

Session 3.1

Formal Partnership or Informal Alliance?

This is a simple example of a game with two (proper) subgames. We solve the two subgames, and then feed the solutions of the two subgames into the original game to form an (almost trivial) reduced game. This basic idea extends the notion of backwards recursion beyond perfect information games.

Perfect information games

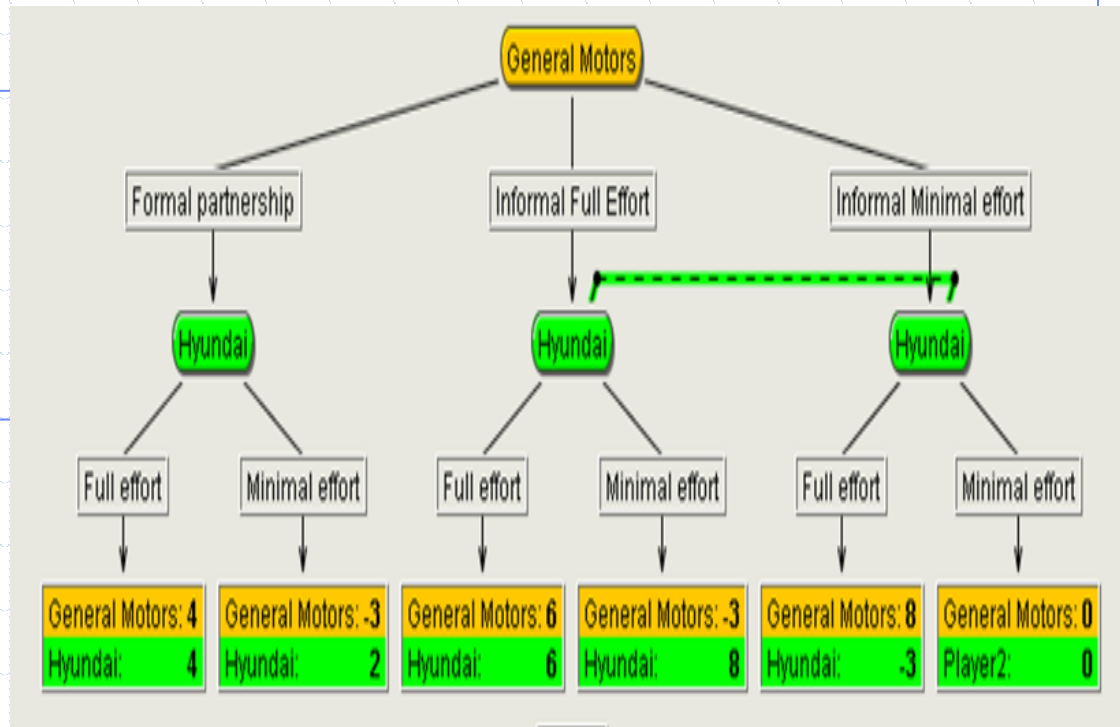
- ◆ Perfect information games are defined in the extensive form by a singular feature: they have **no dotted lines**.
- ◆ This means that every information set contains only one node: intuitively when a player moves, s/he knows the exact history of the game so far.
- ◆ Therefore the solution to a perfect information game is to start at the set of the very last decision nodes, solve for those final decisions, and then work up the game tree . . . **backwards recursion**.

General Motors and Hyundai

- ◆ Over the years GM and Hyundai have explored various types of partnerships of limited scope with each other.
- ◆ One question that periodically arises in these kinds of arrangements is how formal things should be:
 - Tying things up with legalities is rigid but enforces commitment.
 - Keeping things loose and flexible fosters innovation but discourages teamwork.
- ◆ This strategic situation does *not* lend itself to a perfect information game: informal agreements have less monitoring and mutual verification than formal agreements.

General Motors and Hyundai

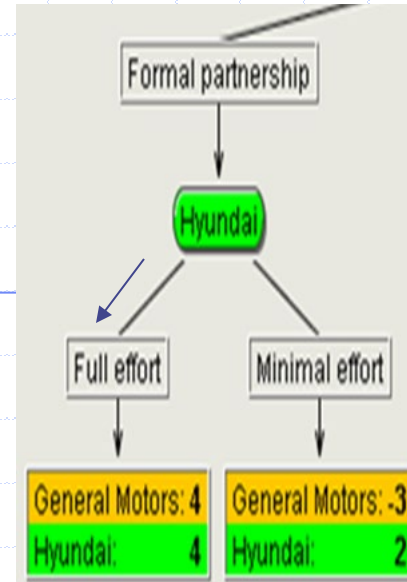
◆ If both companies exert full effort, then an informal agreement offers each 2 additional units of net value, compared to a formal agreement.



◆ Under an informal (and less checkable) arrangement, both companies make even more (2 extra units) if they exert minimal effort and if the other company abides by the informal agreement.

One of the two subgames

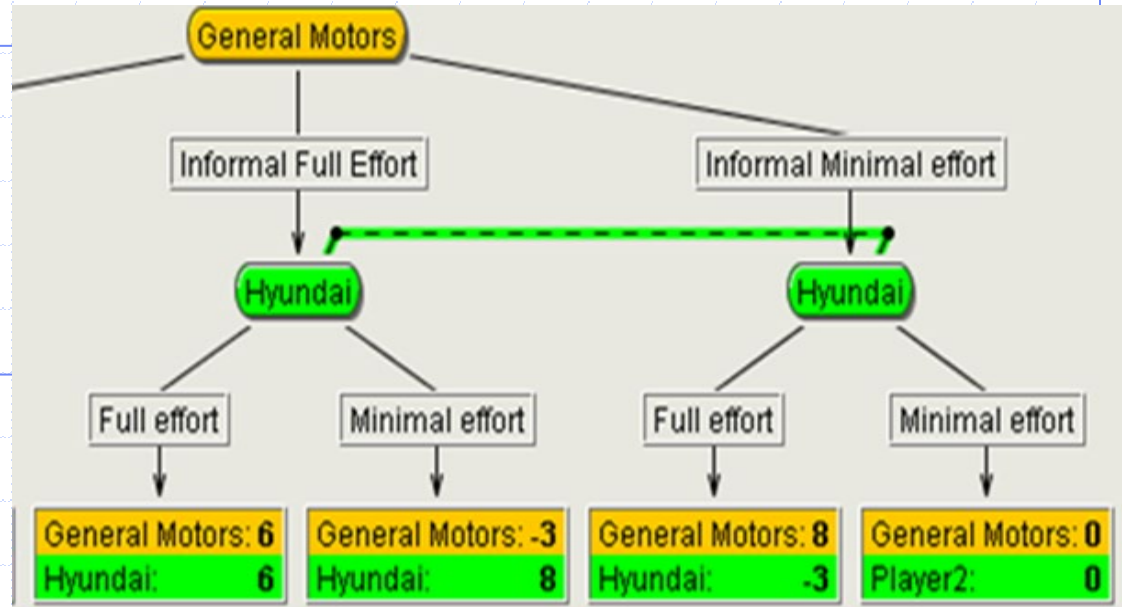
- ◆ One of the subgames begins by GM going into a full partnership with Hyundai.



- ◆ In this subgame it is easy to see Hyundai exerts full effort (rather than being sued).
- ◆ The solution outcome yields 4 units each.

The other subgame

- ◆ The other subgame begins with GM engaging in an informal partnership with Hyundai.



- ◆ Hyundai knows that GM is engaging in an informal partnership but cannot observe how much effort GM is putting into it. (Hence the dotted lines.)

The strategic form of this game

◆ This subgame is a **simultaneous move** game, in which each strategy corresponds to a single move.

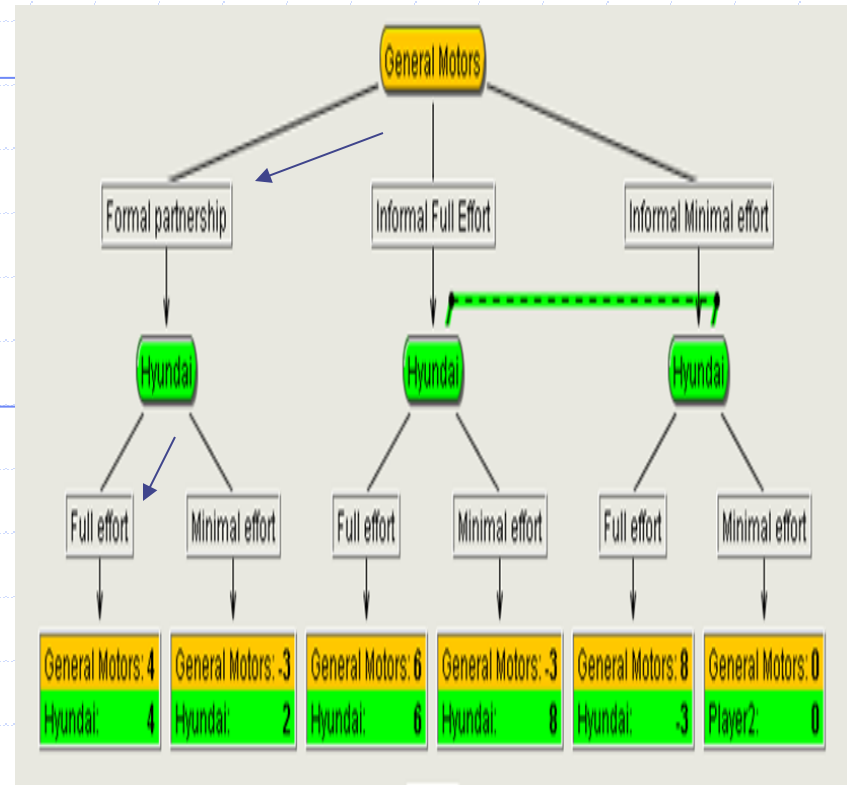
		General Motors	
		informal full effort	informal minimal effort
Hyundai	informal full effort	6, 6	-3, 8
	informal minimal effort	8, -3	0, 0

- ◆ In this subgame the strategies and payoff inequalities have the same structure as the **prisoners' dilemma**.
- ◆ The **dominant** strategy of both GM and Hyundai is to exert minimal effort.
- ◆ This yields a payoff of zero to each to both players.

Summary remarks

- ◆ If GM initially chooses:
 - Formal partnership, their payoff is 4.
 - Informal partnership, then the payoff will be 0.

◆ This shows the value of lawyers, leveraging off the judicial system to enforce commitment all round.



◆ More generally companies engage in rent seeking by looking for cooperative arrangements with each other at the expense of consumers (who pay higher prices) and taxpayers (funding the arrangements).