Oligopoly

Rob Hayward

December 9, 2016

Imperfect competition

There are two broad categories of *imperfect competition*

Imperfect competition

There are two broad categories of *imperfect competition*

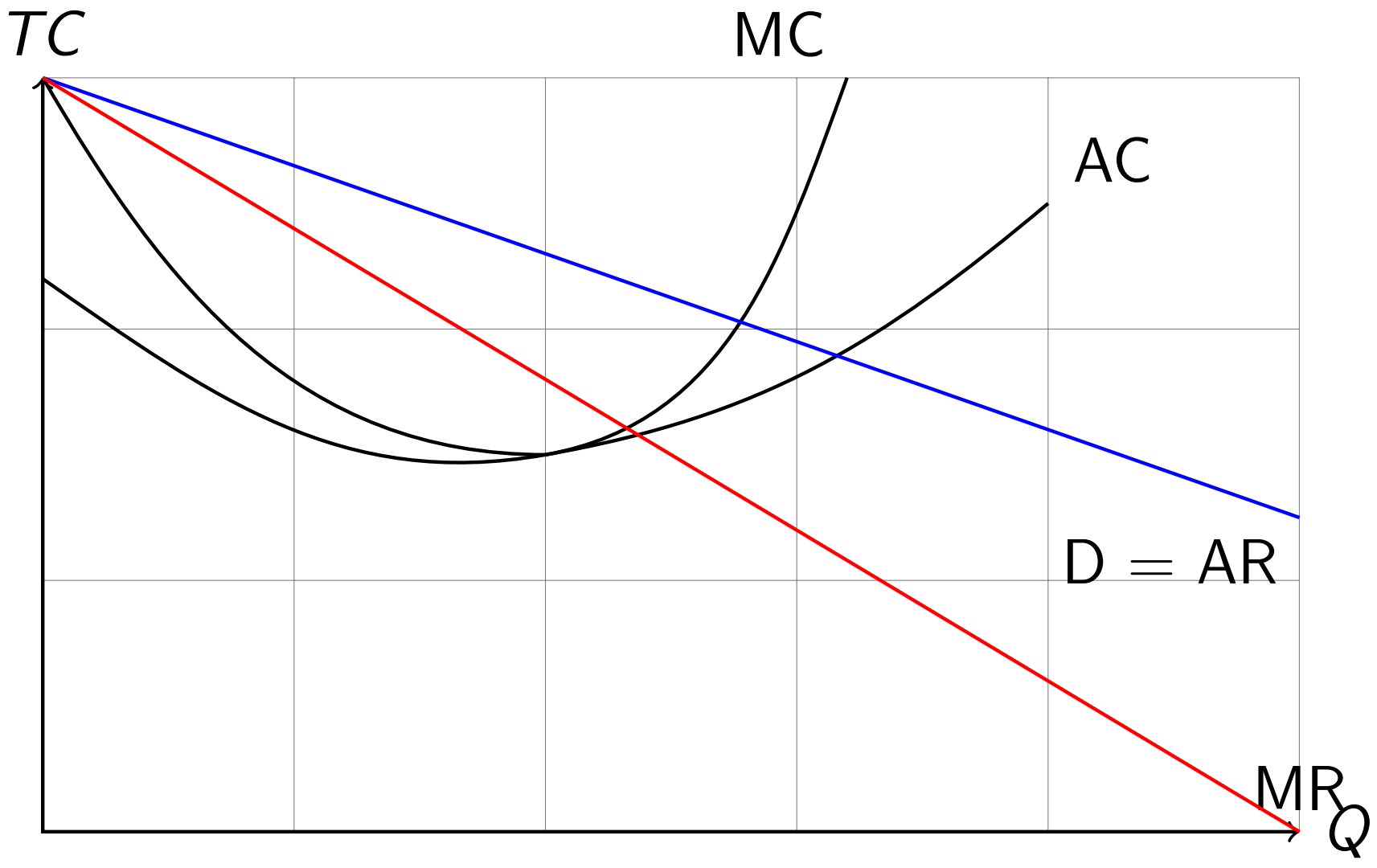
- Monopolistic competition: where there is *product differentiation*. There tend to be lots of small companies because there are no barriers to entry

Imperfect competition

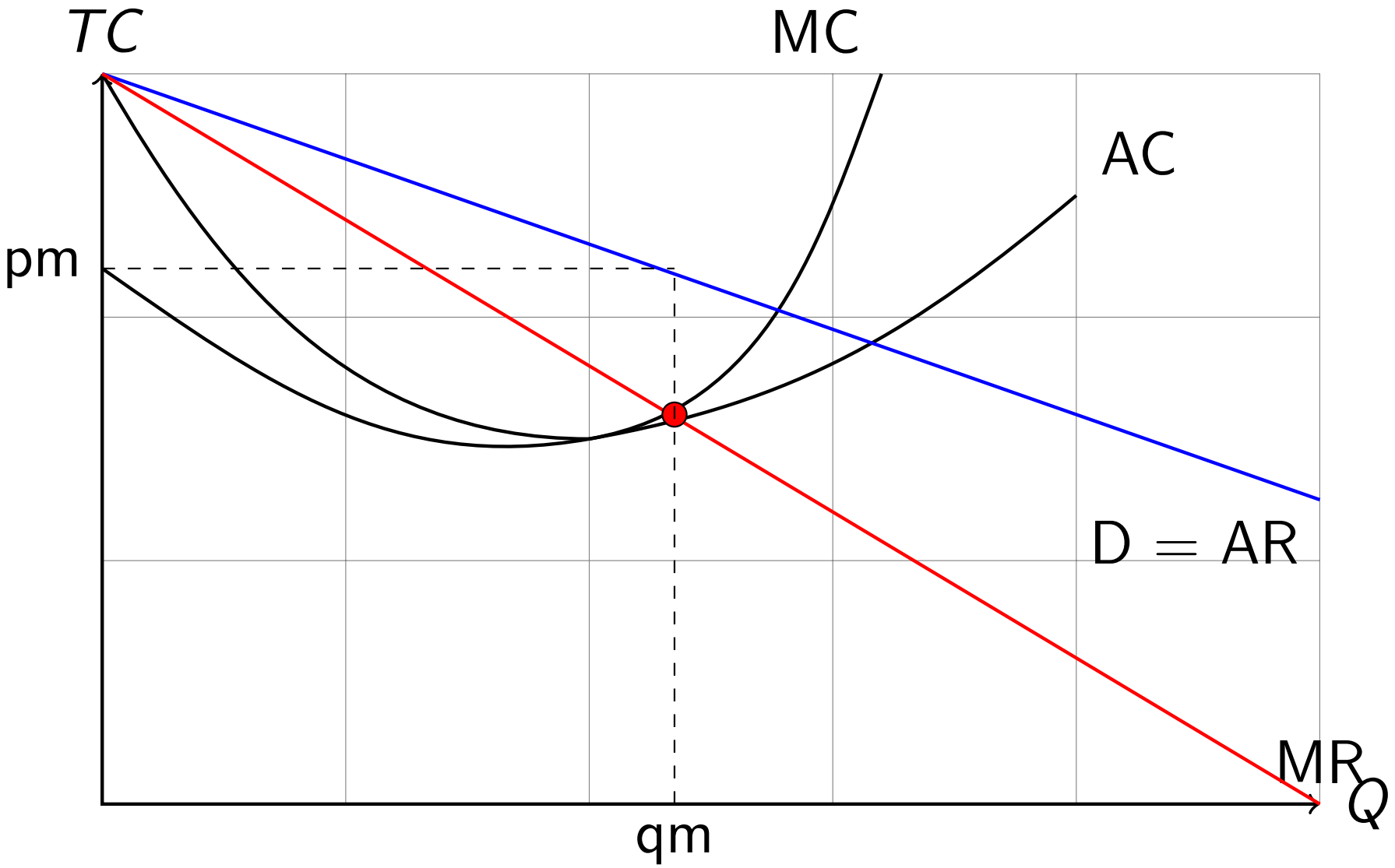
There are two broad categories of *imperfect competition*

- Monopolistic competition: where there is *product differentiation*. There tend to be lots of small companies because there are no barriers to entry
- Oligopoly: where there are some barriers to entry. There tend to be a few large companies

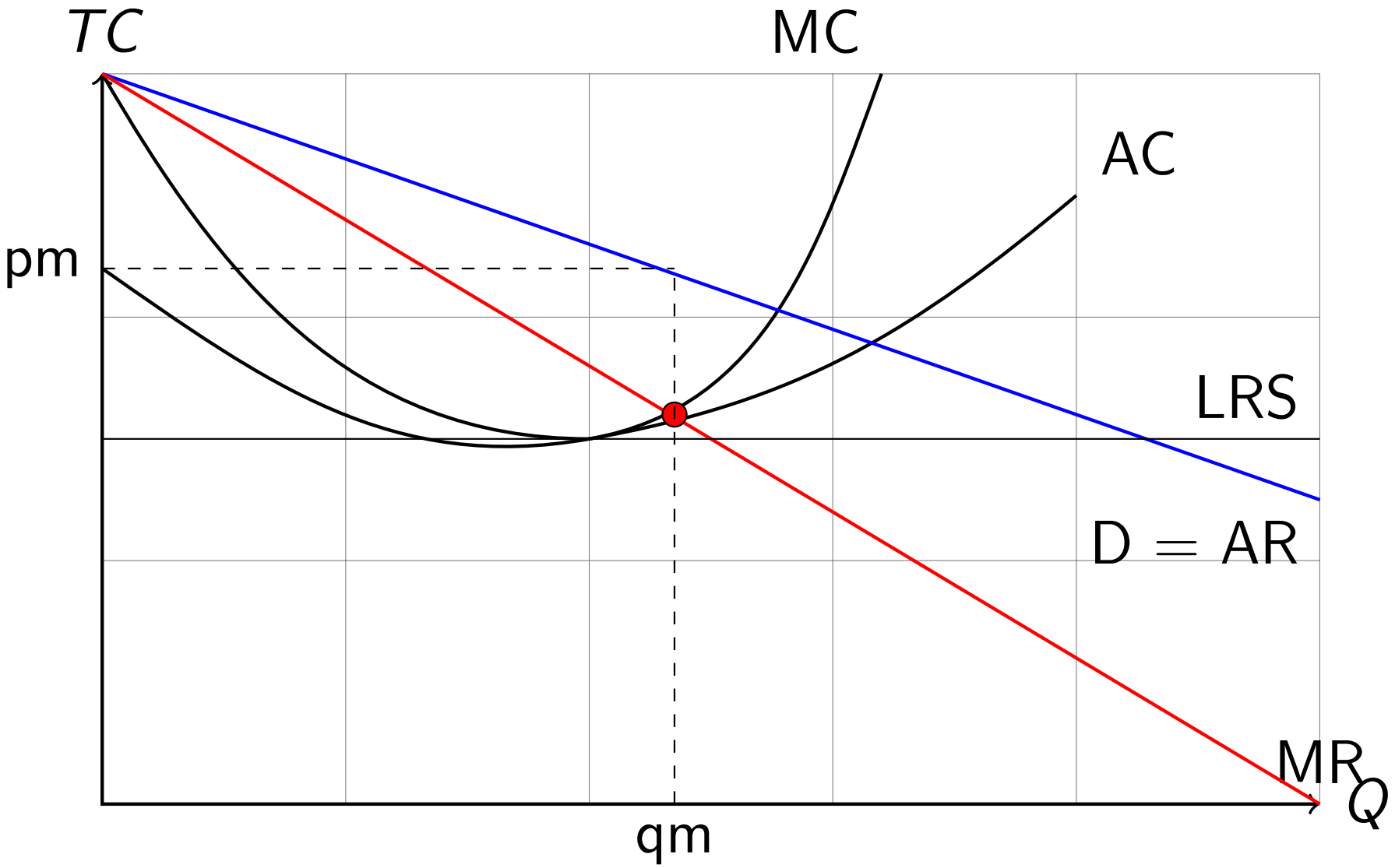
Competition vs monopoly



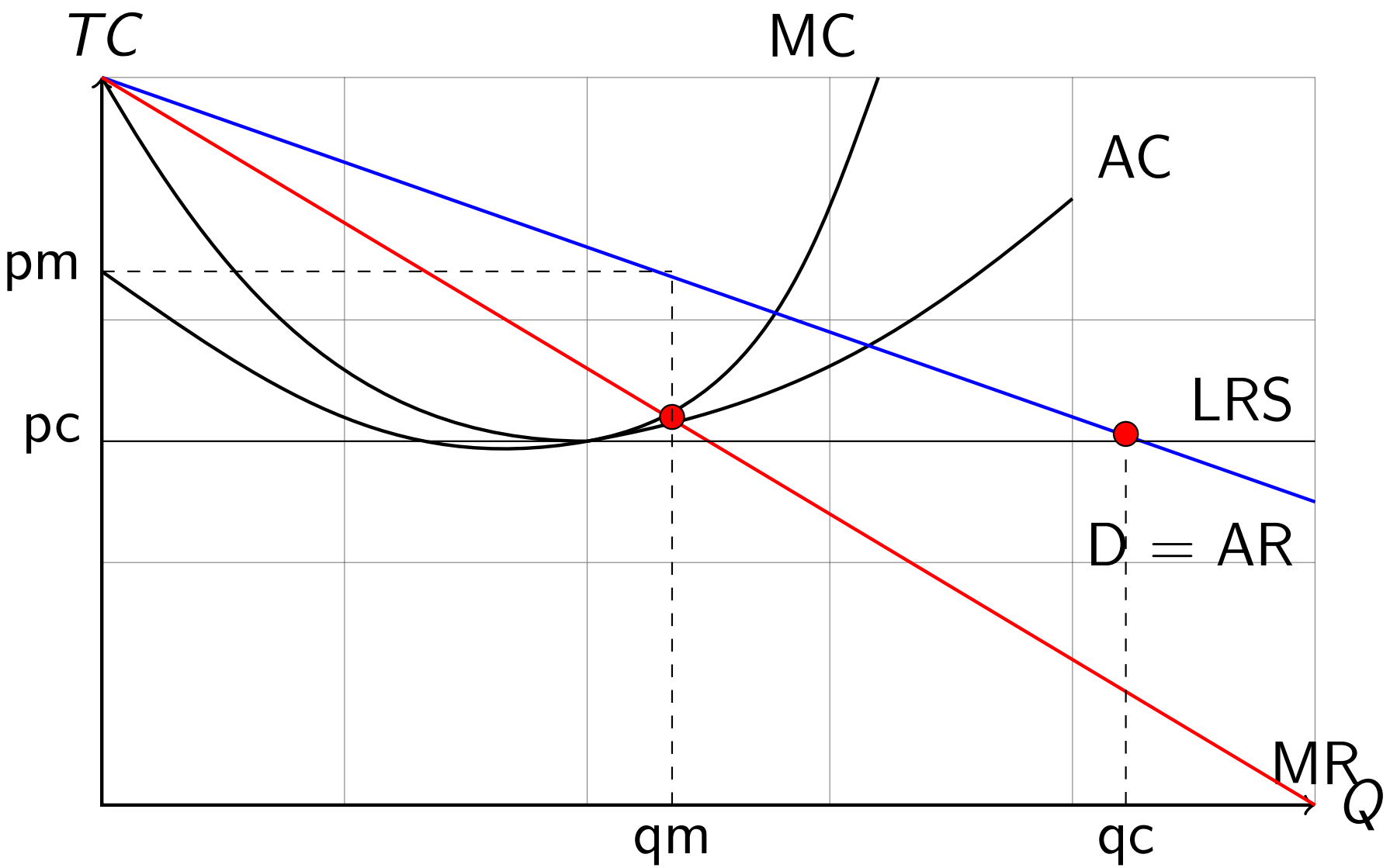
Competition vs monopoly



Competition vs monopoly



Competition vs monopoly



Factors that influence level of competition

The level of competition is influenced by

Factors that influence level of competition

The level of competition is influenced by

- The number of firms

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand
  - costs

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand
  - costs
  - technology

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand
  - costs
  - technology
- Level of product standardisation

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand
  - costs
  - technology
- Level of product standardisation
- Durability of barriers to entry

Factors that influence level of competition

The level of competition is influenced by

- The number of firms
- The variability of
  - demand
  - costs
  - technology
- Level of product standardisation
- Durability of barriers to entry
- Level of social cohesion

Interdependence

- A key feature of oligopoly is *interdependence*.

Interdependence

- A key feature of oligopoly is *interdependence*.
- The firm is influenced by the other firms in the industry

Interdependence

- A key feature of oligopoly is *interdependence*.
- The firm is influenced by the other firms in the industry
- Actions (pricing and output) will depend on expected action of other firms

Interdependence

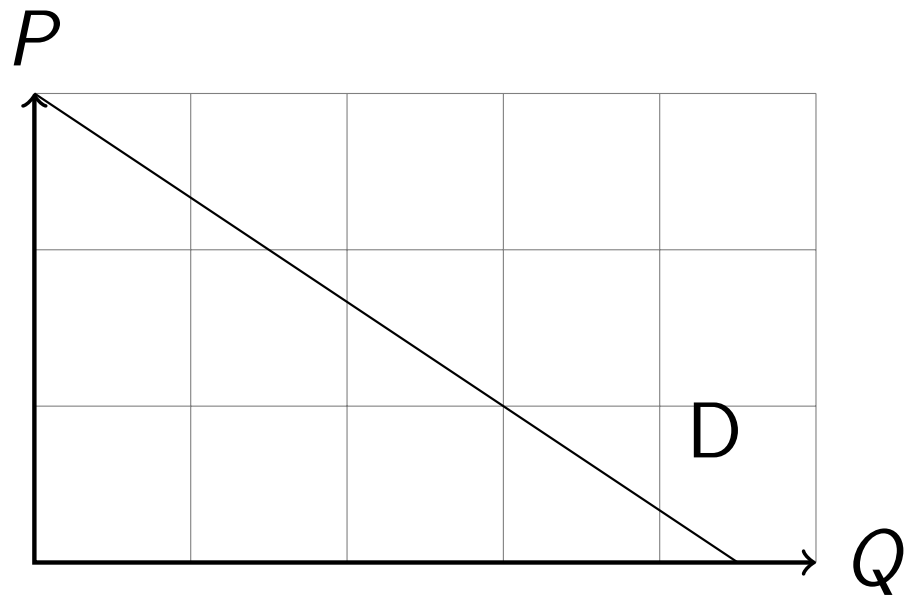
- A key feature of oligopoly is *interdependence*.
- The firm is influenced by the other firms in the industry
- Actions (pricing and output) will depend on expected action of other firms
- More complicated analysis.

Interdependence

- A key feature of oligopoly is *interdependence*.
- The firm is influenced by the other firms in the industry
- Actions (pricing and output) will depend on expected action of other firms
- More complicated analysis.
- Use of *game theory*

Duopoly

Q	P	TR (P × Q
0	120	0
20	100	2000
40	80	3200
60	60	3600
80	40	3200
100	20	2000
120	0	0



Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition

Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition
  - MC = MR = 0 (output equal to 60 litres)

Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition
  - MC = MR = 0 (output equal to 60 litres)
  - total output is equal to 120 litres

Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition
  - MC = MR = 0 (output equal to 60 litres)
  - total output is equal to 120 litres
- Collusion

Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition
  - MC = MR = 0 (output equal to 60 litres)
  - total output is equal to 120 litres
- Collusion
  - profit is maximised at 60 litres (30 each)

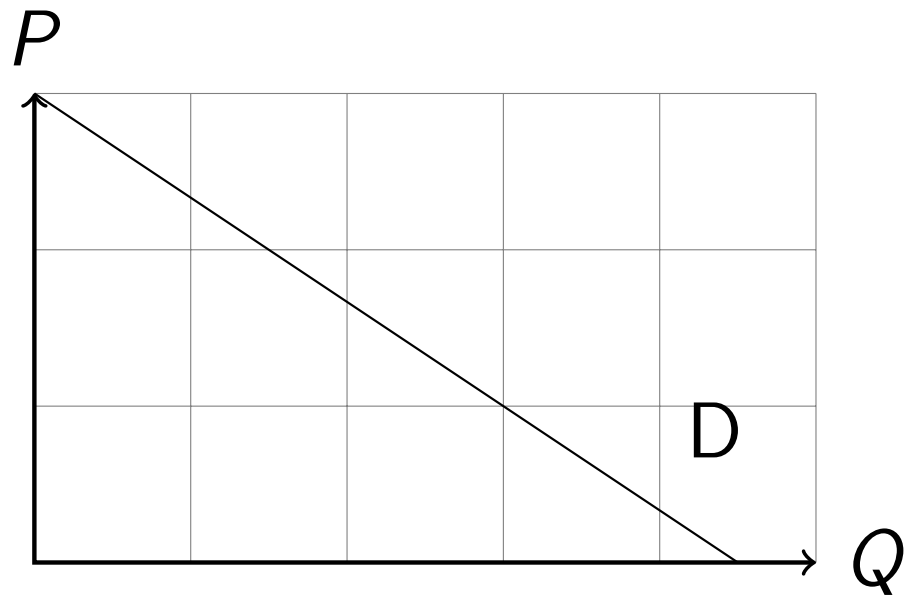
Duopoly 2

Outcome depends on the action of the two firms.
Marginal cost of drawing water is zero

- Competition
  - MC = MR = 0 (output equal to 60 litres)
  - total output is equal to 120 litres
- Collusion
  - profit is maximised at 60 litres (30 each)
  - profit is 3600 (1800 each)

Duopoly

Q	P	TR (P × Q
0	120	0
20	100	2000
40	80	3200
60	60	3600
80	40	3200
100	20	2000
120	0	0



Cartels

Cartels

- OPEC

Cartels

Cartels

- OPEC
- LCD display

Cartels

Cartels

- OPEC
- LCD display
- England football shirts

Cartels

Cartels

- OPEC
- LCD display
- England football shirts
- FX fixing

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)
- There is an incentive for one to cheat and produce 40 litres

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)
- There is an incentive for one to cheat and produce 40 litres
- Total output of 70, price 50, profit 3500 (2000-1500 split)

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)
- There is an incentive for one to cheat and produce 40 litres
- Total output of 70, price 50, profit 3500 (2000-1500 split)
- Or, total output 80, price 40, profit 3200 (1600 each)

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)
- There is an incentive for one to cheat and produce 40 litres
- Total output of 70, price 50, profit 3500 (2000-1500 split)
- Or, total output 80, price 40, profit 3200 (1600 each)
- *Nash equilibrium*

Nash equilibrium

Without a cartel, there is an incentive to push output above the *joint* profit-maximising

- Each produce 30 litres at 60 (profit is 3600 or 1800 each)
- There is an incentive for one to cheat and produce 40 litres
- Total output of 70, price 50, profit 3500 (2000-1500 split)
- Or, total output 80, price 40, profit 3200 (1600 each)
- *Nash equilibrium*
- Total output 90, price 30, profit 2700 (1500 1200 split)

Number of firms

The larger the number of firms, the more likely that the firm will increase output. Decision for each firm is a balance of

Number of firms

The larger the number of firms, the more likely that the firm will increase output. Decision for each firm is a balance of

- Output effect (if price is above marginal cost, selling more will raise profit)

Number of firms

The larger the number of firms, the more likely that the firm will increase output. Decision for each firm is a balance of

- Output effect (if price is above marginal cost, selling more will raise profit)
- Price effect (raising output will increase total output and reduce the price and the profit on all the units sold)

Number of firms

The larger the number of firms, the more likely that the firm will increase output. Decision for each firm is a balance of

- Output effect (if price is above marginal cost, selling more will raise profit)
- Price effect (raising output will increase total output and reduce the price and the profit on all the units sold)

Number of firms

The larger the number of firms, the more likely that the firm will increase output. Decision for each firm is a balance of

- Output effect (if price is above marginal cost, selling more will raise profit)
- Price effect (raising output will increase total output and reduce the price and the profit on all the units sold)

At the extreme as number of firms tends to infinity, output effect dominates and there is perfect competition.

Game theory

Game theory is the study of decision-making under interdependence.

Game theory

Game theory is the study of decision-making under interdependence.

- Players or actors make *strategic decisions*

Game theory

Game theory is the study of decision-making under interdependence.

- Players or actors make *strategic decisions*
- Strategies have *pay-offs* that depend on the decision and the decision that is adopted by other players

Game theory

Game theory is the study of decision-making under interdependence.

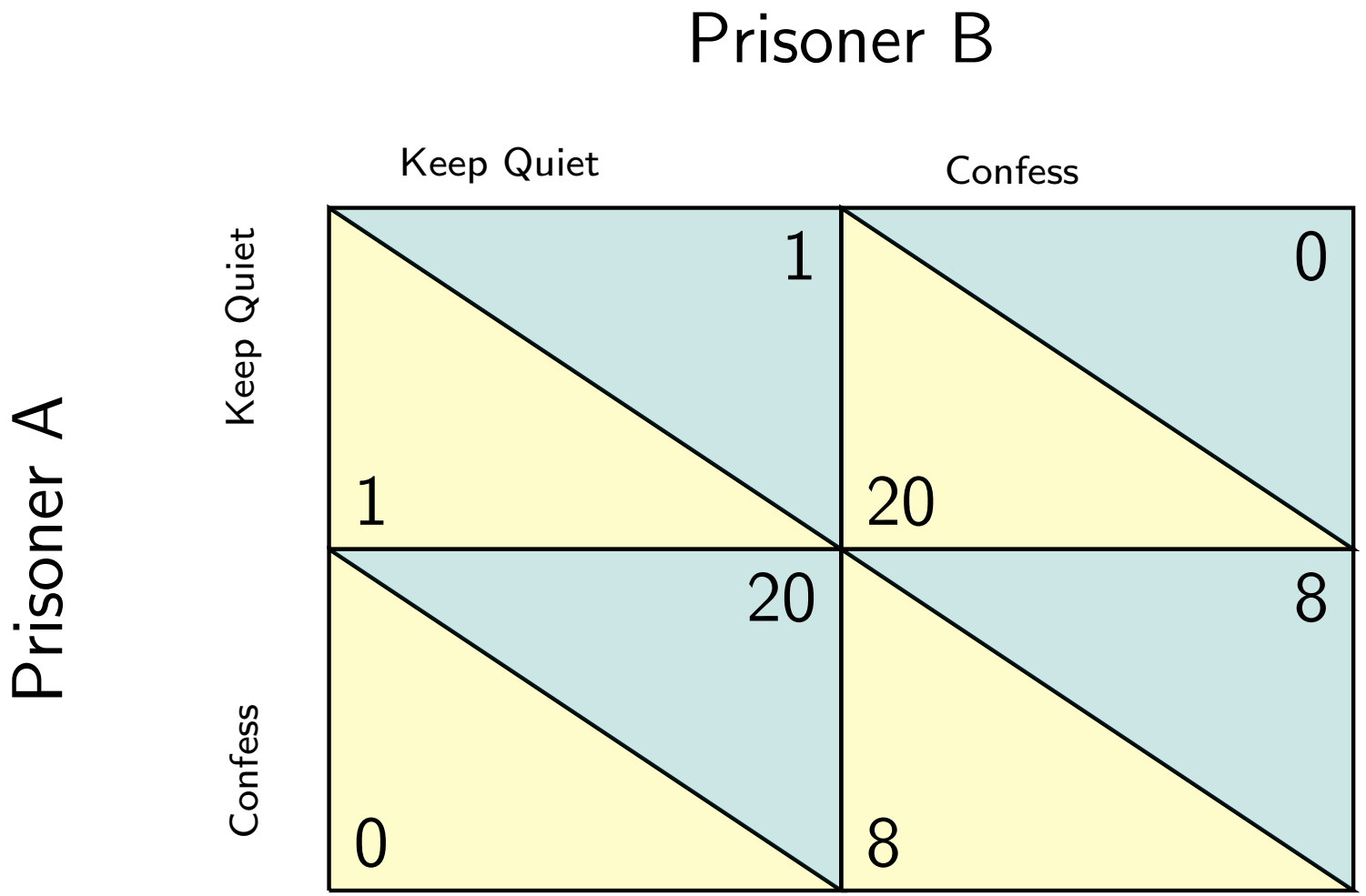
- Players or actors make *strategic decisions*
- Strategies have *pay-offs* that depend on the decision and the decision that is adopted by other players
- Own pay-offs and pay-offs to other players are known

Game theory

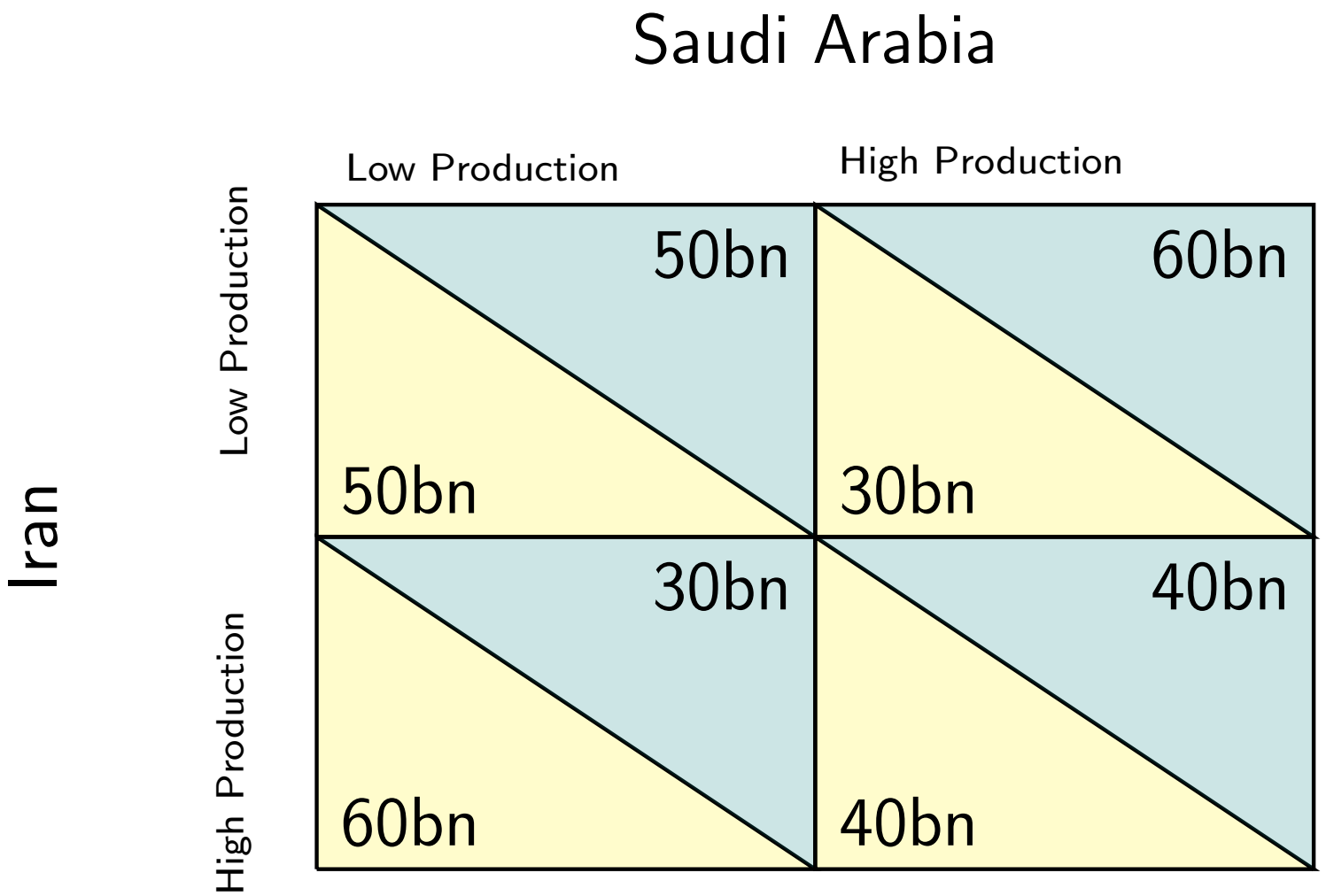
Game theory is the study of decision-making under interdependence.

- Players or actors make *strategic decisions*
- Strategies have *pay-offs* that depend on the decision and the decision that is adopted by other players
- Own pay-offs and pay-offs to other players are known
- These are portrayed in a *pay-off matrix*

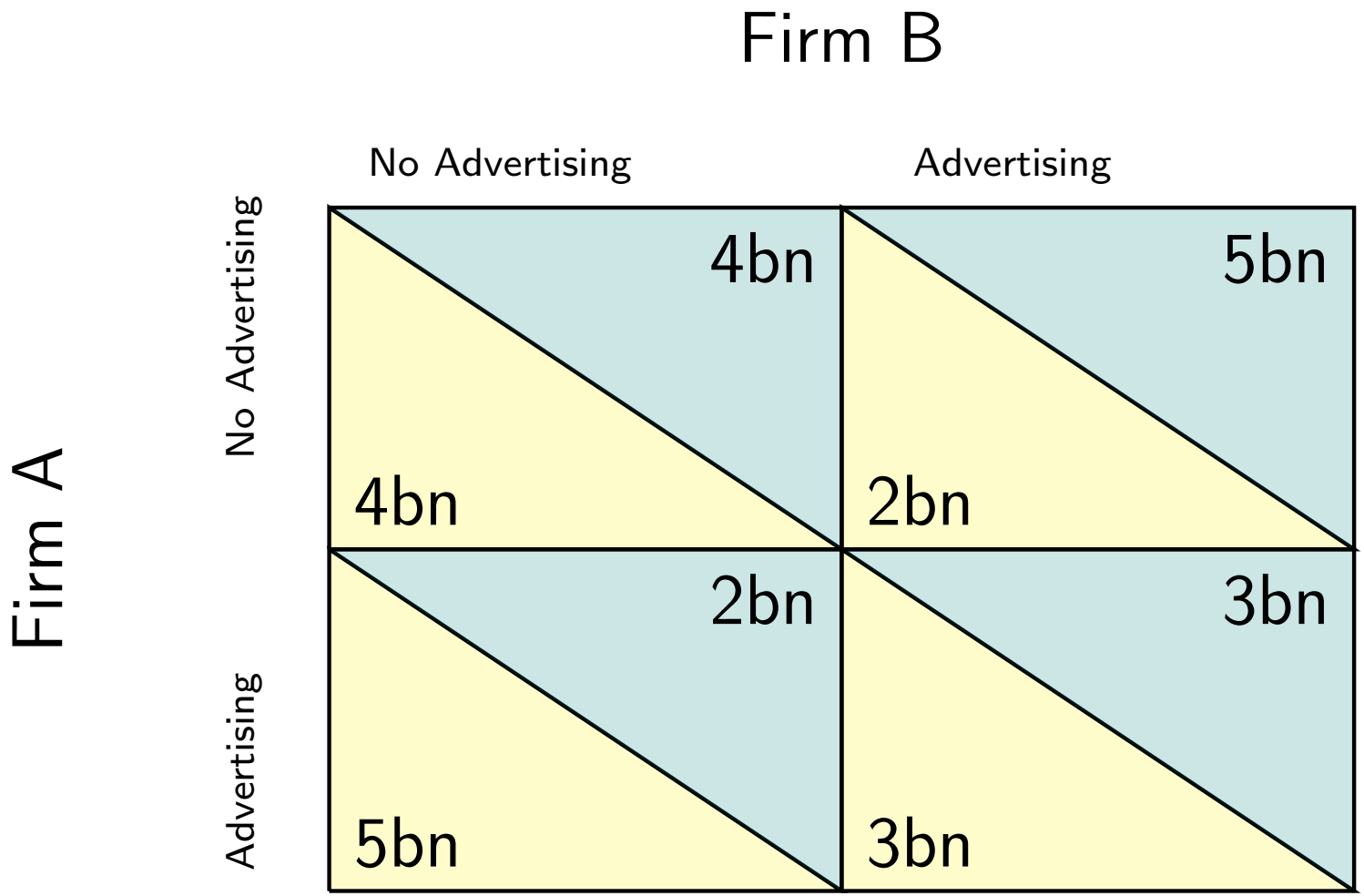
Prisoners' dilemma 1



Prisoners' dilemma 2



Prisoners' dilemma 3



Cooperative games

It is often the case that a better outcome can be reached with cooperation. However, this demand some agreement between the parties.

Cooperative games

It is often the case that a better outcome can be reached with cooperation. However, this demand some agreement between the parties.

- Commitment: taking some action that determines future decisions (*Conquistadores*)

Cooperative games

It is often the case that a better outcome can be reached with cooperation. However, this demand some agreement between the parties.

- Commitment: taking some action that determines future decisions (*Conquistadores*)
- Threats and punishment (Over-production, beating ...)

Cooperative games

It is often the case that a better outcome can be reached with cooperation. However, this demand some agreement between the parties.

- Commitment: taking some action that determines future decisions (*Conquistadores*)
- Threats and punishment (Over-production, beating ...)
- Repeated games and *Super-games*

Cooperative games

It is often the case that a better outcome can be reached with cooperation. However, this demand some agreement between the parties.

- Commitment: taking some action that determines future decisions (*Conquistadores*)
- Threats and punishment (Over-production, beating ...)
- Repeated games and *Super-games*
- The auction of G3 networks

Other issues

- Product differentiation

Other issues

- Product differentiation
  - The more differentiated, the more market power

Other issues

- Product differentiation
  - The more differentiated, the more market power
- Barriers to entry

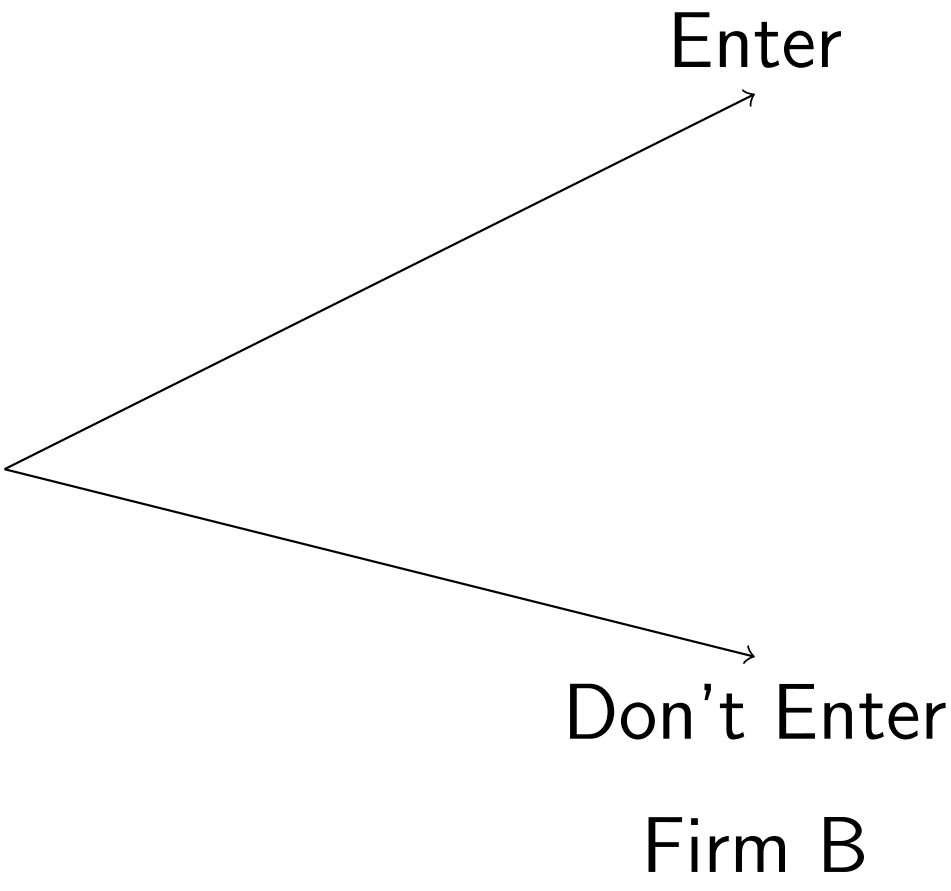
Other issues

- Product differentiation
  - The more differentiated, the more market power
- Barriers to entry
  - *Contestable markets*

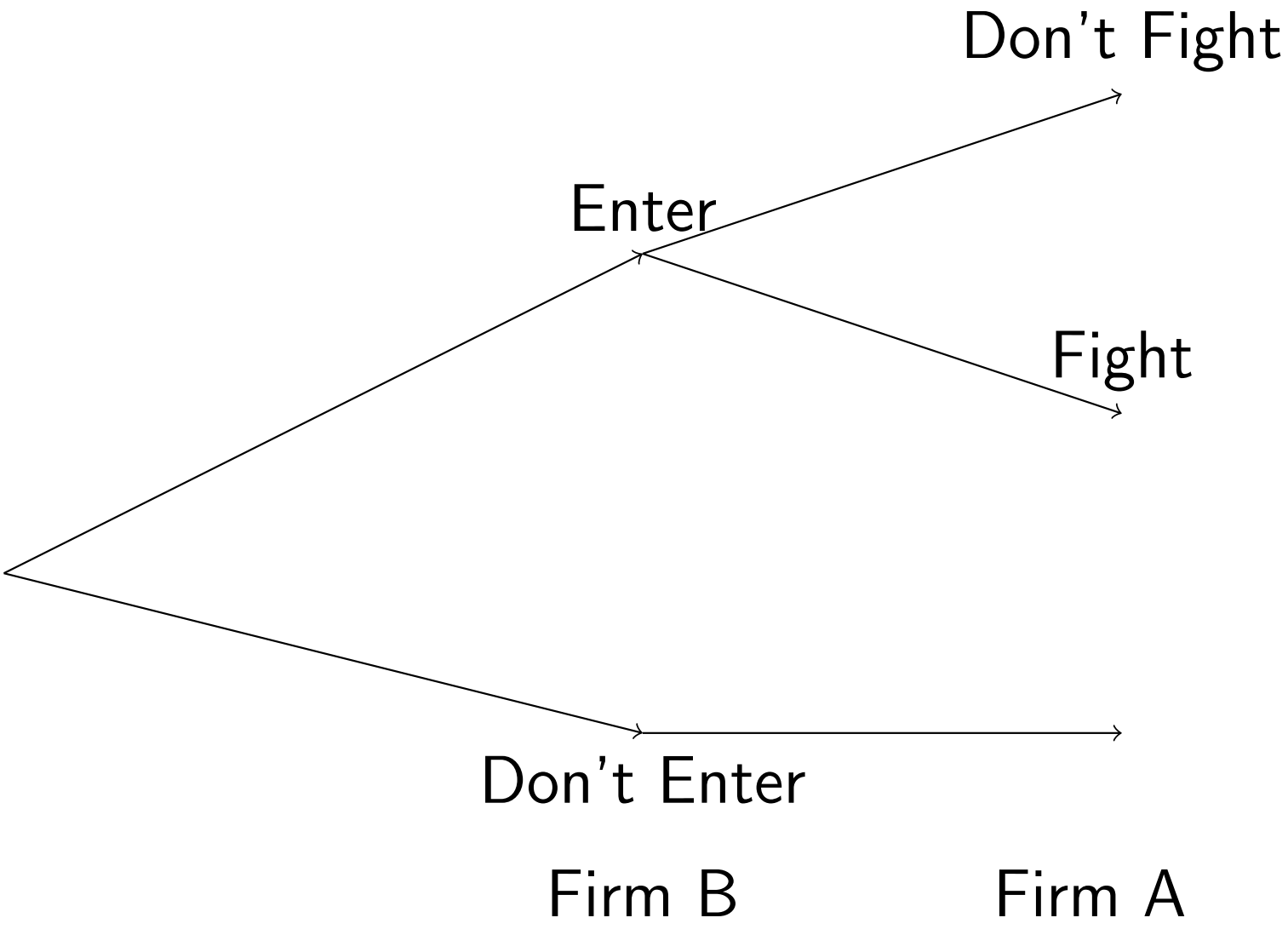
Other issues

- Product differentiation
  - The more differentiated, the more market power
- Barriers to entry
  - *Contestable markets*
  - Credible threats

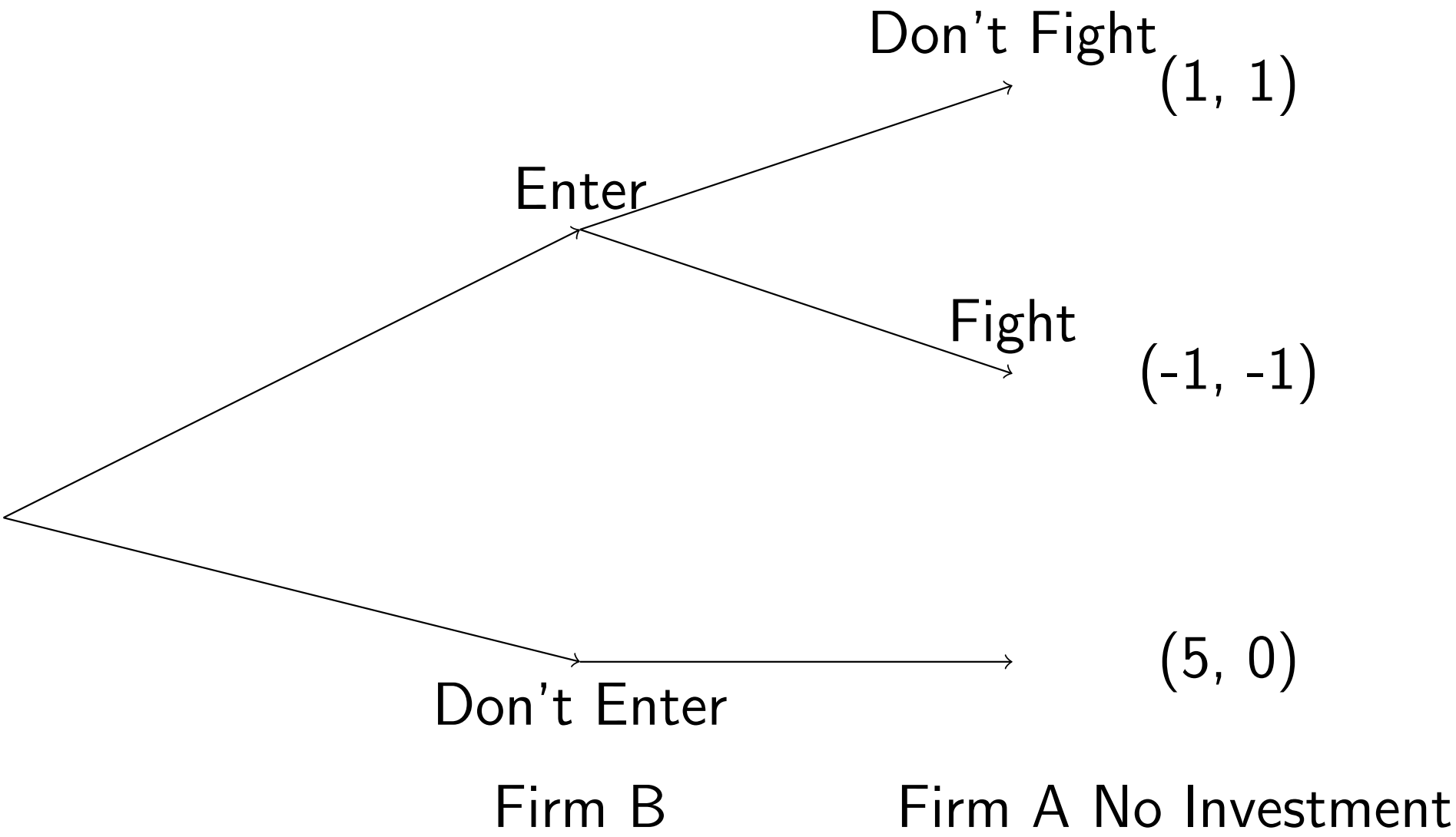
Credible Threats: No investment



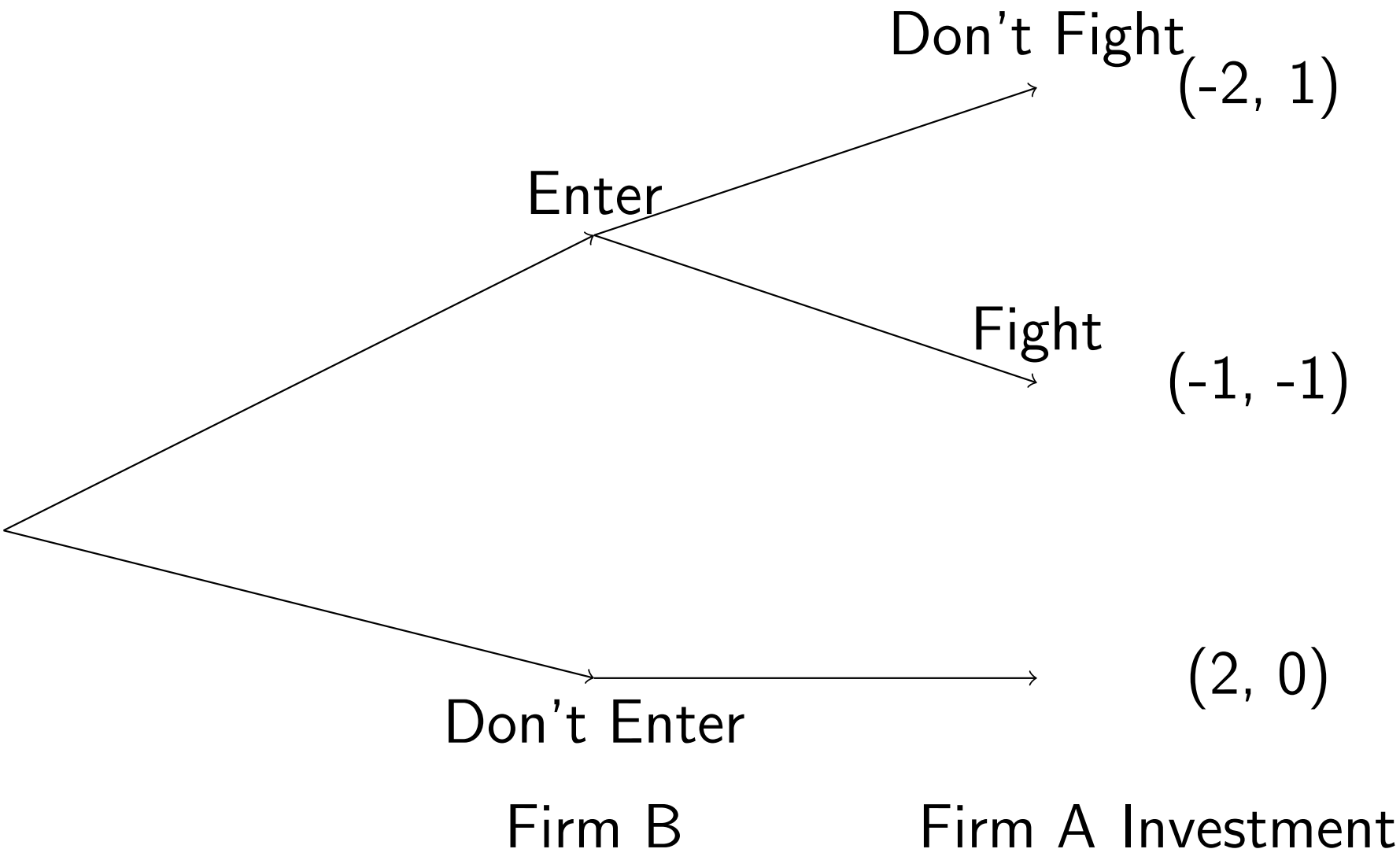
Credible Threats: No investment



Credible Threats: No investment



Credible Threats: Investment



Controversies

- Retail price maintenance

Controversies

- Retail price maintenance
  - De Beers/Jeans

Controversies

- Retail price maintenance
  - De Beers/Jeans
- Predatory pricing

Controversies

- Retail price maintenance
  - De Beers/Jeans
- Predatory pricing
  - Lemon bus

Controversies

- Retail price maintenance
  - De Beers/Jeans
- Predatory pricing
  - Lemon bus
- Tying

Controversies

- Retail price maintenance
  - De Beers/Jeans
- Predatory pricing
  - Lemon bus
- Tying
  - Gillette-printers