Unternehmensstrategien im Wettbewerb / Competitive Strategy

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This course is

- on firms and their decisions on prices, quantities, advertising, quality, ...,
- on the (obvious and less obvious) effects that those choices have on profits and
- on game theory as a major tool for analysing the behaviour of competing firms.

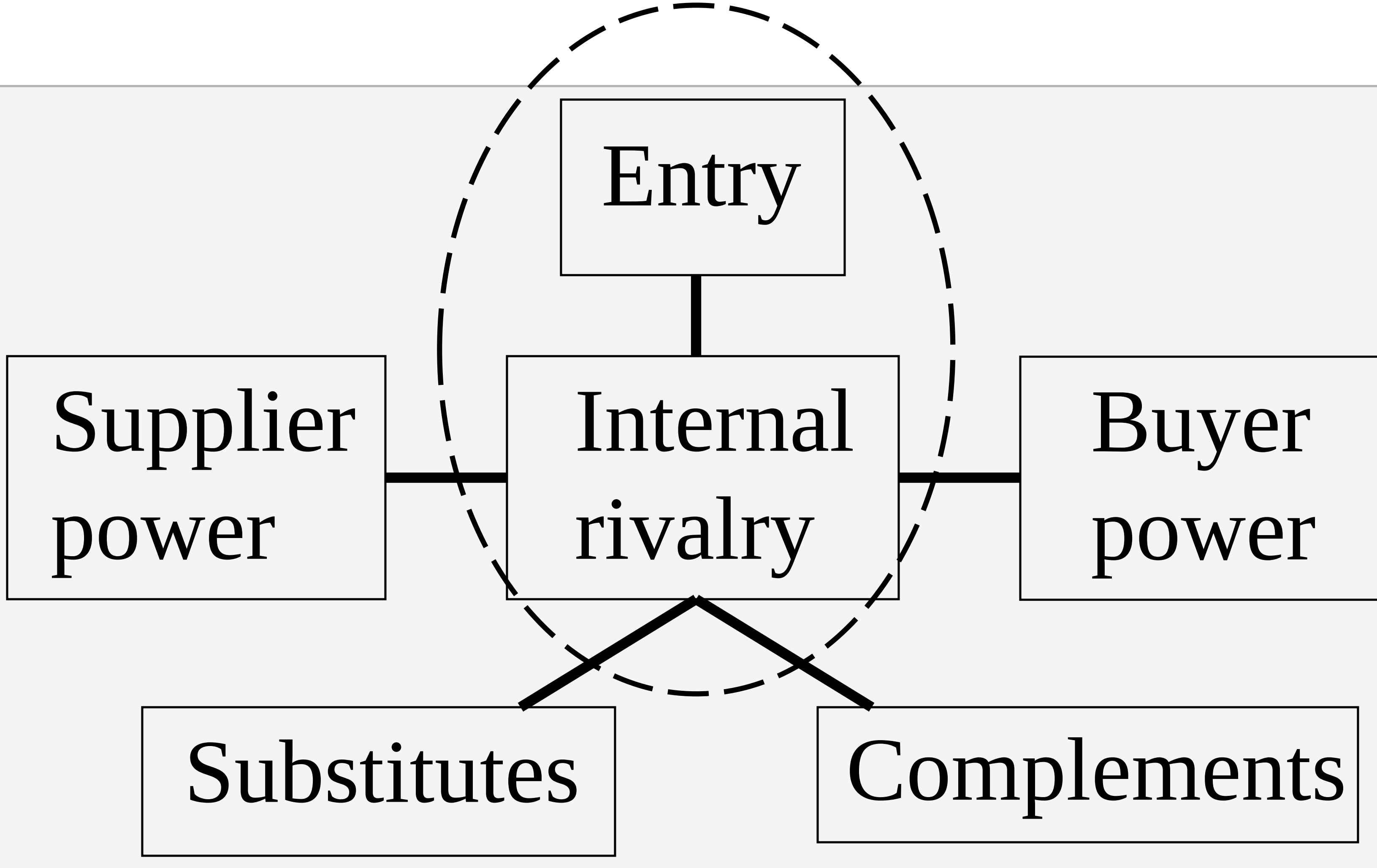
Structure - Conduct - Performance

- Number of buyers and sellers
- Barriers to entry
- Product differentia-tion
- Vertical integration

- Advertising
- Pricing
- Product choice
- Collusion
- Compatibility
- Investment
- R&D
- to sum up: 4 p

- Profits
- Technical progress
- Efficiency
- Product quality
- Unemploy-ment

Five (Porter) or six forces



Michael Porter`s generic strategies

- Cost leadership (Korean and Chinese shipyards)
- Differentiation
  - being better (Japanese shipyards: high quality vessels at premium prices)
  - being different (Scandinavian shipyards: specialized ships such as icebreakers)
  - being better known
  - being first

    ⋮

Course outline I

- Introduction
- Game theory
- Price setting
  - monopoly
  - oligopoly
- Quantity setting
  - monopoly
  - oligopoly
- Process innovation

} Homogeneous goods

Course outline II

- Product differentiation
- Advertising competition
- Compatibility competition

} Heterogeneous goods

Profit maximization

- Profit is defined as revenue minus costs.
- We do not discuss the desirability of profit maximization (stakeholder approach).
- Nor do we consider which organizational structures do lead firms to pursue profit maximization (several owners, manager).

We use game theory which

- is part of microeconomics,
- is also known as interactive decision theory,
- is well suited for the analysis of oligopolies, and
- is nowadays the main tool of analysis in industrial economics.

Reality is more colourful than simple game theory models, but

- it is impossible to find a truthful model of reality (unless reality itself is the model),
- we need glasses to look at and understand reality, and
- game theory helps understanding selected aspects of competition in the real world.

Literature on ...

- ... industrial economics:
  - Pfähler, Wilhelm/Wiese, Harald: Unternehmensstrategien im Wettbewerb, 2006
  - Shy, Oz: Industrial Organization, 1995
  - Tirole, Jean: The Theory of Industrial Organization, 1988
  - Bester, Helmut: Theorie der Industrieökonomik, 2004
  - Martin, Stephen: Industrial Economics, 1994

Literature on ...

- ... game theory:
  - Gibbons, Robert: A Primer in Game Theory, 1992
  - Wiese, Harald: Entscheidungs- und Spiel-theorie, 2002
- ... competition policy:
  - Neumann, Manfred: Wettbewerbspolitik, 2000
  - Knieps, Günter: Wettbewerbsökonomie, 2001

Literature on ...

- ... strategic analysis:
  - Welge, Martin K./Al-Laham, Andreas: Planung. Prozesse - Strategien - Maßnahmen, 2003
  - Grant, Robert M.: Contemporary Strategy Analysis, 2005
  - Besanko, David/Dranove, David/Shanley, Mark/Schaefer, Scott: Economics of Strategy, 2004
  - …

Three other books

- Shapiro, Carl/Varian, Hal R.: Information Rules, 1999
- Brandenburger, Adam/Nalebuff, Barry: Co-opetition, 1996
- Porter, Michael: Competitive Strategy, 1980

Course outline I

- Introduction
- Game theory
- Price setting
  - monopoly
  - oligopoly
- Quantity setting
  - monopoly
  - oligopoly
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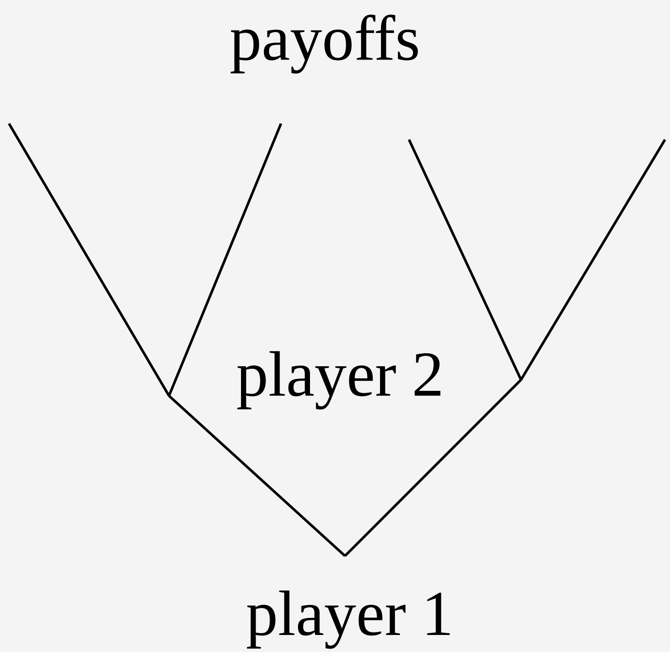
} Homogeneous goods

Game Theory

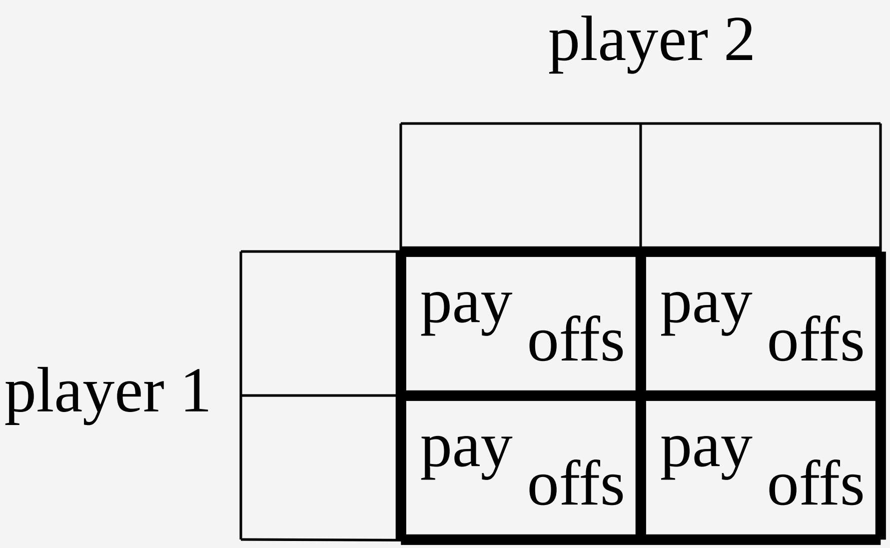
- Representations of Games
- Notions in Game Theory
- Backward solving
- External effects

Representations of Games

extensive form (game tree)



normal form (matrix)



Prisoners‘ Dilemma

		Gangster 2	
		deny	confess
Gangster 1	deny	3, 3	1, 4
	confess	4, 1	2, 2

- Nash equilibrium: (confess, confess)
- dominant strategy: confess

Notions in Game Theory

- **dominance**
  a strategy A dominates a strategy B of the same player if A yields a higher payoff than B for all strategies of the other player(s)
- **dominant strategy**
  a strategy that dominates all other strategies
- **dominated strategy**
  a strategy that is dominated by some other strategy
- **Nash equilibrium**
  a strategy combination where no player can achieve a higher payoff by deviating unilaterally

Game of Chicken

		Player 2	
		chicken out	continue to speed
Player 1	chicken out	2, 2	1, 4
	continue to speed	4, 1	0, 0

- Nash equilibria?
- dominant strategies?

Matching Pennies

		Player 2	
		Head	Tail
Player 1	Head	1, 0	0, 1
	Tail	0, 1	1, 0

- Nash equilibria?
- dominant strategies?

Battle of the Sexes: normal form

She

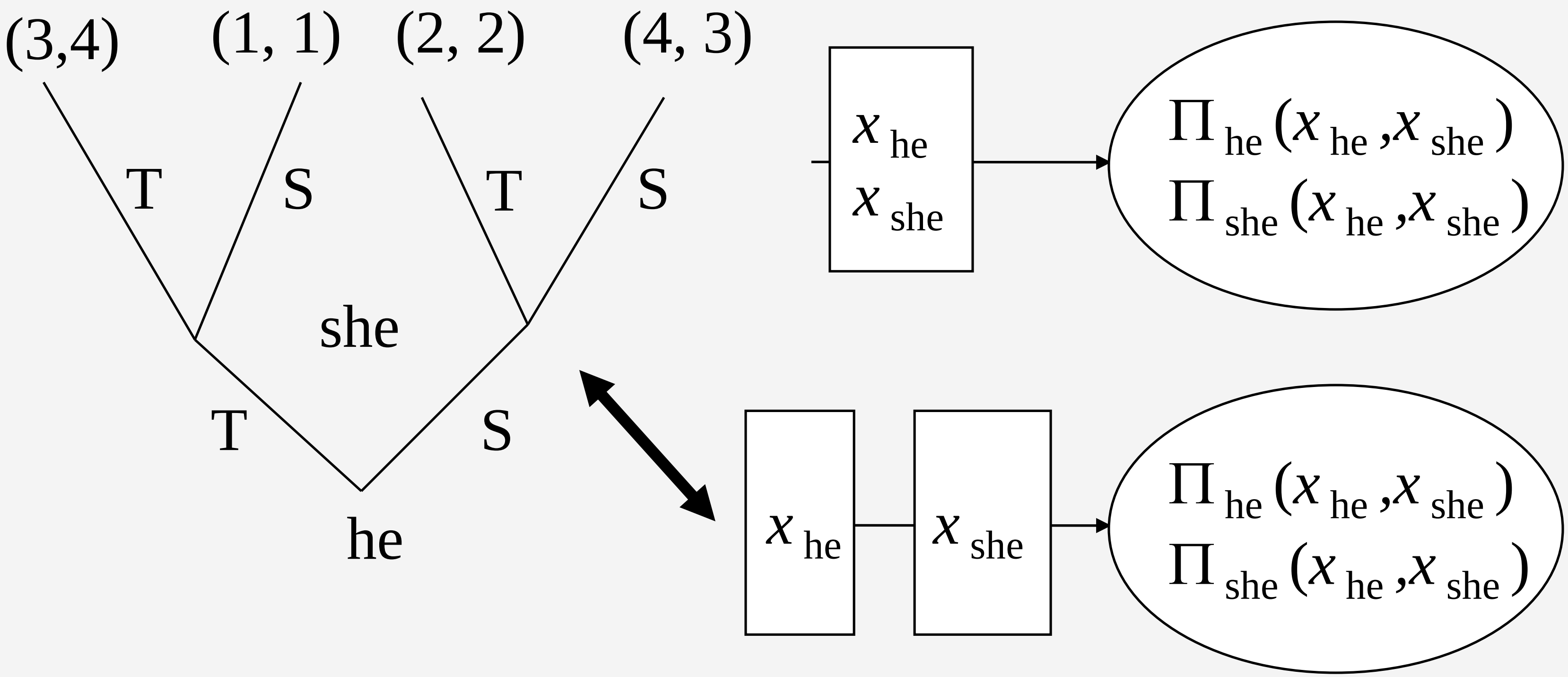
		theater	soccer
He	theater	3, 4	1, 1
	soccer	2, 2	4, 3

- Nash equilibria?
- dominant strategies?

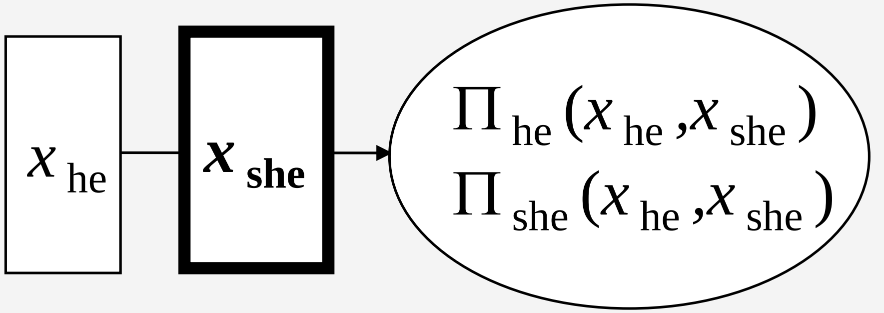
Battle of the Sexes: extensive form

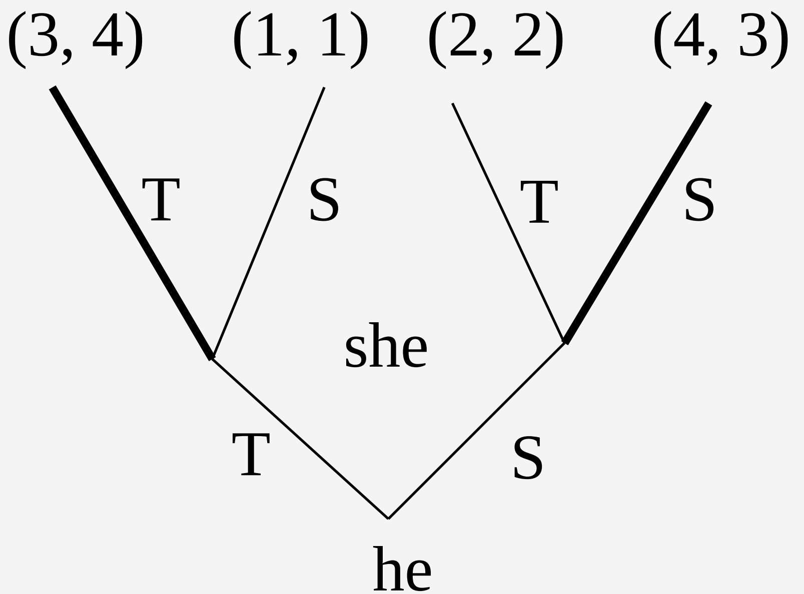
extensive form (game tree)

Game structures/
competition structures

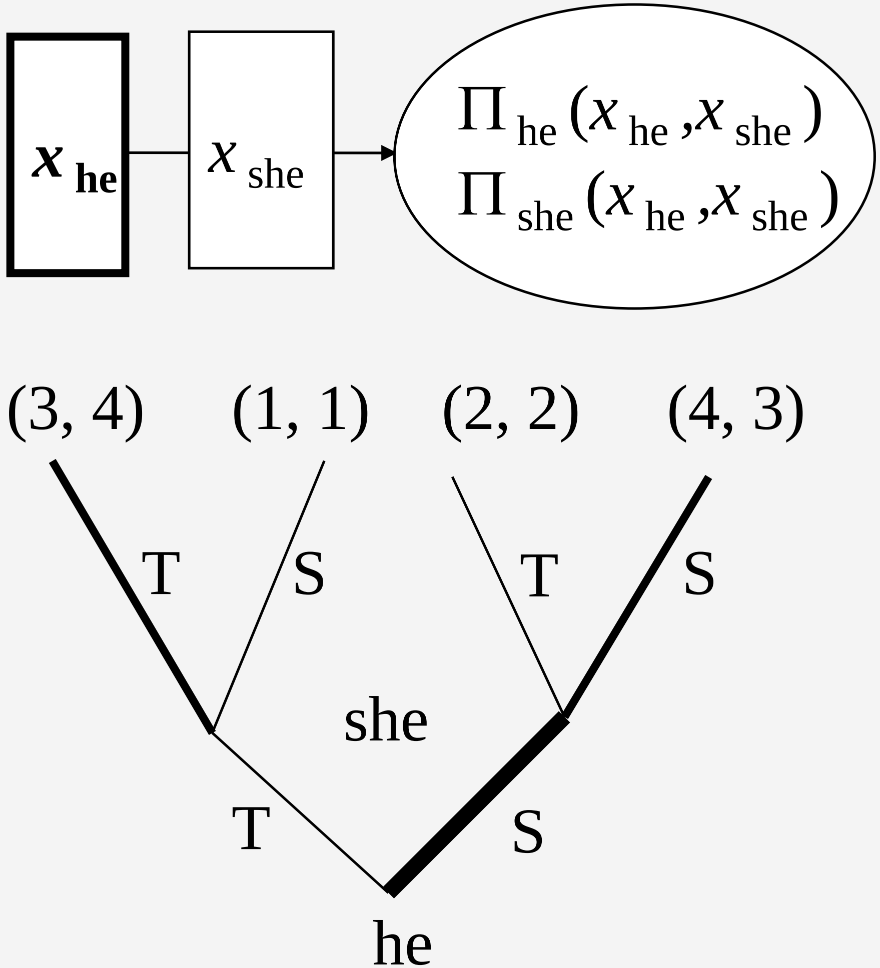


Battle of the Sexes: backward induction, second stage



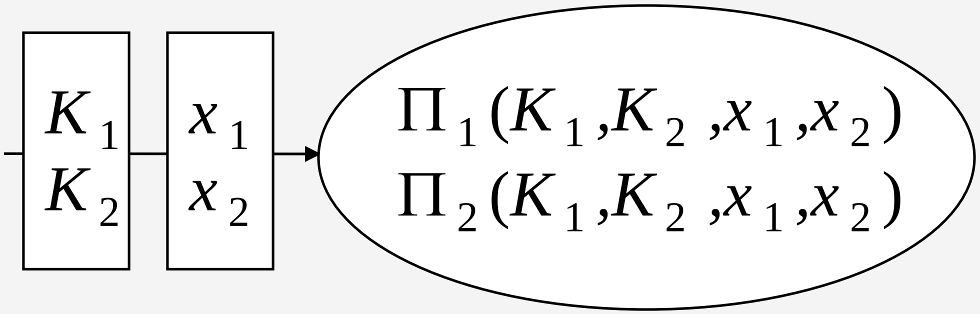


Battle of the Sexes: backward induction, first stage



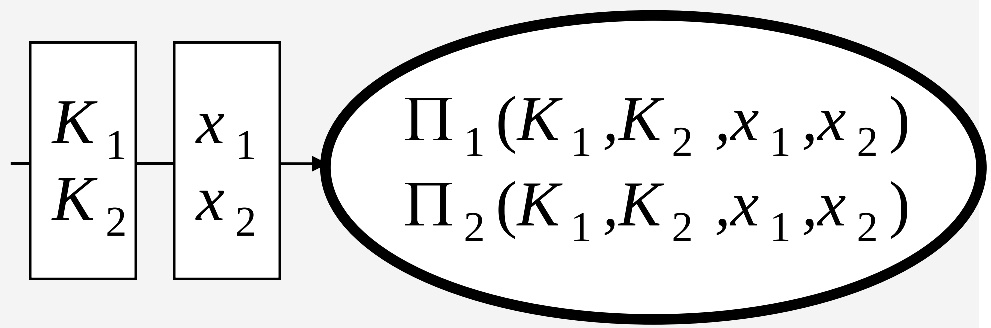
Backward solving I

- Competition structure



- Profit functions

$$\Pi_1(K_1, K_2, x_1, x_2)$$
$$\Pi_2(K_1, K_2, x_1, x_2)$$



Backward solving II

- Reaction functions second stage

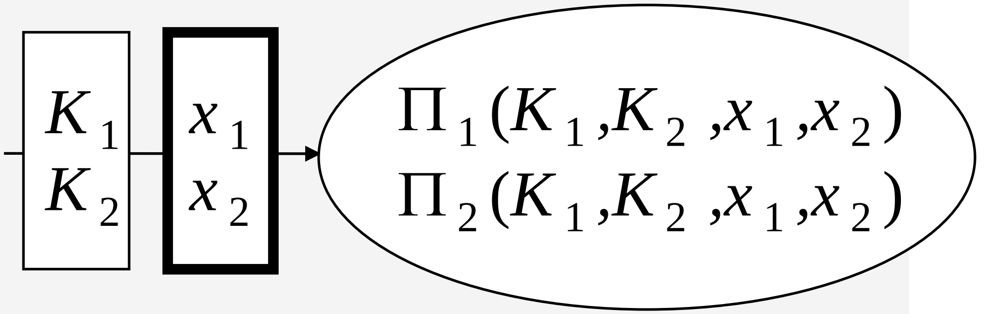
$$x_1^R(K_1, K_2, x_2) = \arg\max_{x_1} \Pi_1(K_1, K_2, x_1, x_2)$$

$$x_2^R(K_1, K_2, x_1) = \arg\max_{x_2} \Pi_2(K_1, K_2, x_1, x_2)$$

- Equilibrium second stage

$$x_1^N = x_1^R(K_1, K_2, x_2^N)$$

$$x_2^N = x_2^R(K_1, K_2, x_1^N)$$

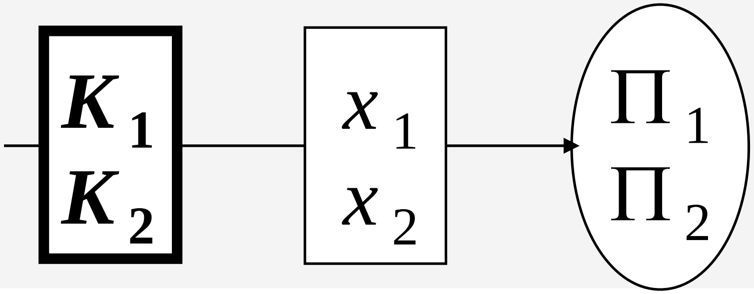


Backward solving III

- First stage

$$\Pi_1\left(K_1, K_2, x_1^N(K_1, K_2), x_2^N(K_1, K_2)\right)$$
$$\Pi_2\left(K_1, K_2, x_1^N(K_1, K_2), x_2^N(K_1, K_2)\right)$$

or



Backward solving IV

- Profit functions first stage

$$\Pi_1^N(K_1, K_2) = \Pi_1\left(K_1, K_2, x_1^N(K_1, K_2), x_2^N(K_1, K_2)\right)$$
$$\Pi_2^N(K_1, K_2) = \Pi_2\left(K_1, K_2, x_1^N(K_1, K_2), x_2^N(K_1, K_2)\right)$$

- Reaction functions first stage

$$K_1^R(K_2) = \arg\max_{K_1} \Pi_1^N(K_1, K_2)$$
$$K_2^R(K_1) = \arg\max_{K_2} \Pi_2^N(K_1, K_2)$$

Backward solving V

- Equilibrium first stage

$$K_1^N = K_1^R\left(K_2^N\right)$$

$$K_2^N = K_2^R\left(K_1^N\right)$$

External effects I

Positive

$$\frac{d\Pi_2(K_1)}{dK_1} > 0$$

Negative

$$\frac{d\Pi_2(K_1)}{dK_1} < 0$$

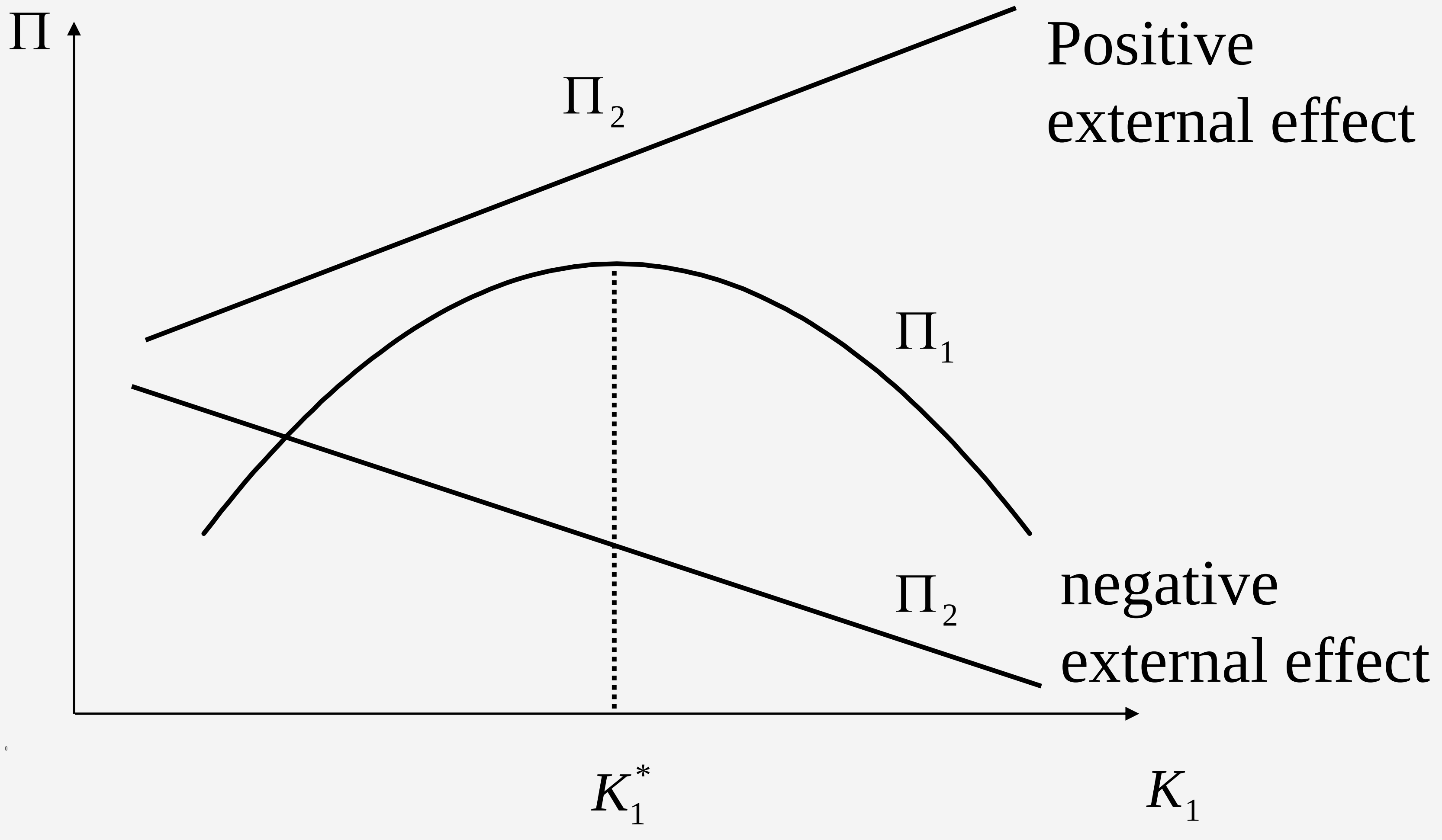
Reciprocal

$$\frac{d\Pi_2(K_1)}{dK_1} \neq 0$$

and

$$\frac{d\Pi_1(K_2)}{dK_2} \neq 0$$

External effects II



External effects and cartel

Optimal action K_1^N satisfies: $$\left.\frac{d\Pi_1(K_1)}{dK_1}\right|_{K_1^N} = 0$$

	pos. external effect of dK_1	neg. external effect of dK_1
External effect exist, if	$\frac{d\Pi_2(K_1)}{dK_1} > 0$	$\frac{d\Pi_2(K_1)}{dK_1} < 0$
Cartel solution requires	$K_1^{Kart} > K_1^N$	$K_1^{Kart} < K_1^N$