Gliederung der Vorlesung

Teil 1: Markt- und Preistheorie

A   Perfect Competition vs. Monopoly

B   Market Power, Competition, and Welfare
◄
    1) Welfare and Efficiency
    2) The Cournot Model
    3) The Bertrand Model ▶
    4) Cournot: asymmetric firms
    5) Bertrand: asymmetric firms
    6) Dynamic Efficiency and
       Incentive to Innovate
    8) Contestable Markets
    9) Persistance of Dominance ▶

C   Market Structure and Market Power

D   Collusion and Cartels

Teil 2: Wettbewerbstheorie und –politik

E   Competition Policy

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    Zusammenschlüsse

I   Behinderungsstrategien – Kampfpreise,
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B1: Market power, competition, and welfare

- Key questions:
  - What is market power?
  - How bad is market power in terms of welfare?
  - How does it relate to the number of firms in the market and the intensity of competition?
  - Is governmental intervention called for, and if yes, what kind of intervention?
- Topics:
  1. Allocative efficiency
  2. Productive efficiency
  3. Dynamic efficiency
  4. Public policies, and incentives to innovate
  5. Will the market fix it all?

See Motta, Chapter 2

B1: Efficiency

- What is *efficiency?*

  no reallocation of the available resources makes one economic agent better off without making some other economic agent worse off

- Need a measure of well-being

  - *consumer surplus:* difference between the maximum amount a consumer is willing to pay for a unit of a good and the amount actually paid for that unit

  - aggregate consumer surplus is the sum over all units consumed and all consumers

  - *producer surplus:* difference between the amount a producer receives from the sale of a unit and the amount that unit costs to produce

  - aggregate producer surplus is the sum over all units produced and all producers

  - *total surplus* = consumer surplus + producer surplus

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Can we reallocate resources to make some individuals better off without making others worse off?

⇒Pareto-efficiency!

In competition policy, welfare very often is defined in terms of consumer surplus => consumer standard!

B1: Consumers surplus

- Demand and inverse demand function

$$q = D(p) = q(p); \quad p = D^{-1}(q) = p(q)$$

- Consumers Surplus

$$S(p_0, \bar{p}) = \int_{p_0}^{\bar{p}} q(c)\,dc = \int_{0}^{q(p_0)} p(c)\,dc - p_0 q(p_0)$$

Calculate example with linear demand!

Diese Folie habe ich schon in der vorhergehenden Stunde besprochen!

B1: Properties of market equilibrium under perfect competition

- Technical Efficiency
    - $\Rightarrow$ Total social cost of production is minimized
    - $\Rightarrow$ Production at MES in LRE
- $\Rightarrow$ Allocative Efficiency
    - $\Rightarrow$ Each consumer who is willing to pay the marginal social cost of production obtains the good
    - $\Rightarrow$ total surplus is maximum.

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B1: 1. Allocative efficiency

Definition of market power: the ability of a firm to profitably raise price above marginal costs

A matter of degree, not of existence

The deadweight loss (see Figure 2.1)

Inverse relationship between market power and welfare => See Cournot model below

An additional loss of monopoly: *rent-seeking activities* (see Figure 2.2)

Kaplow, Shapiro, p. 1079:

A price-taking firm has no control over price:

In contrast, a firm

with power over price can cause price to rise or fall by decreasing or increasing its output:

We say that a firm has "technical market power" if it faces a

downward sloping (rather than horizontal) demand curve.

In practice almost all firms have some degree of technical market power. Although the notion of

a perfectly competitive market is extremely useful as a theoretical construct, most real-world
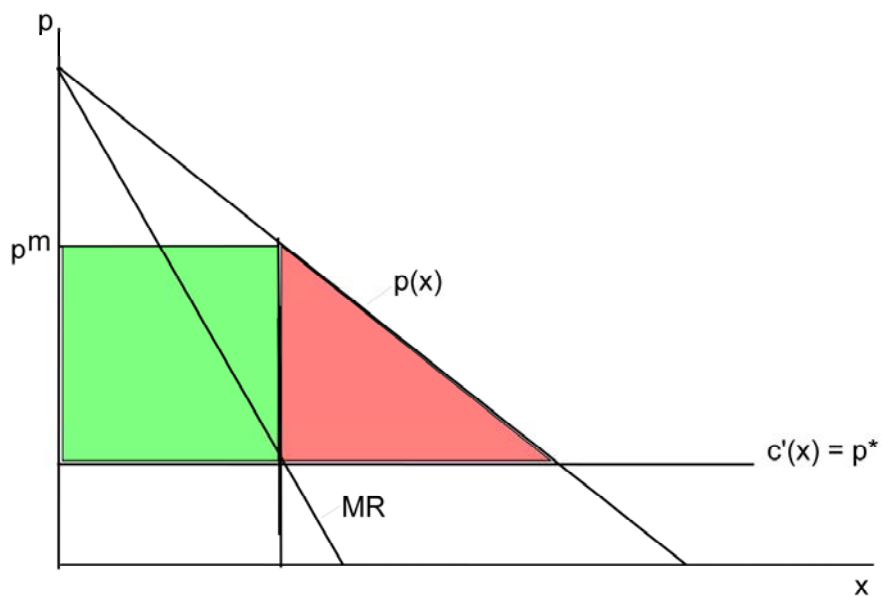
markets depart at least somewhat from this ideal. An important reason for this phenomenon is

that marginal cost is often below average cost, most notably for products with high fixed costs

and few or no capacity constraints, such as computer software, books, music, and movies. In

such cases, price must exceed marginal cost for firms to remain viable in the long run.
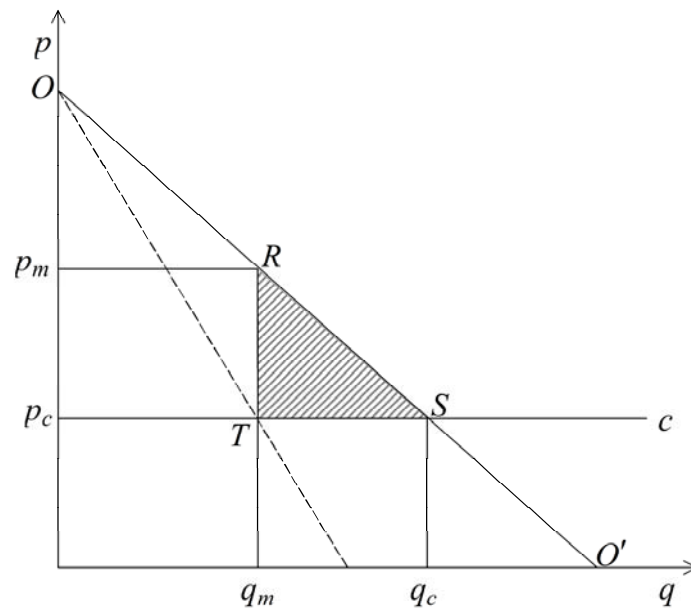
B1: Deadweight loss of Monopoly

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Green area: producer surplus (if there are fixed costs)!

Red area: dead weight loss (DWL)

B1: Figure 2.1. Welfare loss from monopoly

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B1: Deadweight loss of Monopoly (cont.)

- Why can the monopolist not appropriate the deadweight loss?
  - Increasing output requires a reduction in price
  - *this assumes that the same price is charged to everyone.*
- The monopolist bases her decisions purely on the surplus she gets, *not* on consumer surplus (nevertheless some surplus goes to consumers)
- The monopolist undersupplies relative to the competitive outcome
  ⇒ Allocative inefficiency: some consumers have a willingness to pay greater than the social cost of production but are not served by the monopoly.
- Distributional concerns: market power shifts surplus from consumers to firm owners
- The primary problem: ***the monopolist is large relative to the market***

B1: Figure 2.2. Possible additional loss from rent seeking

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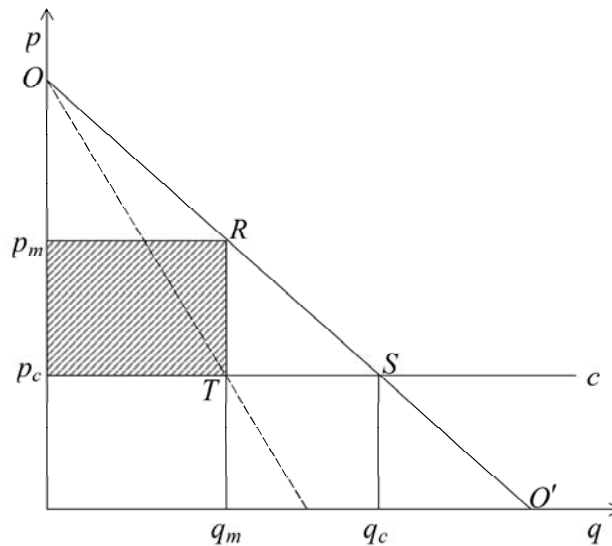
Firms try to capture the monopoly profit, e.g. by engaging in costly lobbying activities

Other example: war of attrition: fight for monopoly profit: Premiere - Arena, US example with Digital satellite radio. See below
See also discussion of dynamic efficiency

Reuters - March 24, 2008
Satellite radio merger gets antitrust OK
By Peter Kaplan and Randall Mikkelsen
WASHINGTON (Reuters) - Sirius Satellite Radio's <SIRI.O> $4.59 billion purchase of rival XM Satellite Radio <XMSR.O> was given antitrust clearance on Monday as the Justice Department concluded consumers have many alternatives, including mobile phones and personal audio players.
Investors sent shares of both companies sharply higher even though the Federal Communications Commission must still approve the combination of the only two U.S. providers of satellite radio, a deal first announced in February 2007.
In a victory for Sirius Chief Executive Mel Karmazin, who lobbied hard for the deal, the Justice Department agreed the satellite radio companies face stiff competition from traditional AM/FM radio, high-definition radio, MP3 players and programming delivered by mobile phones.
"Competition in the marketplace generally protects consumers and I have no reason to believe that this won't happen here," Justice Department antitrust chief, Thomas Barnett, told a conference call with reporters.
The traditional radio industry, consumer groups and some U.S. lawmakers had criticized the deal, which would bring entertainers such as talk show host Oprah Winfrey and shock-jock Howard Stern under one roof.
The National Association of Broadcasters, which fought against the deal, said the Justice Department had granted XM and Sirius a "monopoly" and called the decision "breathtaking."
Sirius and XM, which are losing money, each currently charge subscribers about $13 a month for more than 100 channels of news, music, talk and sports.
New York-based Sirius' programming includes lifestyle guru Martha Stewart and NFL Football while Washington, D.C.-based XM is home to Bob Dylan's radio show and Major League Baseball.
The Justice Department said the combination would lead to "substantial" cost saving steps such as consolidating the line of radios they offer. It said those savings would "most likely be passed on to consumers in the form of lower prices."
XM stock ended Monday up 15.5 percent to $13.79, while Sirius closed up 8.6 percent to $3.15, both on Nasdaq. At that price for Sirius' stock, the deal, in which 4.6 shares of Sirius are to be exchanged for each XM share outstanding, is worth $4.59 billion.
AWAITING FCC DECISION
The antitrust decision shifts the spotlight to the FCC, which must determine whether the XM-Sirius is in the public interest, and whether to enforce its 1997 order barring either satellite radio company from acquiring the other.
A source at the FCC said Chairman Kevin Martin has yet to make a proposal either approving or opposing the XM-Sirius combination, but has asked the agency's staff to draft documents for different possible outcomes.
This source said the FCC could be strongly influenced by the Justice Department decision. "I think it would be hard to go in the complete opposite direction," said the source.
Analysts at Stifel Nicolaus said the FCC could impose conditions, such as requiring the companies to adhere to promises Karmazin made to Congress last year.
Karmazin promised lawmakers that a combined company would offer packages of channels that customers could pick on an "a la carte" basis, and that customers would be able to block adult channels and get a refund for those channels.
In addition, Stifel Nicolaus said, the FCC also may require Sirius and XM to promise that all existing satellite radios will continue to work after the companies are combined.
David Bank, an analyst with RBC Capital Markets, was optimistic about FCC approval. "Now it's past DOJ, and we feel pretty optimistic it will get through the FCC," he said.
The Justice Department's decision provoked immediate criticism from a key lawmaker in Congress, Senate antitrust subcommittee chairman Sen. Herb Kohl, a Wisconsin Democrat.
Kohl took the department to task for "failing to oppose numerous mergers which reduced competition in key industries, resulting in the Justice Department not bringing a single contested merger case in nearly four years."
"We urge that the FCC find the merger contrary to the public interest and exercise its authority to block it," Kohl said in a statement.
Sirius and XM said in a brief statement that they had received antitrust clearance and that their deal was still subject to FCC approval.
(Additional reporting by Diane Bartz; editing by Tim Dobbyn)

B1: 2. Productive efficiency

Additional welfare loss if monopolist has higher costs (see Figure 2.3)

"Quiet life" and managerial slack

Principal-agent models: market competition helps, but too fierce competition may decrease efficiency

Nickell et al.: individual firms' productivity higher in competitive industries

Darwinian arguments: competition selects more efficient firms

Olley-Pakes, Disney et al.: industry productivity mostly increases through entry/exit

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Modell von Klaus Schmidt, RES 1997: Mehr Wettbewerb => höheres Bankrottrisiko, aber gleichzeitig geringere Unternehmensgröße und damit auch geringere Anreiz in Prozessinnovationen zu investieren.

B1: Figure 2.3. Additional loss from productive inefficiency
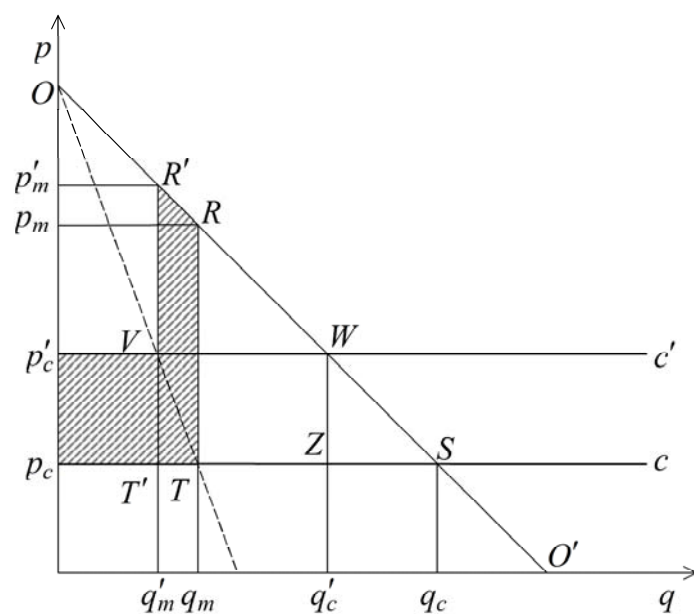
B2: Allocative and productive efficiency with "few" firms: The Cournot Model

Duopoly, homogeneous good, identical constant marginal costs c; **inverse demand function** :

$p = p(q_1 + q_2)$, where $p' < 0$.

The firms maximise (by choosing quantities!)

$\max \pi_1(q_1, q_2) = q_1[p(q_1 + q_2) - c] \rightarrow q_1$

$\max \pi_2(q_1, q_2) = q_2[p(q_1 + q_2) - c] \rightarrow q_2$

$\Rightarrow$ FOCs

$p(q_1 + q_2) + q_1 p'(q_1 + q_2) - c = 0$

$p(q_1 + q_2) + q_2 p'(q_1 + q_2) - c = 0$

$p' < 0$ implies $p^c > c$.

See Motta, Sect. 8.4.2 and Sect. 2.3.3

Now: Market power and efficiency with few firms and as a function of the number of firms.

Cournot supposed that the homogeneous product was spring water. q_1 and q_2 firms' outputs

Firms maximise given an expectation of what their rivals do. Nash equilibrium: Expectations are satisfied and no incentive to deviate from optimal choice.

Cournot model: Quantities as strategic variables! Cournot model can also be derived from two-stage model with capacity decision in first stage and price-competition in second stage (Kreps-Scheinkman model)

B2: The Cournot model: Linear Demand

Inverse demand function:
$$P = A - BQ = A - B(q_1 + q_2)$$

Residual demand curve:

$$P = (A - Bq_1) - Bq_2$$

The profit-maximizing choice of output by firm 2 depends upon the output of firm 1

Marginal revenue for firm 2 is

$$MR_2 = (A - Bq_1) - 2Bq_2$$

$$MR_2 = MC$$

$$A - Bq_1 - 2Bq_2 = c$$

Solve this for output q_2

If output of firm 1 is increased the residual demand curve for firm 2 moves to the left
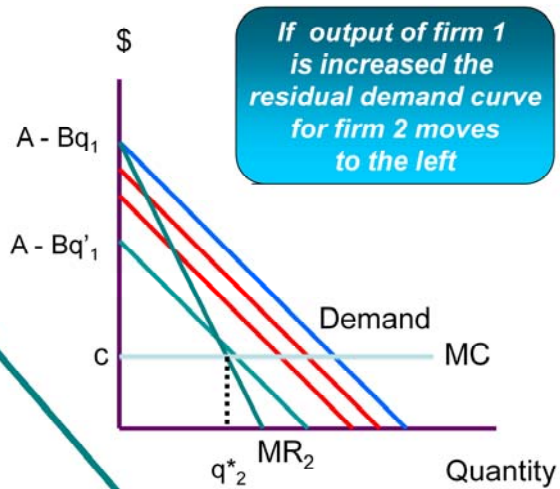
$\$$

$A - Bq_1$

$A - Bq'_1$

c .... MC

Demand

MR_2

q^*_2

Quantity

$$\therefore q^*_2 = (A - c)/2B - q_1/2$$

B2: The Cournot model (cont.)

$q^*_2 = (A - c)/2B - q_1/2$

This is the **best response function** for firm 2

It gives firm 2's profit-maximizing choice of output for any choice of output by firm 1

There is also a **best response** function for firm 1

By exactly the same argument it can be written:

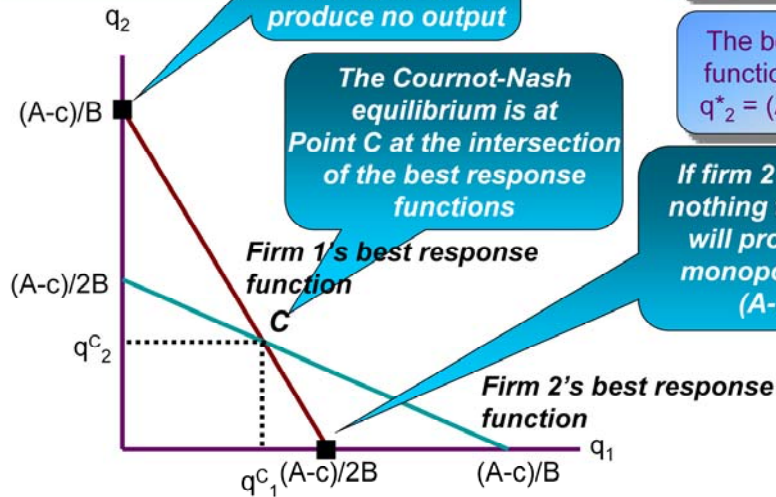$q^*_1 = (A - c)/2B - q_2/2$

> **Cournot-Nash equilibrium requires that both firms be on their best response functions**.

Best response function is also called reaction function. Note that in the Cournot model there is neither a response nor a reaction to the rival's action since the game is simultaneous.

B2: Cournot-Nash Equilibrium

$\therefore q^*_1 = (A - c)/3B$

$\therefore q^*_2 = (A - c)/3B$

If firm 2 produces (A-c)/B then firm 1 will choose to produce no output

The best response function for firm 1 is $q^*_1 = (A-c)/2B - q_2/2$

The best response function for firm 2 is $q^*_2 = (A-c)/2B - q_1/2$

The Cournot-Nash equilibrium is at Point C at the intersection of the best response functions

If firm 2 produces nothing then firm 1 will produce the monopoly output (A-c)/2B

Firm 1's best response function

Firm 2's best response function

q_2

$(A-c)/B$

$(A-c)/2B$

q^c_2

C

q^c_1 $(A-c)/2B$ $(A-c)/B$ q_1

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B2: Cournot-Nash Equilibrium (cont.)

In equilibrium each firm produces $q^C_1 = q^C_2 = (A - c)/3B$

Total output is, therefore, $Q^* = 2(A - c)/3B$

Recall that demand is $P = A - BQ$

So the equilibrium price is $P^* = A - 2(A - c)/3 = (A + 2c)/3$

Profit of firm 1 is $(P^* - c)q^C_1 = (A - c)^2/9$

Profit of firm 2 is the same

A monopolist would produce $Q^M = (A - c)/2B$

Competition between the firms causes their total output to exceed the monopoly output. Price is therefore lower than the monopoly price

But output is less than the competitive output $(A - c)/B$ where price equals marginal cost and P exceeds MC

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B2: Cournot-Nash Equilibrium (cont.)

What if there are more than two firms?

Much the same approach.

Say that there are N identical firms producing identical products

Total output $Q = q_1 + q_2 + \ldots + q_N$

Demand is $P = A - BQ = A - B(q_1 + q_2 + \ldots + q_N)$

Consider firm 1. It's demand curve can be written:

$P = A - B(q_2 + \ldots + q_N) - Bq_1$

> This denotes output of every firm *other than* firm 1

- Use a simplifying notation: $Q_{-1} = q_2 + q_3 + \ldots + q_N$
- So demand for firm 1 is $P = (A - BQ_{-1}) - Bq_1$

General approach: N profit functions => N first order conditions => N equations in N variables (the N output levels)

Here: Symmetry assumption: All firms have identical marginal costs.

B2: The Cournot model (cont.)

$P = (A - BQ_{-1}) - Bq_1$

The profit-maximizing choice of output by firm 1 depends upon the output of the other firms
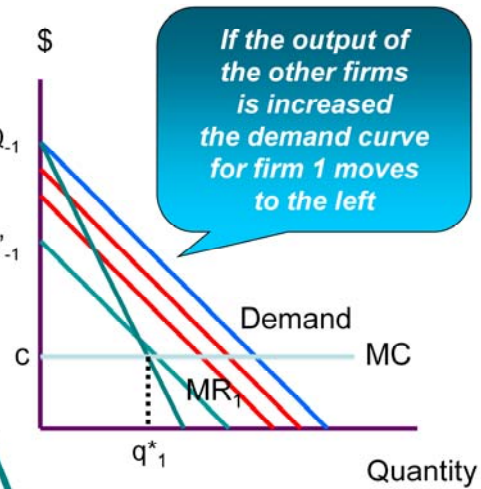
Marginal revenue for firm 1 is

$MR_1 = (A - BQ_{-1}) - 2Bq_1$

$MR_1 = MC$

$A - BQ_{-1} - 2Bq_1 = c$

Solve this for output q_1

$\therefore q^*_1 = (A - c)/2B - Q_{-1}/2$

$\$$

$A - BQ_{-1}$

$A - BQ'_{-1}$

c

Demand

MC

MR_1

q^*_1

Quantity

If the output of the other firms is increased the demand curve for firm 1 moves to the left

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B2: Cournot-Nash Equilibrium (cont.)

$q^*_1 = (A - c)/2B - Q_{-1}/2$

$\therefore Q^*_{-1} = (N - 1)q^*_1$

How do we solve this for q^*_1?

$\therefore q^*_1 = (A - c)/2B - (N - 1)q^*_1/2$

$\therefore q^*_1 = (A - c)/(N + 1)B$

The firms are identical. So in equilibrium they will have identical outputs

$\therefore Q^* = N(A - c)/(N + 1)B$

$\therefore P^* = A - BQ^* = (A + Nc)/(N + 1)$

Profit of firm 1 is $\Pi^*_1 = (P^* - c)q^*_1 = (A - c)^2/(N + 1)^2 B$

Consumer surplus: $CS = (A - P^*)Q^*/2 = N^2 (A - c)^2/(2(N + 1)^2 B)$

Total surplus: $W = CS + N\Pi^*_1 = (1/2 + 1/N) N^2 (A - c)^2/((N + 1)^2 B)$

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As the number of firms increases output of each firm falls
As the number of firms increases aggregate output increases
As the number of firms increases profit of each firm falls

Betrachte Extremfälle für N: 1 und unendlich (= vollkommener Wettbewerb)!

B2: Results Cournot model

- As the number of firms increases output of each firm falls
- As the number of firms increases aggregate output increases
- As the number of firms increases price tends to marginal cost
- As the number of firms increases profit of each firm falls
- As the number of firms increases consumer surplus and total welfare increases

! Important assumption: No fixed or sunk costs!

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Show these results by taking derivatives!

B2: Productive efficiency, II

Number of firms and welfare: trade-off between allocative and productive efficiency

As number of firms increases, market power decreases, but eventually also welfare

Important: defending competition, not competitors! (else, inefficiencies, and fixed cost duplications)

$\Rightarrow$ See Cournot oligopoly with fixed costs!

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Gegeben die weiter oben gemachte Aussage zur Existenz einer inversen Beziehung zwischen Marktmacht und Wohlfahrt, ist die Aussage hier: Mehr Firmen, weniger Marktmacht, aber auch weniger Wohlfahrt „seltsam". Liegt an Berücksichtigung von fixen Kosten!

B2: Cournot Equilibrium with fixed costs

Assumption: Market entry and/or production causes fixed/sunk costs F

Profit of firm 1 is $\Pi^*_1 = (P^* - c)q^*_1 - F$ $= (A - c)^2/((N + 1)^2B) - F$

Consumer surplus: $CS = (A - P^*)Q^*/2 = \mathbf{N^2 (A - c)^2/(2(N + 1)^2B)}$

Total surplus: $W = CS + N\,\Pi^*_1 = (1/2 + 1/N)\,\mathbf{N^2 (A - c)^2/((N + 1)^2B) - N\,F}$

$\Rightarrow$ Total surplus eventually becomes negative as N increases!

$\Rightarrow$ Socially optimal number of firms exists

$\Rightarrow$ Smaller than the free entry number firms! (Mankiw/Whinston 1986)

$\Rightarrow$ Business stealing (profit destruction) effect!

$\Rightarrow$ Firms are too small! Do not exploit economies of scale sufficiently!

See Motta, Sect. 2.3.5.2

Berechnen Sie die sozial optimale Firmenzahl* und die bei freiem Marktzutritt realisierte Firmenzahl für A =100, B = 1, c = 0 und F=100.

Monopol besser als Duopol? Bei Fixkosten (für obige Parameter) zwischen etwa 700 und 1111 werden genau zwei Firmen in den Markt eintreten.
Die Wohlfahrt ist im Monopolfall 3750 –F, im Duopolfall 4444 – 2 F
$\Rightarrow$Duopol im relevanten Bereich schlechter als Monopol!! Überprüfen!
$\Rightarrow$Premiere und Arena!
$\Rightarrow$Einkaufszentren!

B3: Allocative and productive efficiency with "few" firms: Bertrand Price Competition

- In the Cournot model price is set by some market clearing mechanism
- Firms seem relatively passive
- An alternative approach is to assume that firms compete in prices: this is the approach taken by Bertrand
- Leads to dramatically different results
- Take a simple example
  - two firms producing an identical product (spring water?)
  - firms choose the prices at which they sell their water
  - each firm has constant marginal cost of $10
  - market demand is $Q = 100 - 2P$

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See Motta, Sect. 8.4.1.1
Check that with this demand and these costs the monopoly price is $30 and quantity is 40 units
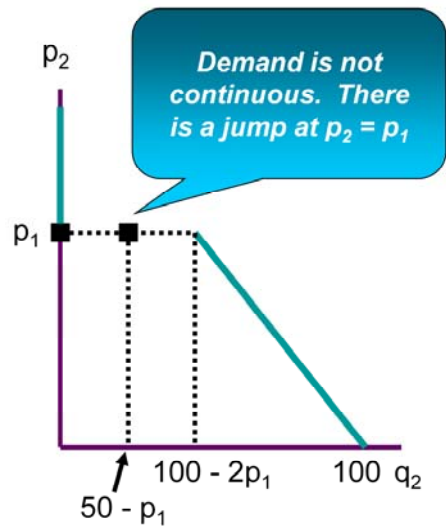
B3: Bertrand competition (cont.)

- Demand to firm 2 given p_1 (*derived demand*) is:
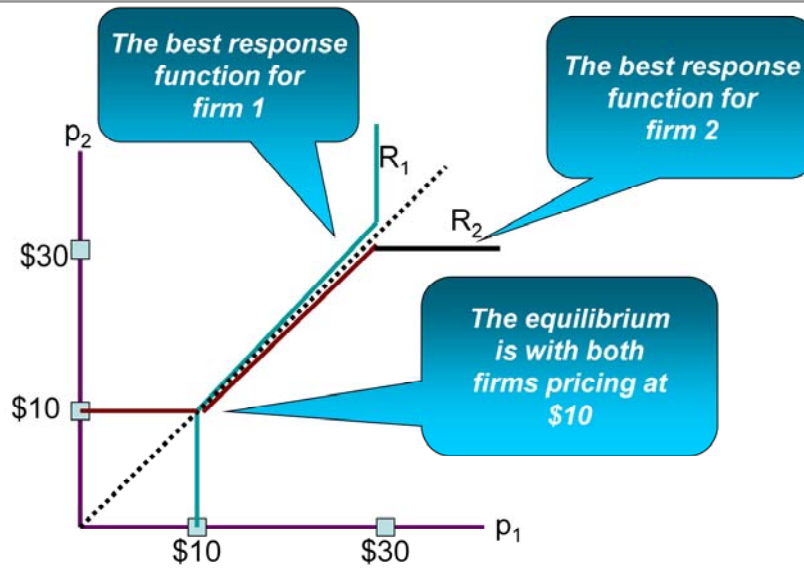
  $q_2 = 0$ if $p_2 > p_1$

  $q_2 = 100 - 2p_2$ if $p_2 < p_1$

  $q_2 = 50 - p_1$ if $p_2 = p_1$ (Tie-breaker rule)

- The discontinuity in demand carries over to profit

Demand is not continuous. There is a jump at $p_2 = p_1$

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The best response functions look like this

30 is monopoly price!

B3: Bertrand competition: Equilibrium

- Firms undercut each other as long as price is above the constant marginal cost c.

$\Rightarrow$ Unique equilibrium with both firms charging $p^B = c$.

$\Rightarrow$ Allocative and productive efficiency in the duopoly case!

Bertrand paradox due to the following assumptions:
a) 'Unlimited' capacities.
b) Homogeneous goods.
c) One shot game.
d) Identical, constant average and marginal costs.
Extensions: Two stage capacity game, differentiated products, repeated and super games, contestable markets, mixed strategy equilibria.

Tell undercut story: Important: Homogeneous products: Small difference in price leads to total demand for the low price firm.
Cutting price below cost gains the whole market but loses money on every customer. Actually with constant marginal cost each firm is indifferent about producing and not producing. But charging a different price would not be an equilibrium! The other would have an incentive to charge another price as well.

We will discuss most of the extensions furtheron.

B3: Bertrand Equilibrium: modifications

- The Bertrand model makes clear that competition in prices is very different from competition in quantities
- Since many firms seem to set prices (and not quantities) this is a challenge to the Cournot approach
- But the Bertrand model has problems too
  - for the p = marginal-cost equilibrium to arise, both firms need enough capacity to fill all demand at price = MC
  - but when both firms set $p = c$ they each get only half the market
  - So, at the p = mc equilibrium, there is huge excess capacity
- This calls attention to the choice of capacity
  - Note: choosing capacity is a lot like choosing output which brings us back to the Cournot model
- The intensity of price competition when products are identical that the Bertrand model reveals also gives a motivation for *Product differentiation*

Needs to be extended!

B4: Asymmetric firms: Cournot-Nash equilibrium

- What if the firms do not have identical costs?
- Once again, much the same analysis can be used
- Assume that marginal costs of firm 1 are c_1 and of firm 2 are c_2.
- Demand is $P = A - BQ = A - B(q_1 + q_2)$
- We have marginal revenue for firm 1 as before
- $MR_1 = (A - Bq_2) - 2Bq_1$
- Equate to marginal cost: $(A - Bq_2) - 2Bq_1 = c_1$

Solve this for output q_1

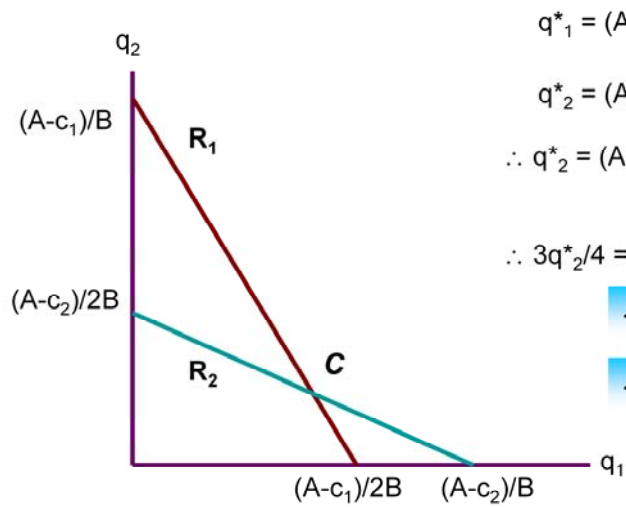$$\therefore q^*_1 = (A - c_1)/2B - q_2/2$$

$$\therefore q^*_2 = (A - c_2)/2B - q_1/2$$

A symmetric result holds for output of firm 2

See Motta, Sect. 8.4.1.2

Assignment!

B4: Cournot-Nash Equilibrium

$q^*_1 = (A - c_1)/2B - q^*_2/2$
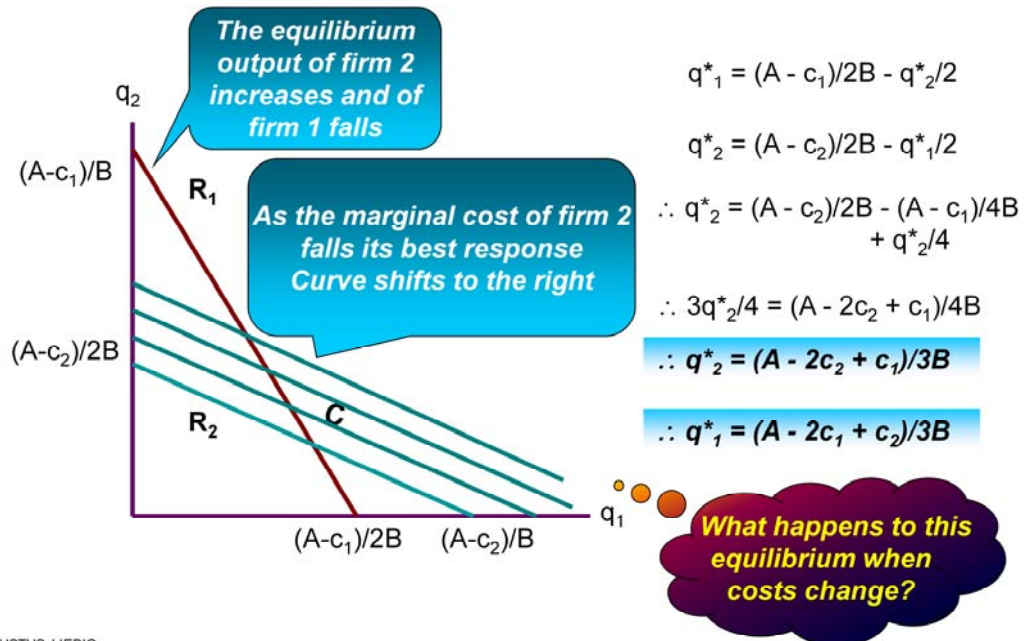
$q^*_2 = (A - c_2)/2B - q^*_1/2$

$\therefore q^*_2 = (A - c_2)/2B - (A - c_1)/4B + q^*_2/4$

$\therefore 3q^*_2/4 = (A - 2c_2 + c_1)/4B$

$\therefore q^*_2 = (A - 2c_2 + c_1)/3B$

$\therefore q^*_1 = (A - 2c_1 + c_2)/3B$

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Change in costs!

B4: Cournot-Nash Equilibrium (cont.)

- In equilibrium the firms produce

  $q^C_1 = (A - 2c_1 + c_2)/3B$; $q^C_2 = (A - 2c_2 + c_1)/3B$

- Total output is, therefore, $Q^* = (2A - c_1 - c_2)/3B$
- Recall that demand is $P = A - BQ$
- So price is $P^* = A - (2A - c_1 - c_2)/3 = (A + c_1 + c_2)/3$
- Profit of firm 1 is $(P^* - c_1)q^C_1 = (A - 2c_1 + c_2)^2/9B$
- Profit of firm 2 is $(P^* - c_2)q^C_2 = (A - 2c_2 + c_1)^2/9B$
- Equilibrium output is less than the competitive level
- Output is produced inefficiently: the low-cost firm should produce all the output

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See Motta, Sect. 2.3.5.1 for the case with n firms and two types of firms (high cost and low cost).

Assignment!

B5: Asymmetric firms under Bertrand competition: Different marginal costs

- Let $c_1 < c_2 \Rightarrow$ equilibrium: only firm 1 active, with c_2 as upper limit for its price, formally:

- $\max \pi(p_1, c_2) = (p_1 - c_1)x(p_1) - \lambda(p_1 - c_2)$

- Denote monopoly price as $p^m(c_1)$. Either $p_1 = p^m(c_1) < c_2$ or $p_1 = c_2$. (Limit-pricing)

- **Tie-breaker rule** $x_2 = 0$.

$\Rightarrow$ Only efficient firm survives under fierce competition!

$\Rightarrow$ Productive efficiency!

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See Motta, Sect. 8.4.1.1

Optimization approach: Kuhn-Tucker with complementary slackness: Either λ or $p_1 - c_2$ must be zero.

Complicated!

Simple solution: Just calculate the monopoly price and check whether it is below or above the rival's cost!

B6: 3. Dynamic efficiency

"*In der kapitalistischen Wirklichkeit jedoch ...zählt ... die Konkurrenz der neuen Ware, der neuen Technik, der neuen Versorgungsquelle, des neuen Organisationstyps - jene Konkurrenz, die über einen entscheidenden Kosten- oder Qualitätsvorteil gebietet und die bestehenden Firmen nicht an den Profit- und Produktionsgrenzen, sondern in ihren Grundlagen, ihrem eigentlichen Lebensmark trifft. Diese Art der Konkurrenz ist um so viel wirkungsvoller als die andere, wie es ein Bombardement ist im Vergleich zum Aufbrechen einer Tür, und sie ist so viel wichtiger, daß es verhältnismäßig gleichgültig wird, ob die Konkurrenz im gewöhnlichen Sinn mehr oder weniger rasch funktioniert...*"
(J.A. Schumpeter, 1972, S.140)

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Schumpeter: ‚Nicht statische Effizienz ist wichtig, sondern dynamische. Deadweight loss ist unbedeutend.'

B6: 3. Dynamic efficiency

Inverted U-shaped relationship between
market power and welfare: trade-off
between appropriability and competition in
R&D investment

Lower incentives to innovate of a monopolist:
innovation introduced if *additional* profits
higher than costs

Appropriability matters: no (little) innovations
if no patent protection, compulsory
licensing etc...

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Plot inverted U-shaped relation!

Problem: Weder theoretische noch empirische Ergebnisse sind im Hinblick auf Innovationsaktivitäten eindeutig. Wichtig ist jedenfalls der Schutz der Erträge riskanter Investitionen.

Monopolist innoviert weniger wegen Replacementeffekt, gleichzeitig hat er wegen der größeren Ausbringungsmenge größeren Anreiz in Prozeßinnovationen zu investieren.

Wettbewerbsintensität gemessen über die Möglichkeit Marktanteile zu gewinnen (Cournot vs. Bertrand) spielt eine große Rolle

Diffusionspaper!

B6: Digression: Market structure and the incentive to innovate (Arrow 1962)

- Assumption: New technology discovered which reduces unit costs from k to $\underline{k}$ (process innovation)
- What is the gain from this innovation to a firm that is the **only** one to undertake R&D?

Two cases:

- Monopoly
- Bertrand and perfect competition, resp.

Definition:

Drastic (or large or major) innovation: $p_M(\underline{k}) \leq k$

Gradual (or small or non-drastic) innovation: $p_M(\underline{k}) > k$

See Motta, Sect. 2.4.3 for a related formal analysis

Arrow, K., 1962, Economic Welfare and the Allocation of Resources for Inventions. In: Nelson, R. (ed.): The Rate and Direction of Inventive Activity. NBER. Princeton University Press.

Monopoly: no threat of entry. If the monopolist does not invest, nobody else can in the respective market.

E.g. telecoms sector before liberalization

Bertrand competition equivalent to perfect competition if one assumes that – under perfect competition – an outside innovator holds the patent for the innovation and licenses the innovation to all firms in the industry charging a royalty (either k – $\underline{k}$ (non-drastic innovation) or p_Monopoly($\underline{k}$) – $\underline{k}$ (drastic innovation)).

Drastic innovation: Innovator not constrained by competitors

B6: Incentive to innovate under monopoly: A graphical analysis
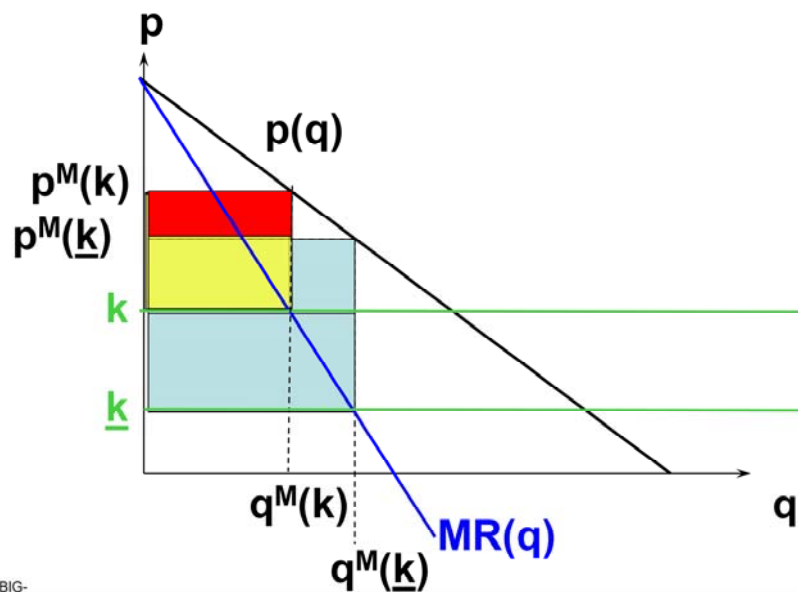
Non-drastic innovation!

Incentive to innovate (How much would the firm be willing to pay for the innovation/ to invest in the development of the new product):

Profit after innovation – profit before innnovation = Green – red area

Consumers gain from innovation: price falls.

Important for welfare analysis (see below): consumer surplus effect one of the reasons for insufficient incentive to invest in R&D. Firms cannot appropriate all returns from R&D.
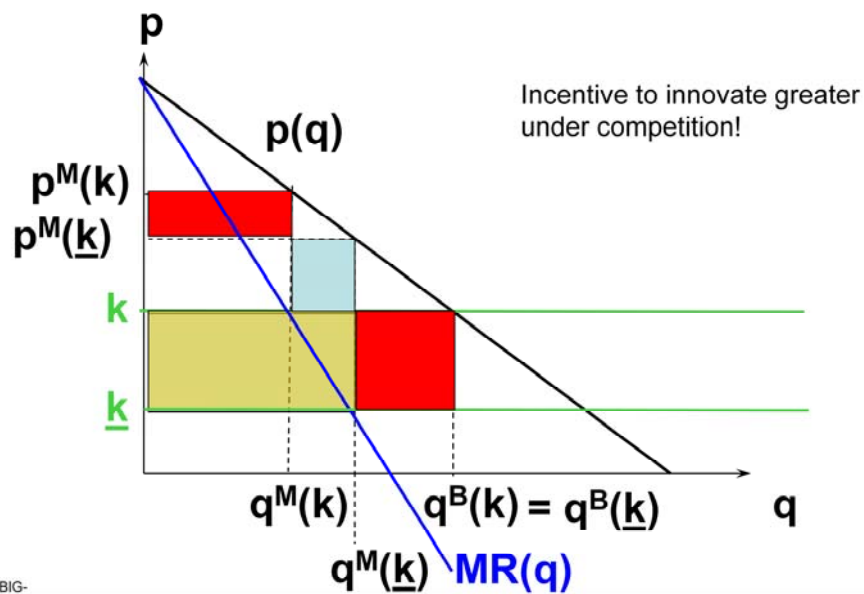
B6: Incentive to innovate under Bertrand competition (one firm innovates)
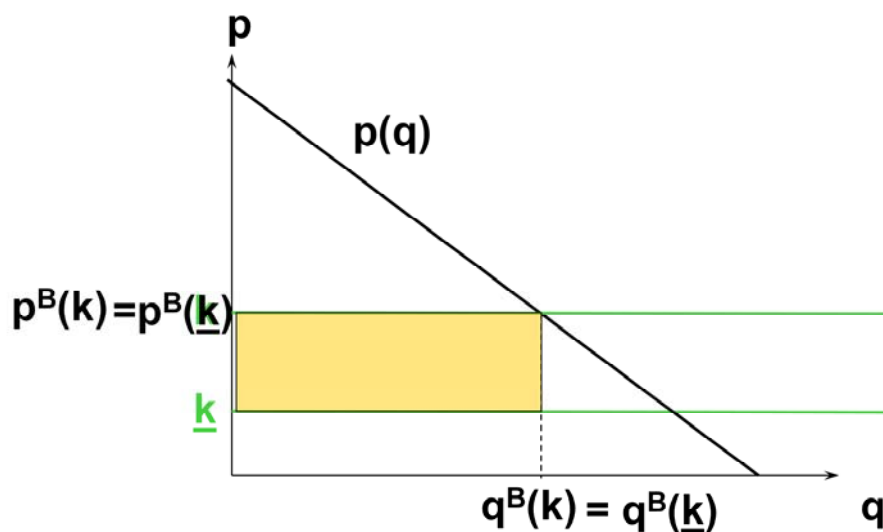
Would it be possible under Bertrand competition that more than one firm invests in R&D (if the success of the the R&D activity is certain)? No! Both (in the the two firm case) firms would make losses!

Limit-pricing: $p^B = k$

B6: Incentive to innovate: Monopoly vs. (Bertrand) competition

Incentive to innovate greater under competition!

$p(q)$

$p^M(k)$
$p^M(\underline{k})$

k

$\underline{k}$

$q^M(k)$ $q^B(k) = q^B(\underline{k})$ q

$q^M(\underline{k})$ MR(q)

Incentive to innovate clearly smaller under monopoly: sum of red areas greater than green area.

B6: Incentive to innovate: Monopoly vs. (Bertrand) competition

Formal analysis: the linear case

- Linear demand function: $q = s(a - p)$
- The monopolist's profit as a function of marginal costs k:

$$\Pi(k) = \frac{s}{4}(a - k)^2$$

- Gain from innovation: $\Delta\Pi = \Pi(\underline{k}) - \Pi(k)$

- Monopolist: $\Delta\Pi^M = \frac{s}{4}(2a - \underline{k} - k)(k - \underline{k})$

- Competition: $\Delta\Pi^B = s(a - k)(k - \underline{k})$

- Cournot duopoly: $\Delta\Pi^B > \Delta\Pi_1^C$; $\Delta\Pi_1^C \lesseqgtr \Delta\Pi^M$

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Wichtig: Innovationsanreiz im Cournotoligopol sinkt mit steigender Firmenzahl!

Reduced profit function: Profits as a function of costs

(Per-period) Gain from nondrastic innovation. To obtain total gain take the discounted sum of the per-period gain over the relevant time horizon. In the case of an infinite horizon the gain is the per-period gain divided by the interest rate r.

Incentive to innovate is greater under Cournot compared to oligopoly if the innovation is large, ie. Close to a drastic innovation

$\Rightarrow$Leads to large post-innovation output and large gain of market share.

Incentive to innovate is smaller for small innovations

$\Rightarrow$large difference in output between monopoly and Cournot; smaller incentive to invest in process innovation

B6: Dynamic efficiency -
Market structure and incentives to innovate

- Incentives to innovate greater under competition than in a protected ('entrenched') monopoly
  - Replacement effect: Monopolist cannibalizes own profits
- Incentives to innovate greater for incumbent than for entrant
  - Incumbent has more to loose ('monopoly profit') than entrant has to gain ('duopoly profit')
- More competition via a larger number of more firms often reduces incentives to innovate
- $\Rightarrow$ Some intermediate level of competition might be optimal for innovations and productive efficiency
- $\Rightarrow$ However: No chance to choose the "right" level of competition
- $\Rightarrow$ Entrenched monopoly or cartel bad in terms of dynamic efficiency

See Motta, S. 2.4

B6: 4. Public policies and incentives to innovate

Ex ante (incentives) v. ex post (diffusion): IPR protection (patents) guarantees market power

⇒ Without market power no innovation!

Related point: Essential facilities (EF) doctrine

- Non-reproducible inputs & necessary to offer 'related' product & refusal to supply
- Ex.: airport slots, port installations, local loop, Apple iTunes (Fairplay DRM), Telefonauskunftsdaten (Telegate), …
- EC accept EF doctrine, but ECJ: *Bronner* case
- Important to preserve incentives to innovate!
- Apply EF doctrine only when owner has not invested to create the facility

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On EF in general and the interventionist approach of the Commission in particular s. Motta, p. 67, in particular footnote 53.

Apple, VDSL-Zugänge (Leitungsnetz)

Bronner-Bedingungen:
ein Ausschluss von Mitbewerbern von diesem nur dann missbräuchlich wäre, wenn

(1) die Lieferung unentbehrlich ist und
(2) ein neues Produkt verhindert wird und
(3) die Lieferverweigerung nicht durch sachliche Erwägungen gerechtfertigt ist und
(4) jeglicher Wettbewerb auf dem abgeleiteten Markt ausgeschlossen wird.

Cases Magill, IMS Health

Apple: DRM iPod: Virgin Media versus iTunes

No abuse of market dominance by Apple according to the French Competition Council
Author: Didier Deneuter - Partner ULYS Lawfirm (Brussels – Paris) - didier.deneuter@ulys.net
Date: 23-12-2004
On the 9th of November 2004, the French Competition Council dismissed a complaint put by VirginMega.fr against its competitor Apple for alleged abuse of market dominance. The complaint was based on the refusal by Apple to grant a license on its Fairplay DRM system.

The facts
Apple commercialises digital walkmans known under the name iPod. These walkmans are only compatible with Apple's digital rights management system (DRM), called Fairplay. This DRM allows in particular downloads from Apple's music downloading platform iTunes to be played directly on the iPods.
VirginMega.fr, on the other hand, has chosen for a Microsoft DRM that is not iPod-compatible. This incompatibility implies that downloads from the latter company's website cannot be transferred directly to the iPod.
The success of iPod made VirginMega.fr contact Apple in order to obtain a license on the Fairplay DRM. However, as it already did with its other competitors, Apple refused to grant such license.
Due to this refusal, VirginMega.fr filed a complaint before the French Competition Council on the 28th June of 2004 for alleged abuse of dominant position. VirginMega.fr was in particular of the opinion that access to the Fairplay DRM is indispensable for the activity of on-line music providers, the DRM being an essential resource and that the refusal to license constituting an abuse of dominant position in the relevant market for digital hard disk walkmans.
Before discussing the content of the Council Decision, some aspects concerning DRM and the applicable Competition law are highlighted hereafter.
DRM: technical and legal aspects
Both parties in the present case deliver on-line music download services.
In general, music downloading relies on the technology of compression/decompression (used to compress the music for fast delivery over the Internet and decompresses it for playback) and encryption/decryption (providing security for digital downloads by modifying a digital file, so that it can be read only with the decrypting software). Another technology, which was at stake in the present case and essential as well for the downloading of music, is the aforesaid DRM.
DRM technology and software manages the process of transferring audio files from their source to their recipients, and in particular the transfer of a particular song for downloading, hereby verifying its receipt and creating a record for the transaction. Since encryption is used by most DRM systems to prevent unauthorized access to the content, the DRM technology must be interoperable with the encryption technology.
DRM systems often include a whole of technological measures aiming at preventing unauthorized access to contents of, for instance, an online music download platform. Within the framework of counterfeiting, it occurs, however, that technological measures are removed or circumvented without the authorization of their owner.
In order to prevent such abuse, a legal protection framework has been established. With regards to the European Community law, one can refer in particular to the following instruments:
- Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs states that any act of putting into circulation, or the possession for commercial purposes of, any means the sole intended purpose of which is to facilitate the unauthorized removal or circumvention of any technical device which may have been applied to protect a computer program.
- Directive 2001/29/EC of 22 May 2001 on the harmonization of certain aspects of copyright and related rights in the information society states that Member States shall provide adequate legal protection against the circumvention of any effective technological measures, which the person concerned carries out in the knowledge, or with reasonable grounds to know, that he or she is pursuing that objective and the manufacture, import, distribution, sale, rental, advertisement for sale or rental, or possession for commercial purposes of devices, products or components or the provision of services which are promoted, advertised or marketed for the purpose of circumvention of, or have only a limited commercially significant purpose or use other than to circumvent, or are primarily designed, produced, adapted or performed for the purpose of enabling or facilitating the circumvention of, any effective technological measures.
In order to be (directly) applicable and to offer the envisaged protection against unauthorized circumvention and removal of technological measures, these Directives are to be transposed into the national legislations of the EC – Member States. However, as in a number of other Member States, this is not the case yet in France for Directive 2001/29.
Within the field of the French intellectual property law, technological measures therefore benefit merely from the partial protection offered by the computer program legislation. This means in particular that protection for DRM systems is possible against the commercialisation and keeping of the means facilitating the removal or circumvention of technological measures, but not against the circumvention act as such(1).
Relevant aspects of Competition Law
Some particular aspects of the Competition Law important for the Decision of the French Competition Council are addressed hereafter.
(i).- The relevant market
As mentioned above, the market of downloadable music was at stake in the present case. In this regard, one can wander whether this market is to be regarded as a separate market, or does it form part of the larger market for recorded music? With other words, is downloadable music substitutable for music distributed on physical carriers (such as CD's)?
These questions are important for the applicability of the competition rules. The concept of the 'relevant market' is indeed an essential element in the assessment of whether competition rules have been disregarded or not. The exact delimitation of the market is often of great importance for the outcome of a competition law case.
The extent, in which a market is defined in a narrower or larger way, can have its effects on the qualification of a dominant position in that market(2).
In this regard, one can refer to the AOL/Time Warner case, in which the European Commission recognized the upcoming relevant market for online music activities, such as the downloading and streaming of music files. The Commission stated in particular that there are a number of significant differences, which make downloadable music an entirely different business model, and a separate market.(3)
(ii).- The essential facilities doctrine
Since Apple refused to grant a license on its DRM, and taking into account the complaint of VirginMega.fr, one could question as to which extent a market operator, who refuses to grant access to a (technological) component of a network or its contents, abuses its dominant position following Article 82 of the EC-Treaty.
This question relates in particular to the upcoming essential facilities-doctrine, as introduced by the European Court of Justice in the cases Magill(4), Bronner(5) and IMS Health(6).
In the Bronner case, to which reference was made in IMS Health, the Court stated that, in order to determine whether a product or service is indispensable for enabling an undertaking to carry on business in a particular market, it must be determined whether there are products or services which constitute alternative solutions, even if they are less advantageous, and whether there are technical, legal or economic obstacles capable of making it impossible or at least unreasonably difficult for any undertaking seeking to operate in the market to create, possibly in cooperation with other operators, the alternative products or services. In order to accept the existence of economic obstacles, it must be established, at the very least, that the creation of those products or services is not economically viable for production on a scale comparable to that of the undertaking which controls the existing product or service(7).
The Council Decision
In its Decision, the French Competition Council considered both the applicable French and (above mentioned) European Community case law, and came to the following conclusions:
- With respect to the relevant market and the position of Apple on that market, the Council acknowledged that it is not excluded that Apple, at the moment of the complaint, retains a dominant position on the market of walkmans, on the one hand, and the market of music downloading, on the other hand.
In this regard, the Council, reiterating that there has to be a causal link between the dominant position and the abuse, stated that there is no proof of such a causal link between the state of competition of the music downloading market and the possible dominant position of Apple in the market of hard disk walkmans.
- According to the Council, no proof was established sufficiently that the refusal to grant the license was not justified, an element required for qualifying this refusal as an abuse.
- The proof of the access to an essential facility to be of an indispensable nature has neither been established, due to the fact that downloaded music is only transferred to a walkman in a minority of cases, the incompatibility between the both DRMs can be worked around by burning to CD's and, in France, many digital walkmans are compatible with the VirginMega platform.
Moreover, the Council concluded that, taking into account the elements provided for in this case, it is excluded that the Fairplay DRM can be considered, in the present state of the market, to be an essential facility for the legal, on-line music download platforms.
- The risk of elimination of competition appears to be very small, since there are, at present (and expected to be in the future), a considerable number of competitors active in the market concerned.
- VirginMega.fr has not exposed its willingness to commercialise a product or a service that is new and not intended to be commercialised by Apple, and for which a license on the Fairplay DRM is prerequisite.
Taking into account these elements, the Competition Council came to the global conclusion that the factors, leading to the qualification of an abuse of a dominant position, are not reunited in the present case and that the rules ensuring the free competition are not affected.
Since the Council recognized that it is possible that Apple holds a dominant position in the distinctive markets of walkmans and the legal music downloading, it is at present not excluded that similar complaints will be made before a national competition authority of a Member State where Apple is active. In this context, one can refer to the 'invitation' of the Competition Council underlining that its decision should not prevent the operators in these markets to bring new elements before the Council at a later stage.
In the meanwhile, given the problem of the lack of interoperability between DRMs, one can already have a look to the work of the Digital Living Network Alliance. This association, counting more than a hundred of firms active in the digital sector, is envisaging the adoption of a universal and standard DRM. Cases as addressed above can therefore be avoided in the future, that is … if Apple joins the Alliance.

Didier Deneuter
Partner ULYS Lawfirm (Brussels – Paris)

B7: 5. Will the market fix it all?

Contestable market theory: does free entry eliminate all concerns about market power of incumbents?

Theory:

- Assume an incumbent *I* and a potential entrant *E* are equally efficient and produce homogenous goods.

- Cost of production is $F + cq$

- Baumol et al (1982): at equilibrium *I* will not set monopoly price, but p^I equal *AC*: $p^I = c + F/q$

Proof (a contrario):

$\Rightarrow$ If $p^I > AC$, firm *I* would make profits; *E* would be attracted into the industry, set $p^E = p^I - \varepsilon > AC$ and earn positive profit

$\Rightarrow$ If $p^I < AC$, firm *I* would make losses.

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Zentral: Existieren Marktzutritts- und Marktaustrittsschranken?

Theory detailed in Baumol, Panzar, Willig, Contestable Markets and the Theory of Industry Structure, 1982, Harcourt, Brace Jovanovich, New York

B7: Contestable markets: discussion

The theory of contestable markets would have strong implications: if entry is free, we should not care about monopolists, as efficient outcome is reached.

Critique: the theory hinges on two strong assumptions:

- Unrealistic timing of the game (*I* cannot change price as *E* enters the market)
- No fixed sunk costs of entry (hit-and-run strategy not profitable for *E* if some costs are non-recoverable)

But the theory has the merit to stress the role of free entry in limiting market power: crucial in merger analysis.

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Model might be less unrealistic as it seems: long-term contracts as entry-facilitating device.

Lidl: Entry assistance via long-term contracts! => Multiple Sourcing

Mention Bertrand model with sunk and constant marginal costs: Even with free entry monopoly situation. However, again: What about long-term contracts between entrant and customers? Forces incumbent to decrease prices.

=> Assignment!

B8: 6. Persistence of dominance (even) under free entry: Switching costs

- Definition: costs of switching between brands of products which are ex-ante undifferentiated
- Types:
  - Transaction costs (bank account, provider)
  - Learning costs (new software)
  - Artificial or contractual costs (Frequent flyer programs)
- $\Rightarrow$ ex-post differentiation of products
- $\Rightarrow$ Free entry (vs. incumbents with large base of customers) does not guarantee reduction of market power
- $\Rightarrow$ However: switching cost markets can lead to very competitive outcomes in initial stage of the market
- $\Rightarrow$ Ambiguous effect in two-period model, higher prices in long run

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Zeitungen und Magazine,

B8: 6. Persistence of dominance (even) under free entry - Network effects

- Definition: willingness to pay/utility by a consumer increases as the number of current consumers increase
  - Direct effect (externality): telephones, fax, Internet, Windows software
  - Indirect (virtual) effect: hardware-software networks: More software for more widespread hardware (game consoles, credit cards)
- Implications: Incumbents can use their customer basis to exclude (more efficient) entrants. For instance:
  - By using price discrimination the incumbent can exclude more easily (Karlinger and Motta, 2005)
  - Making a product/network not compatible with other product/networks consumers may not buy the latter
  - Since coordination of consumers play important role, incumbent may manipulate expectations so as to deter entry

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B8: 6. Persistence of dominance (even) under free entry – (Endogenous) sunk costs industries

Shaked-Sutton (1982):

- When products are vertically differentiated (= different qualities) and

- consumers' taste with respect to quality are not 'too' different (e.g. because of rather equal income distribution)

$\Rightarrow$ A natural monopoly or oligopoly arises even if sunk costs are only ε

$\Rightarrow$ Generally, the number of firms which co-exist at equilibrium is finite even as market size S goes to infinity

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B8: Endogenous sunk costs: Finiteness Property

The finiteness property holds if the cost of producing a higher quality does not fall upon variable costs

It holds across a number of different specifications (see e.g., Shaked-Sutton, 1987)

Sutton (1991) puts the result to an empirical test. It shows that in advertising-intensive industries as S increases the industry does not become fragmented (when S increases, firms have incentive to increase advertising, which in turn raises fixed costs and limit the number of firms in the market).

B8: 6. Persistence of dominance (even) under free entry

- Predatory and exclusionary practices:

$\Rightarrow$ Strategic behavior of incumbents to deter entry

$\Rightarrow$ See later!

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Market power, competition, and welfare
Conclusion (Motta, p. 89)

- This chapter has illustrated the relationship between market power and welfare. The analysis of allocative efficiency has shown that market power brings about a welfare loss, due to higher prices than in a competitive situation. Productive and dynamic inefficiencies (higher production costs and lower innovation rates) might also be associated with market power. This explains why competition policy should be concerned with market power.

- However, I have also argued that the elimination of market power - even if it were practicable - is not one of the objectives competition policy agencies should pursue. Indeed, the prospect of having some market power (i.e., some profit) represents a most powerful incentive for firms to innovate and invest. Competition laws and their enforcement should therefore ensure that firms will be able to enjoy the rewards for their investments. I have therefore argued that any expropriation of firms' assets (whether material or immaterial) should be avoided. As a consequence, resorting to the doctrine of essential facilities (granting access of crucial assets to competitors), to price controls, or even more drastic structural remedies must be carried out only in truly exceptional circumstances.

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Dieses Zitat fasst den Inhalt und die zentralen Aussagen dieses Abschnitts (perfekt) zusammen!

Market power, competition, and welfare
Conclusion (Motta, p. 89) cont.

- I have also tackled other misconceptions of competition policy. In particular, I have underlined that defending competition is not tantamount to defending competitors. Indeed, competition often leads inefficient firms to exit, and this is beneficial from a welfare point of view. Protecting inefficient firms so as to prolong their life artificially in an industry would be detrimental from a welfare perspective.

- Finally, market forces alone will not "fix it all": for several reasons, very often incumbent firms are able to keep and reinforce their market power. Competition policy must be vigilant, and guarantee an environment where potential and actual competitors are able to challenge firms enjoying a position of large market power.

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Preis und Wettbewerb – Sommersemester 2010

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Dieses Zitat fasst den Inhalt und die zentralen Aussagen dieses Abschnitts (perfekt) zusammen!