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Game Theory Applications
Lecture 8

1. Financial Statement Audit Game

		Client	
		Overstate earnings	Tell truth
Auditor (A)	Extensive audit	2, -5	4, -1
	Normal audit	-10, 5	7, -1

Payoff descriptions:

- An "Extensive audit" detects overstated earnings, whereas a "Normal audit" does not detect overstated earnings.
- The client's report is made prior to the audit, but we assume that the auditor cannot observe the client's action choice.
- If the auditor plays "Extensive audit", he will incurs an extra cost of **w** relative to "Normal audit".
- If the client overstates earnings and the auditor perform extensive audit, there is a dispute and an additional cost to the auditor of **d**, which might include potential costs of disputes such as a damaged client relationship or a possible auditor change.
- If the client overstates earnings and the auditor perform normal audit, the auditor incurs the cost of a failed audit, **l**, which might be the auditor's reputation loss.

(1) Based on the payoff descriptions above, the two players are playing simultaneous game. Please find all NEs.

(2) Based on your answers to (1), please calculate the probability of "over-auditing", i.e., the probability such that the client plays "Overstate" and the auditor plays "Extensive audit".

(3) Based on your answers to (1), please calculate the probability of "failed auditing", i.e., the probability such that the client plays "Overstate" and the auditor plays "Normal audit". (*Implication: The failed audit occurs as a result of client ethics and without the auditor's direct intent.*)

(4) If client's report is made prior to the audit, and the auditor can observe the client's action choice, please find NEs and SPNEs.

(5) Please calculate **w**, **d**, and **l**.

2. Audit Opinion Shopping Game

(1) Recently, the accounting profession has suffered a serious erosion of public confidence: confidence in its standards, in the relevance of its work and in the financial reporting process. The problem involves "opinion shopping" by clients.

(2) The "opinion shopping" is taken to be a representative ethical dilemma in the following sense. The auditor who does the right thing, which is to deny the client's request to approve a dubious accounting method, suffers the loss of an audit fee if the client switches to another, less scrupulous, auditor. Meanwhile,

the auditor who does the wrong thing, which is to consent to the client's request, will avoid losing the audit fee, but will cause the accounting profession to incur a loss of credibility or status, which is presumed to have an adverse pecuniary effect on all auditors. Hence, the auditor's personal pecuniary incentive conflicts with what is both right in an ethical sense and best for all auditors in general.

(3) In the basic model, there are two auditors and two client firms. Each auditor is engaged by one of the client firms, and earns an audit fee, net of costs, of $3. However, each client firm requests its auditor's approval of an accounting method that both auditors view as dubious. That is, while the proposed method is not explicitly prohibited by GAAP, it is at best marginally acceptable, and both auditors would refuse to approve it if doing so had no pecuniary effects. However, both clients have threatened to dismiss their auditor if the proposed accounting method is not approved. If both auditors deny their own client's requests, then it is presumed that each would also deny the request from the other auditor's client. This would force each audit client to remain with its original auditor and forego use of the dubious accounting method. If both auditors consent to the client requests, then both retain their clients and their net audit fee of $3. If only one of the auditors consents to the client requests, then it gets both clients and earns a net audit fee of $6, while the other auditor earns no audit fees. In either of these cases, both clients are permitted to adopt the dubious accounting method. In this event, it is assumed that both auditors incur a loss of credibility and/or status, and that the monetary effect of this is a loss of $1 to each auditor.

(4) Please fill, according to (3), the payoffs into the normal form game and find the NE.

		Auditor B	
		Deny	Consent
Auditor A	Deny	3, 3	-1, 5
	Consent	5, -1	2, 2

(5) Observations

<u>Observation 1</u>: In a single play of this game, (a) a dominant strategy for both auditors is to consent, and (b) the unique equilibrium solution is that both auditors consent.

<u>Observation 2</u>: In a single play of this game, the unique equilibrium solution produces a strictly Pareto-inferior outcome.

<u>Observation 3</u>: If the opinion-shopping game is played repeatedly with no definite stopping point, and if the auditors do not discount the future too heavily, then a Nash equilibrium is attained if both auditors adhere to the following strategy: choose deny in every period unless and until the other auditor chooses consent, in which case choose consent in every period thereafter.