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Microeconomic analyses of Old Indian law

Abstract:

Microeconomics is a toolbox that can be applied to a wide range of subjects, including law. The present paper reports three of those applications: (i) compensation of stolen items by the king, (ii) ordeals, and (iii) judicial wagers. (i) The Old Indian Law Code of Viṣṇu stipulates that the king should compensate the victim for items stolen by a thief if the latter cannot be apprehended. A three-stage game-theory model is presented in order to assess whether this may be a sensible rule. (ii) Ordeals (by fire, by water, etc.) are described in many Old Indian dharma texts. Decision models and game models are employed to find out the rationale behind these time-honoured procedures. (iii) In contrast to ordeals, judicial wagers seem to have been employed in India only for a short time span.

Keywords:

compensation of stolen items; ordeals; judicial wagers; decision theory; game theory; law and economics

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I. Introduction

Microeconomics is the field of economics that concerns decision making by individuals (producers, buyers, voters, etc.) and how these decisions interact (on markets, in hierarchies, in political institutions etc.). Situations of conflict and cooperation are described and analyzed. The specific field of application is less relevant than the instruments employed. In particular, agents are assumed to be “rational” (i.e., they try to achieve what they consider best). While the microeconomic rationality assumption has been criticized a lot, it has proved fruitful in all fields of social sciences. If only one agent is present, decision theory is applied. In the case of several (but few) agents, interactive decision theory is needed. The latter is also called game theory.

Law and economics is the name of a field of research where microeconomic techniques are applied to legal problems.² The main question is this: What are the consequences of legal rules for the behavior of rational individuals? US American law schools tend to have at least one professorship in the field of law and economics. Two founding fathers in this field earned a Nobel price in economics: Ronald Coase (in 1991) and Gary Becker (in 1992).

This paper presents three examples taken from Old Indian law texts. Section II deals with stolen items when the thief is not caught. Perhaps, the king might want to (or might be obliged to) compensate the victim?³

Sections III and IV deal with the problem of identifying the dishonest party in a conflict. Consider a defendant who is accused of a misdeed. Since defendant and accuser are not able sort out this disagreement between themselves, they resort to the king for a judgement. The usual procedure is this: The king considers the evidence presented to him and decides in favor of the defendant or of the accuser.

Apart from the “objective” evidence, the parties to a legal conflict may try to underline the trueness of their respective assertions by other means. In particular, and with special relevance for Old Indian law, they may resort to ordeals. Ordeals are a manner of saying: “I am speaking the truth; this will be revealed by God.”⁴ Ordeals are the subject matter of section III.⁵

² Consider the textbooks by Baird et al. (1998) and Friedman (2000).

³ This section borrows from Wiese (2017b).

⁴ According to *Manu* 8.114 (in Olivelle 2005, p. 173), a defendant is to “carry fire, stay submerged in water, or touch separately the heads of his sons and wife. When the blazing fire does not burn a man, the water does not push him up to the surface, and no misfortune quickly strikes him, he should be judged innocent by reason of his oath.” Ordeals would have been carried out in the context of formal trials but also as so-called restorative ordeals (see Brick 2010).

⁵ This section borrows heavily Wiese (2016).

Apparently, a second manner to insist on one's truthfulness is the "judicial wager" in the Old Indian law literature. Basically, a judicial wager amounts to proclaiming: "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 ." Section IV addresses this interesting legal institution.⁶ Section V concludes the paper.

II. Compensation for stolen items

The Old Indian Law Code of Viṣṇu (ViDh 3.65-67) stipulates that the king should compensate the victim for items stolen by a thief if the latter cannot be apprehended:

*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 recover, he should provide restitution from his own treasury.⁷

In a three-stage model, Wiese (2017b) shows how a compensation of stolen property affects the incentives of the agents involved:

1. The king K incurs the cost $c_K(\alpha)$ that allow him to apprehend a thief with some probability α . These cost may stand for the size of the police force that the king entertains.
2. The subject S incurs the cost $c_S(\pi)$ that thwart a thief's attempt to steal, with some probability π . The subject may invest in non-breakable glass or other prevention measures.
3. The thief T decides on whether to attempt theft or not. In the former case, he incurs some cost C_T (breaking-in equipment). He hopes to steal an object of value V , but fears to be apprehended which would lead to a fine of F .

Dynamic models such as these are usually solved by a solution concept called "backward induction"⁸. At the third stage, the payoff for a thief who attempts to steal is

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

⁶ This section borrows from Wiese (2017a).

⁷ Olivelle 2009

⁸ See, for example, Gibbons (1992: 55-61).

Thus, attempting theft is not worthwhile if $T^{(3)} \leq 0$ holds, i.e., if the probabilities α and π are large.

At the second stage, the potential victim maximizes

$$S^{(2)} = -c_S(\pi) - (1 - \pi)(1 - \alpha)(1 - \gamma)V$$

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 $1 - \alpha$).

At the first stage, the king decides on the apprehension probability in order to maximize his expected payoff. The details can be obtained from Wiese (2017b). The main results are as follows:

- The compensation rate γ positively influences the policing rate.
- The compensation rate γ negatively influences the protection rate via two mechanisms: First, the larger the compensation rate, the smaller the potential victim's possible loss $(1 - \gamma)V$. Second, the larger the compensation rate, the larger the policing rate that discourages the thief and makes the subject's protection measures less important.
- An interesting question (not modeled in Wiese 2017b) 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 while policing efforts tend to be larger in country 1 than in country 2. It is unclear whether these two effects make country 1 more or less attractive for international robbers, for example in the Europe of the Schengen agreement. However, attempted robberies are more often carried out in country 1 than in country 2, and carried-out robberies are more often punished in country 1 than in country 2. One might expect that newspapers in country 1 have more to tell about robberies and conviction of robbers than those in country 2.

It seems that compensation for theft is quite unusual in law texts. Note, however, the Old Egyptian narrative "The voyage of Unamūn" that dates from the second half of the second millennium BCE where a similar rule is reported.⁹ In modern times, damage to health is (partly!) compensated for according to legislation found in several countries.¹⁰

⁹ Erman (1927)

¹⁰ For example, the German "Gesetz über die Entschädigung für Opfer von Gewalttaten (Opferentschädigungsgesetz - OEG)".

III. Ordeals

A. *Ordeals as specified in Old Indian texts*

In many Old Indian law texts and other texts, ordeals are described that are to convict the guilty defendant and to clear the innocent one. According to MDh 8.114, a defendant is to “carry fire, stay submerged in water, or touch separately the heads of his sons and wife. When the blazing fire does not burn a man, the water does not push him up to the surface, and no misfortune quickly strikes him, he should be judged innocent by reason of his oath.”¹¹

Ordeals go by several terms, mainly *divya* (most common) and *daiva* where *divya* is short for *divyapramāṇa* (“divine evidence”) in contrast to human evidence (witnesses, documents, or possession). Briefly, we often encounter these ordeals¹²:

- In the fire (*agni*) ordeal a hot object (often a ball of iron) has to be carried by the defendant. If his hands show no signs of burning, he is considered innocent.
- The ordeal by balance (*dhata*) rests on the idea that a defendant who has declared his innocence is lighter than before. In that case, he is cleared. In some texts, an increase (rather than a decrease) in a defendant’s weight indicates innocence.¹³
- Undergoing the ordeal by water (*jala*) involves submerging under water and staying there until another person has regained an arrow discharged at the time of submerging. Innocence is proven if the runner is back in time.
- The ordeal by poison (*viṣa*) means that the defendant is given some amount of poison. If no serious effects are seen, the defendant is cleared.
- In the ordeal by holy water (*koṣa*), the defendant is to drink some sacred water. If then, for some time, he is not hit by a calamity, he is cleared.
- Similar to the fire ordeal, the heated-coin (*taptamāṣa*) ordeal is passed if the hand remains unhurt, here by fetching a coin from a vessel filled with boiling butter.
- In the ordeal by rice (*taṇḍula*), the accused eats “white grains of rice mixed with water in which an image of the Sun-god has been bathed”¹⁴. If he can do so without showing signs of injury in his mouth, he has successfully passed this ordeal.
- The plough-share (*phāla*) is similar to the ordeal by fire or by heated coins. A heated plough-share has to be licked and the test is about the tongue being burnt or not.

¹¹ Olivelle 2005

¹² See, for example, Stenzler (1855: 665-77), Schlagintweit (1866: 9-36), Scriba (1902: 25-35), Lariviere (1981a: 28-54), or Patkar (1978: 98-103).

¹³ See Lariviere (1981a: 29-30).

¹⁴ Patkar (1978: pp. 102)

- The ordeal by religious merit (*dharma*) involves choosing between balls made of earth. One stands for *dharma*, the other for *adharma*. The lucky defendant has chosen the *dharma* ball.

It is important for our later argument that all these ordeals give the ordeal officer ample scope for manipulation (but see the conclusions for some qualifications regarding the priests' motives and understandings). First of all, some ordeals may, by their nature, provide a better success rate than others. This is probably related to rules that differentiate between defendants according to caste. For example, we read in the *Nāradaśmṛti* (NSmV 20.47): “He should not administer the poison to a brāhmaṇa, nor should a kṣatriya carry the iron; a vaiśya should not be plunged into water, nor should a śūdra be allowed to drink Holy Water.”¹⁵

Second, a given ordeal can be manipulated: The fire, the water, and the poison ordeals can be administered in such a way as to increase or decrease the probability of success (from the ordeal taker's point of view). In particular, the iron ball can be more or less hot (fire ordeal), the bow more or less strong and the runner slow or fast (water ordeal), and the poison more or less toxic. Consider also the balance ordeal. It should not be difficult for the official carrying out the ordeal to ensure that the accused weighs more at the second weighing (or less, whatever the required conditions may be). After all, the official needs to apply marks on some wooden sticks. Since the weights (before and after claiming innocence) are about the same, there is obvious room for manipulation by an official who is not monitored very closely by others.

B. How can ordeals be understood: Derrett, Lariviere, Leeson

In modern times, ordeals seem to be strange legal institutions. For people in early and medieval India, they did not. Lariviere (1981a: xii-xiii) compares ordeals to sacrifices: “The question of how ordeals ‘work’ is no more likely than is the question of how sacrifices ‘work’: they ‘work’ because of the nature of the universe as these men of faith understood it. An ordeal was a religious act in the sense that one prayed to a deity for assistance –the ‘workings’ of ordeals were a matter of faith.”

Nearly 40 years ago, Derrett (1978) tried to vindicate this “Ancient Indian ‘Nonsense’” (quoting from the title of his short article) and suggested that the ordeals might have worked for some physiological reason. With respect to the fire ordeal, Derrett (1978:103) writes: “A person of quiet conscience who knows no reason why he should not survive an ordeal is likely to have his pores closed, and will escape blisters more easily than one who sweats with fear of detection.”

¹⁵ Lariviere 2003

Or, referring to the water ordeal, Derrett (1978: 103) explains: “A man who is quiet in mind can hold his breath under water for far longer than a man who is frightened or has his pulse-rate increased for whatever other reason.”

Understandably, Lariviere (1981a: 30) is unconvinced by these arguments (in particular with respect to the balance ordeal¹⁶) and offers the following insight: “The important thing is that the administrators of ordeals and those undergoing them *believed* [emphasis in the original, HW] that they would render a correct verdict. It was this faith that allowed the institution of ordeals to be successfully employed.”

As if following up on Lariviere’s comment, the economist Leeson (2012) explains why ordeals could work. Here is his idea. The credibility of ordeals needed to be supported by producing “correct” verdicts most of the time. The officials responsible for the ordeal separate innocent and guilty people in the following manner. Innocent people undergo the ordeal and guilty people do not. This separating outcome ensues if the accused are sufficiently convinced that ordeals correctly allocate innocence and guilt. The crucial point is that the ordeal officer himself does not (need to) believe in the ordeal, but manipulates the ordeal so that most of them are successfully passed. In Leeson’s words, the ordeal, supposedly *iudicium Dei*, is in fact a *iudicium cleri*.

C. *Leeson’s theory of ordeals*

Leeson (2012) explains how ordeals work in the framework of a simple decision model. Let us consider someone who is accused of a misdeed. In particular, he may be accused of not paying back a loan that he allegedly has taken from the accuser. Or he may be accused of not handing back a deposit that was placed with him (or so the accuser claims). Before him, he has the choice of submitting to an ordeal or refusing to do so. If he refuses the ordeal, he implicitly confesses his wrongdoing and undergoes a “non-ordeal punishment”. It may be a monetary fine or a number of whippings, or the amount of money to be paid (back) to the accuser. The ordeal may confirm his innocence (zero punishment, zero payment to accuser) or may find him guilty.

If the accused’s guilt is proven by the ordeal, he suffers the “ordeal punishment” which one would expect to be larger than the non-ordeal punishment. The difference may stem from the fact that the unsuccessful ordeal is very unpleasant or even life-threatening. Also, one may safely assume that a person found guilty via ordeal had to pay for the ordeal’s elaborate performance. This added an extra financial incentive to just plead guilty, that is, take the non-ordeal punishment.

¹⁶ Derrett’s explanation of balance ordeals is particularly involved and we do not need to go into it.

Leeson (2012: 696-7) first assumes that the accused strongly believes that an ordeal can find out whether he is innocent or not. Differently put, the ordeal is indeed a *iudicium Dei*. If innocent, he will choose to undergo the ordeal and expect to receive zero punishment rather than suffering the non-ordeal punishment. If the accused is guilty, he declines the ordeal because the non-ordeal punishment is smaller than the ordeal punishment which he expects for sure.

Without this strong belief, the accused is not sure whether the ordeal detects his guilt or innocence without fail (Leeson 2012: 699-704). If he is innocent and undergoes the ordeal, he may be cleared for one of two reasons. Firstly, he entertains the belief that God (possibly) reveals his innocence. Secondly, if God is not behind the ordeal, he thinks that the ordeal's outcome is managed (manipulated) by the ordeal officer. For want of better information, the defendant assumes that the officer will acquit him with some probability given that God is not involved in the ordeal.

If the defendant is guilty, then (from the defendant's point of view) the ordeal will clear him with a lower probability than the innocent defendant. In so far as the ordeal is indeed a *iudicium Dei*, he will not be cleared. He can only hope for the officer's acquittal (given that God is not behind the ordeal). If the model's parameters (the punishments, the strength of belief in the ordeal, the assumed acquittal probability) are propitious, it may well be the case that the innocent defendant voluntarily submits to the ordeal while the guilty one does not. Indeed, the stronger the belief in the ordeal, the more likely such a "separating" outcome.

Leeson's ordeal theory suggests the following important features of ordeals:

- A. Agreement by defendant (concerning undergoing an ordeal, not concerning the specific type of ordeal): This is the most important point resulting from Leeson's theory. Separating innocent and guilty defendants would not be possible otherwise.
- B. High success rate: If separation occurs, most of the innocent defendants should be cleared.
- C. Manipulability, i.e., determination of success rate by ordeal officer: Ordeal officers manipulate the success rates in order to make the defendants' beliefs consistent. Manipulation can refer to the specifics of a given ordeal or to the kind of ordeal chosen.
- D. Doubtful matters: The credibility of ordeals can be sustained, only, if the officers are not caught in delivering misjudgements too often.
- E. Rituals: Separating is possible for believers, only.
- F. Non-application for nonbelievers

We find that most of the above features were present in early and medieval India, also. Additionally, we will see that two further points (not addressed by Leeson) need to be mentioned:

- G. Serious offences: In order to uphold and strengthen the dignity of ordeals, Gods are not to be bothered with trifling matters.
- H. Agreement by accuser: In order to put some risk on accusing somebody, ordeals often foresee negative consequences for the accuser should the defendant be cleared. Therefore, accusers should also be forced to agree to an ordeal or not.

D. “Agreement by accuser” in the Old Indian texts

Wiese (2016) shows how features A through H (mentioned in the previous section) are reflected in Early Indian and Medieval Indian texts, such as the *Āpastamba dharmasūtra*, the *smṛtis* according to Nārada (indicated by NSmV¹⁷), Viṣṇu¹⁸ (ViSm), and Pitāmaha¹⁹ (PiSm). The sixteenth-century Bengali *Divyatattva* of Raghunandana Bhaṭṭācārya (DT) quotes and comments upon ordeal sections in various law texts. The focus is now on feature H, i.e., on two closely related requirements: (i) the accuser has to agree to the ordeal, (ii) the accuser has to bear negative consequences in case of the defendant’s clearance. For example, NSmV 20.7 attaches “with the consent of the plaintiff” (*vādino ’numatena*) to every ordeal and stresses *nānyathā* (“not otherwise”).²⁰

DT 4 = YSm 2.95 lists ordeals that “are for serious accusations provided the accuser agrees to undergo punishment.”²¹ In Sanskrit, we have the locative absolute *śīrṣakasthe ’bhiyoktari*. *Śīrṣaka* means “head, helmet, verdict”. Thus, *śīrṣakasthe ’bhiyoktari* points to “agreement by accuser”. DT 4.3 offers this helpful explanation: “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. He ‘abides by it’ (in this fourth part of the legal proceeding). The meaning of agreeing to undergo punishment is that one partakes in the punishment ordered for the matter under dispute (if he is proved wrong).”²²

¹⁷ We use the text and the translation by Lariviere (2003) where chapter 1 of the *vyavahārapadāni* is found on pp. 91-156 and 273-332, respectively. The second chapter of the “Addenda” is also addressed as chapter 20 and found on pp. 233-240 and 447-453, respectively.

¹⁸ Edited and translated by Olivelle (2009). Ordeals are dealt with on pp. 67-71, 254-263.

¹⁹ This text exists in fragments only. 200 double lines were collected and translated (into German) by Scriba (1902). PiSm 28-189 deal with ordeals.

²⁰ Translations by Lariviere 2003. The requirement “agreement by accuser” is not without exceptions, see Wiese (2016).

²¹ Lariviere 1981a

²² Lariviere 1981a

The standard division of labor between undergoing the ordeal and agreement/abiding is given in PiSm 52: “The plaintiff is commanded to accept *śiras* in ordeals and the ordeal is to be given to the defendant” (*abhiyoktā śiraḥsthāne divyeṣu parikīrtiyate abhiyuktāya dātavyaṃ divyaṃ*)²³. In contrast, DT 10 = YSm 2.96 allows a reversal of these roles: “Or, at his pleasure, he may make the one undergo the ordeal, and the other undertake the agreement to undergo punishment” (*rucyā vānyatarah kuryād itaro vartayec chirah*).²⁴

Lariviere (1984: 35-6) correctly interprets the requirement of “agreement by accuser” as a means to avoid abuses: “It is easy to imagine that the use of ordeals in disputes where no human evidence was available could be particularly susceptible to a variety of abuses. Such things as harassment and intimidation of one party by another in the form of vindictive suits, suing in order to cast doubt on another’s character or acquire some financial gain could easily become rife in a situation where one was freed of having to produce any substantial “human” evidence to prove one’s case. This danger is heightened when one considers the threat of serious injury to the accused who may have to undergo one of the more painful ordeals.”

E. The extended Leeson model

The “agreement by accuser” suggests an extended Leeson model where both the defendant and the accuser are free to accept the ordeal or not. The ordeal only takes place if both agents agree to it. Let us assume that the defendant is innocent and that the accusation is not honest. For the inverse case, the considerations below can be easily adapted.

Four cases are to be distinguished:

- 1) Both the defendant and the accuser agree to the ordeal. Then the ordeal is undertaken. The accuser will be punished if the defendant is cleared. But the accuser is able to see his demands fulfilled (for example, he regains his deposit) if the defendant is not cleared.
- 2) The defendant agrees, the accuser does not. In that case, defendant and accuser are treated as if no complaint had been filed.
- 3) The defendant does not agree, but the accuser does. Then, the defendant is punished and the accuser obtains his claim.
- 4) Neither defendant nor accuser agrees. In that case, the defendant is punished while the accuser is neither punished nor does he obtain his claim.

²³ This translation was suggested, in a personal communication, by David Brick. Vi 9.20-21 says the same thing in similar words: *abhiyoktā vartayecchīrṣaṃ abhiyuktaśca divyaṃ kuryāt*.

²⁴ Lariviere 1981a

Wiese (2016) shows by way of strategic games²⁵:

- The best outcome for each agent is his agreeing to the ordeal while the other rejects the ordeal. In that case, the ordeal does not take place and the agreeing agent obtains the best possible outcome for himself without any risk: The defendant is not punished or the accuser obtains his claim, respectively.
- The guilty accuser agrees to the ordeal even if the defendant agrees, whenever the claim he hopes to obtain (if the defendant is not cleared) is large relative to the punishment he fears (if the defendant is cleared).
- This is the 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.

F. Conclusions

Ordeals seem to have been very successful institutions. Schlagintweit (1866: 4-5) reports Indian and other cases of ordeals in the late 18th century and mid 19th century and Lariviere (1981a: 42) has Indian evidence of ordeals being carried out in the 20th century.

The question of “how ordeals work” has not, as yet, been answered in a satisfactory manner. Lariviere (1981a) briefly tells us that they worked because all the agents concerned believed in them. Physiological explanations à la Derrett (1978) are simply unconvincing. The current author (being an economist himself) surely likes Leeson’s theory much better. One may also point out that the assessment of institutions is a matter of comparisons. In a case study of ordeals in modern-day Liberia, Leeson and Coyne (2012) argue (i) that Liberian governmental judicial institutions are very defective and (ii) that informal methods (like the poison ordeal called “sassywood”) may well be a superior institution. However, Indian ordeals were part of the formal judicial framework so that the Indian case does not resemble the Liberian one.

It is easy to overstate the difference between Lariviere (both ordeal administrator and ordeal taker are believers) and Leeson (the ordeal administrator manipulates the ordeal he does not necessarily believe in). Leeson (2012: 698, fn. 23) stresses that “priestly manipulation of ordeals is not incompatible with priestly

²⁵ Strategic games are explained by Gibbons (1992, pp. 1-12). Strategic games consist of players, their strategies, and the payoffs the players obtain for all strategy combinations. In the present case, the players are the two parties, the defendant and the accuser. The strategies are “agree” and “not agree” for both parties. A strategy combination consists of a strategy by the defendant and strategy by the accuser. The main solution concepts are dominant strategies and Nash equilibria. A dominant strategy is a best strategy irrespective of the other player’s strategy. A Nash equilibrium (also simply called equilibrium) is a condition for stability. A strategy combination is called an equilibrium if no player can profit from deviating unilaterally (i.e., by choosing another strategy while the other players stick to their strategies in the strategy combination).

faith in ordeals as genuine *iudicia Dei*. According to the developing doctrine of *in persona Christi*, priests may have believed that they were acting in the person of Christ – that is, that God was guiding them – when they manipulated ordeals.” Also, changing the odds in favor of the ordeal takers could have been a long process already observed by Stenzler (1855: 669). A related point is obvious from the belief and success dynamics sketched by Leeson (2012: 701-4): ordeal administrators who change success probabilities do not necessarily fully understand what the effects might be if they make ordeals easier or harder to pass.

We would like to make one important interpretational point. The probability that ordeals are *iudicia Dei* can be reinterpreted: The priest may come up with the correct judgement with a certain probability. This correct judgement may reflect the priest’s understanding of the conflict and of the people involved. Somewhat related, Richard Lariviere (in a personal communication) argues that “correctness” of the ordeal may have to be more broadly understood: “A known rogue might be punished by the court not for the crime he is accused of, but for his long-standing reputation as a bad actor. In that context, the ‘correct’ outcome of an ordeal is not in question. That is, even if a witness in the audience secretly knew that the accused is not guilty of the crime he is being tried for, the fact that the ordeal found him guilty is easily explained by some unknown karmic factors that made him ‘deserve’ to be found guilty and thus punished.” This interesting observation provides additional support to Leeson’s thesis. Indeed, the reputation of individuals may well be known to the priests who manipulate the ordeal in line with that reputation.

In another paper, Leeson (2011) suggests an economic analysis of “trial by battle” used to settle unclear land disputes. In this nearly 1000-year-old English institution, representatives of the opponents fought against each other. The winning party obtained (or kept) the contested land. One can see trial by battle as a particular form of ordeal where God is on the side of the honest party. However, in contrast to clergy-organized ordeals, the important point of trial by battle seems to have been the money invested to hire promising champions.

IV. Judicial wagers

Finally, the Old Indian judicial institution called *pana* (“wager”) is briefly dealt with.²⁶ Lariviere (1981b) presents the scarce textual evidence. Here let it suffice to present YSm 2.18:

²⁶ While this paper deals with judicial wagers in India, Matthiass (1888, pp. 5-18, and 1912, pp. 341-347) argues that they were present in other Indo-European judicial traditions, also. The author understands wagers as central to the transition from “self-help, that is, physical combat” (Matthiass 1912, p. 342) to increasingly formalized third-party involvement: “If the contending parties appealed to a trusted person they merely gave up the personal encounter, in the place of which there now appeared the assertion by each party that he was right; in other words,

*sapaṇas' 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.²⁷

There is no need to repeat Lariviere's inconclusive findings in detail. They can be summarized (for the current purposes) in the following manner:

- 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.

It is assumed here that the amounts placed by the opponents were decided by themselves individually and that the king or a third party was the recipient, as seems to be the case for Yājñavalkya. Furthermore, the king decides cases on the basis of both (a) the evidence available to him and (b) the wagers offered by the agents. With respect to (b), the king might think that an accuser who files a correct complaint or an innocent defendant tend to decide on a higher wager than dishonest accusers or defendants. Then, the king tends to rule in favor of the agent with the highest wager. Lariviere (1981b, p. 143) does not entertain this possibility when he writes: "The *paṇa* seems ... not to be a factor at all in deciding the case"

Three questions arise:

- i. Can Lariviere's assessment given above ("wager no factor in deciding the case") be plausible?
- ii. What is the rationale behind using wagers?
- iii. Why were wagers much less successful than ordeals?

The strategic game used to analysed this situation has two players, the defendant and the accuser. The strategies are the wagers placed by the parties. The game theory model yields these findings:

- If the king disregards the wagers for his decision, the players will choose zero wagers. To our mind, this result is an answer to (i), against Lariviere.

contending opinions took the place of personal conflict. Each of the parties had to show evidence of the earnestness of his opinion and of his firm belief in his contention, else there would have been no inducement why he should surrender his right to self-help. Substitution of personal opinion was appropriately followed by a deposit made with the trusted party; this deposit, which the trusted party was to surrender to the victor, constituted the penalty that the defeated party incurred. Thus, we see that the parties made a wager and that the oldest form of arbitral court was the wager-court" (Matthiass 1912, p. 342). Later on, argues Matthiass (1912, p. 343), wagers became increasingly important as fees for these third parties.

²⁷ Lariviere 1981b

- 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.
- Wagers are a positive function of the probability of wager-based judgements.
- Wagers tend to be higher for the innocent defendant (the honest accuser) than for the dishonest accuser (the guilty defendant). This result is a vital ingredient for answering (ii).
- A party with a small amount of money to spend on wagers will be deemed guilty more often. This result may well be an important part of an answer to (iii).

Elaborating on question (iii), judicial wagers have serious drawbacks. First, a cash-stripped party may just not be able to place high wagers. Second, a better quality of evidence leads to better evidence-based judgements and also to better wager-based judgements. Thus, it may not help matters much if we suppose that the king decides on the basis of evidence if the evidence is of good quality, and on the basis of wagers, otherwise. Third, the king might have been the recipient of the wagers. Then, the parties may suspect that the king has financial reasons when using the wagers as a basis for his judgement. Doing so and/or the suspicion that he might do so, will certainly undermine any confidence in the justice system. Also, the king may then be torn between two motives. On the one hand, he takes high wagers as an indication for truthful behavior and tends to rule in favor of the high-wager agent. On the other hand, 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. However, the textual evidence collected by Lariviere (1981b) does not provide any support.

These three drawbacks may be the reason why, in India, judicial wagers seem to have gone out of fashion many centuries before ordeals did (compare Lariviere (1981b, 144) and Lariviere (1981a)).²⁸

²⁸ Related to both ordeals and wagers is the nearly 1000 years old English institution of "trial by battle" 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. Now, trial by battle can be understood as a particular form of ordeal (God makes the honest party win). However, neither God nor ordeal-officiating priests were involved, at least as far as the economic analysis by Leeson (2011) goes. The opponents hire champions to fight for them and the outcome is mainly dependent on the money spent to hire a champion (or even several, in order to dry out the champions market for the opponent). The similarity between wagers and trial for battle is that opponents put forward money amounts. In the Indian case, the *pana* is wagered and has to be paid only if the king's ruling is adverse. In the English trials by battle, the money spent for champions is lost for both good or bad outcomes.

V. Conclusions

The relationship between modern legal and microeconomic theory on the one hand and Old Indian law on the other hand is complex. This paper shows that 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.

The opposite question is what we might learn from Old Indian law. To the current author, it seems that judicial wagers are a “bad” institution that have been unsuccessful for good reason.

Compensation for stolen items is not current in modern legal systems. Nonetheless, this rule reminds us of the central obligations of governments, i.e., to ensure inner and outer security. In modern times, we are very much used to letting potential victims fend for themselves. However, it is unclear whether this is efficient. Perhaps, modern governments also need monetary incentives to prevent theft (by stricter laws for theft, by controlling migration, etc.)?

Ordeals seem a “good” institution. One may think about how to adapt ordeals to modern times. Consider a private-law case where the judge cannot come to a conclusion due to insufficient evidence. Then, one may contemplate “ordeals” 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.

VI. Abbreviations and symbols

DT	Divyatattva (see Lariviere 1981a)
MDh	Mānava Dharmaśāstra (see Olivelle 2005)
NSmV	Nāradaśmṛti (see Lariviere 2003)
PiSm	Pitāmahaśmṛti (see Scriba 1902)
ViDh	Vaiṣṇava Dharmaśāstra (see Olivelle 2009)
YSm	Yājñavalkya Śmṛti (cited from DT)

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