraya dharmmātmā aśuddhaṃ majjayaśva māṃ*

Yājñavalkyasmṛti:

- “O Varuṇa, protect me by truth”
- *satyena mā 'bhirakṣa tvam varuṇa*

Lekhapaddhati-Lekhapañcāśīkā

- “Dharma wins, not adharma, truth wins, not untruth, patience wins, not anger, Viṣṇu wins, not the demons”
- *dharmo jayati nādharmah satyam jayati nāṅṛtam / kṣamā jayati na krodho viṣṇur jayati nāsurāḥ*

Weak belief on the defendant's part

- An ordeal taker is cleared for one out of two reasons:
 - ① God will possibly reveal his innocence.
 - ② The ordeal's outcome is managed (manipulated) by the ordeal officer.

The defendant assumes a positive acquittal probability.

From the defendant's point of view, his success depends on a mixture of 1. and 2.

- The ordeal will clear the guilty defendant with a lower probability than the innocent defendant, from defendant's point of view.

Ordeals

Leeson's theory of ordeals III

Depending on

- the punishments
- the strength of belief in the ordeal
- the assumed acquittal probability

it may well happen that

- the innocent defendant voluntarily submits to the ordeal
- while the guilty one does not.

The stronger the belief in the ordeal, the more likely such a “separating” outcome.

Ordeals

The extended Leeson model I

We distinguish four cases:

- 1 Both agree to the ordeal.
 - Ordeal is undertaken.
 - The accuser will be punished if the defendant is cleared.
- 2 Only the defendant agrees.
 - Complaint inconsequential.
- 3 Only accuser agrees.
 - Defendant is punished.
- 4 Neither defendant nor accuser agrees.
 - Defendant is punished.
 - Accuser is neither punished nor does he obtain his claims.

Judicial wagers

compared to trial by battle

- The nearly 1000 years old English institution of “trial by battle” was used to settle unclear land disputes. Here, representatives of the opponents fought against each other and the winning party obtained (or kept) the contested land.
- The opponents hire champions to fight for them and the outcome is mainly dependent on the money spent to hire a champion. The similarity between wagers and trial for battle is that opponents put forward money amounts.
 - In the Indian case, the paṇa is wagered and has to be paid only if the king's ruling is unfortunate.
 - In the English trials by battle, the money spent for champions is lost for both good or bad outcomes.
- Both institutions became extinct a long time ago.

Conclusions

Ordeals seem a “good” institution. How to adapt to modern times?

- Consider a private-law case where the judge cannot come to a conclusion due to insufficient evidence.
- Both parties to the conflict agree to, or do not agree to, having wise men or women (after talking to the people involved, after some rituals) pronounce a decision.
- This can only work if the non-ordeal punishments are smaller than the ordeal punishments.

Publications

Ordeals: Bulletin of the School of Oriental and African Studies, 79 (2016), 513-534

Judicial Wagers: Submitted to JRAS

Compensation for stolen property: Work in progress