Module 3: "Dynamic games of complete information"

Lecture 15: "Dynamic Games; Different Examples"

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Lecture 15: "Dynamic Games; Different Examples"

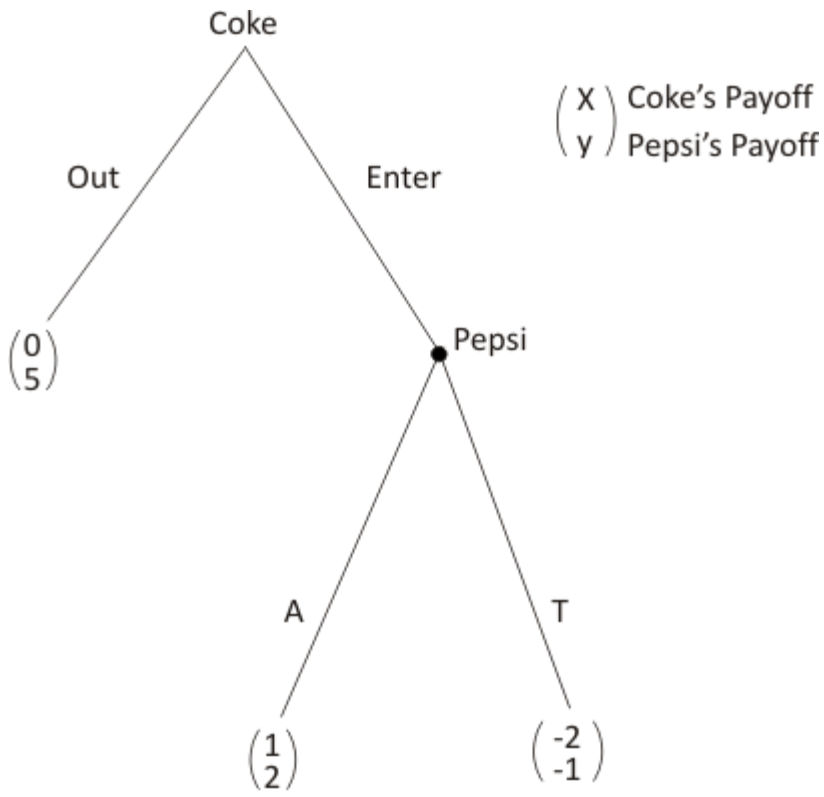
Dynamic Game: Different Examples

- Pepsi & Coke War
  - Coke is contemplating about whether to enter a new market dominated by its rival, Pepsi

Game I:

- Pepsi can either act tough (T).
  - i.e. mounts a big advertising campaign, upgrades facilities
- Or Pepsi can accommodate (A)
  - i.e. does not take any aggressive measures like advertising etc.

Game tree I



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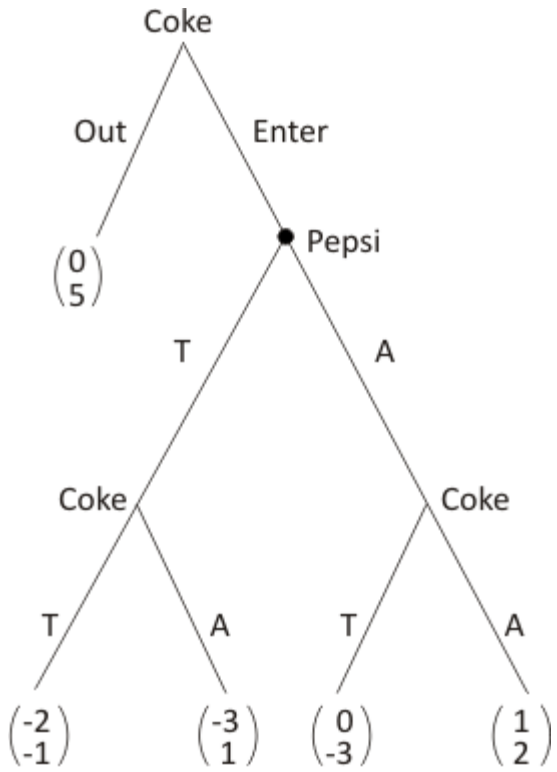
Game II

- After Pepsi's decision coke has a further decision
  - It can either mount an advertising campaign and act tough (T)
  - Or it can accommodate (A)

Game tree II



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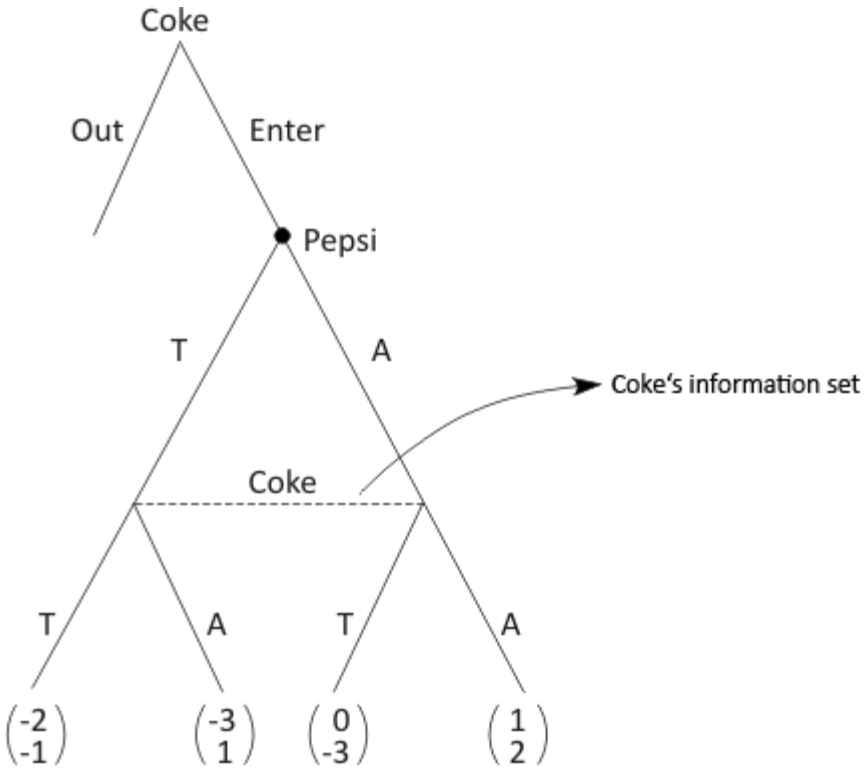
Game III

- Should coke enter the market, then both coke and Pepsi decide about whether to act tough or accommodate
- Decisions are taken simultaneously

Game tree III



Remember, when or player is not aware of the decision node by the rival, then the concerned player has an information set.

- Here Coke is not sure about Pepsi's action (T or A) and hence it has an information set consisting of two nodes.

Sequential rationality

- Decision maker at a decision node will pick the best available action given what he in turn believes about the remaining future of the game
- All the dynamic games are solved on the basis of sequential rationality.

Normal form version of Game I

Coke \ Pepsi	T	A
Enter	-2, -1	1, 2
Out	0, 5	0, 5

Two NE → (Enter, A)

(Out, T)

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Sequential rationality rules out

(Out, Tough)

- (Out, Tough) is an unreasonable Nash equilibrium
- This equilibrium says that Pepsi undertakes to fight Coke (or act Tough) if Coke were to enter the market.
- However if Coke enters the market, then Pepsi is better off by playing A (look at game tree)
- Pepsi is giving a **threat** to Coke that if Coke enters, Pepsi will act tough (T)
- Threat is not credible
  - Pepsi gets worse off by carrying out the threat
- So (Out, Tough) is not sequentially rational

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