Chapter G – Merger Control

Competition Policy and Strategy – German Title: Wettbewerbspolitik und -strategie

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English version of my 2020 lecture

Mergers & Merger Control – Basics

Merger control directive of the EU (Council regulation (EC) No 139/2004)

- Definition of concentration/merger in Art. 3:
  - Lasting change of control
  - Merger of two or more previously independent (parts of) undertakings
  - Acquisition by person who already controls one undertaking (by contract, assets, etc; direct or indirect)
  - Control over merged/acquired entity (decisive influence)
- Evaluation of the merger in Art. 2:
  - Maintain and develop effective/potential competition in common market
  - Prevent creation/strengthening of dominant position
  - Maintain alternatives to buyers and (other) suppliers
  - Prevent foreclosure/entry deterrence
  - Maintain technical and economic progress
  - Coordinated effects

Mergers & Merger Control – Basics

Merger control directive of the EU (Council regulation (EC) No 139/2004)

- Scope: Community dimension in Art. 1
  - "combined aggregate worldwide turnover of all the undertakings concerned is more than EUR 5 000 million;
  - the aggregate Community-wide turnover of each of at least two of the undertakings concerned is more than EUR 250 million
  - unless each of the undertakings concerned achieves more than two-thirds of its aggregate Community-wide turnover within one and the same Member State." (Art. 1(2))

Mergers & Merger Control – Basics

Merger control directive of the EU (Council regulation (EC) No 139/2004)

- If the criteria laid out on the last slide are not met, the merger/concentration still has Community dimension if
  - "the combined aggregate worldwide turnover of all the undertakings concerned is more than EUR 2 500 million;
  - in each of at least three Member States, the combined aggregate turnover of all the undertakings concerned is more than EUR 100 million;
  - in each of at least three Member States included for the purpose of point (b), the aggregate turnover of each of at least two of the undertakings concerned is more than EUR 25 million; and
  - the aggregate Community-wide turnover of each of at least two of the undertakings concerned is more than EUR 100 million,
  - unless each of the undertakings concerned achieves more than two-thirds of its aggregate Community-wide turnover within one and the same Member State." (Art. 1(3))

Mergers & Merger Control – Basics

Examination of merger/concentration by EC

- Notification of concentration to EC (Art. 4).
- Data: `https://ec.europa.eu/competition/mergers/statistics.pdf`; (as of October 22, 2022.)
- 8,083 mergers
- Phase I decision after 25 working days (Art. 10(1)):
  - Compatible (clearance), Referral to member state, proceed to Phase II
  - Compatible 7,170 cases (ca. 88.7%).
- Phase II decision after 90 working days (Art. 10(3))
  - Compatible (clearance), compatible with commitments, prohibition (dissolution/restoration of pre-merger situation possible)
  - 282 cases in Phase II (3.5%), 140 with commitments (1.7%), 30 prohibited, 5 with restoration
- Next instance: ECJ

Mergers & Merger Control – Merger Control in Germany

§35 GWB

- Rules apply if
  1. worldwide turnover of merging parties in total over EUR 500 million and
  2. revenues of at least one of the merging parties in Germany over EUR 25 million and that of another one of the merging parties over EUR 5 million.
- Several other conditions (price of the acquired entity, etc.)

Mergers & Merger Control – Horizontal Mergers

- When/why is merger beneficial to firms?
- How does merger affect consumers?
- How does merger affect other competitors?
- Economic analysis requires market definition (Chapter F)
- Unilateral vs. Coordinated Effects
  - **Unilateral** Effects: merger leads to increased market power/incentive to raise prices for merging firms.
  - **Coordinated** Effects: ability to coordinate increases after merger (esp. collusion, cf. Chapter H).

- Consider Cournot-oligopoly with n symmetric firms.
- Demand function $q(p) = a - p$, constant marginal costs c.
- Output, market price, firm's profits and consumers surplus **pre merger**:

$$(q_i(n), p(n), \pi_i(n), CS(n)) = \left(\frac{a-c}{n+1},\ c + \frac{a-c}{n+1},\ \left(\frac{a-c}{n+1}\right)^2,\ \frac{1}{2}\left(\frac{n(a-c)}{n+1}\right)^2 \right).$$

- Merger between m firms: "m firms become one".
- Number of firms **post merger**:

$$n' = n - m + 1.$$

- Output, market price, firm's profits and consumers surplus **post merger**:

$$(q_i'(n,m), p'(n,m), \pi_i'(n,m), CS'(n,m)) = \left(\frac{a-c}{n-m+2},\ c+\frac{a-c}{n-m+2},\ \left(\frac{a-c}{n-m+2}\right)^2,\ \frac{1}{2}\left(\frac{(n-m+1)(a-c)}{n-m+2}\right)^2\right).$$

- When does merger pay off? How many firms?
- Merger pays off iff

$$\underbrace{\left(\frac{a-c}{n-m+2}\right)^2}_{\text{profits post merger}} \geq \underbrace{m\left(\frac{a-c}{n+1}\right)^2}_{\text{profits of } m \text{ firms prior to merger}}.$$

- For $m = xn$, with x being the share of firms in the market being involved in the merger, merger pays off iff x exceeds

$$x^*(n) = \frac{3+2n-\sqrt{5+4n}}{2n}.$$

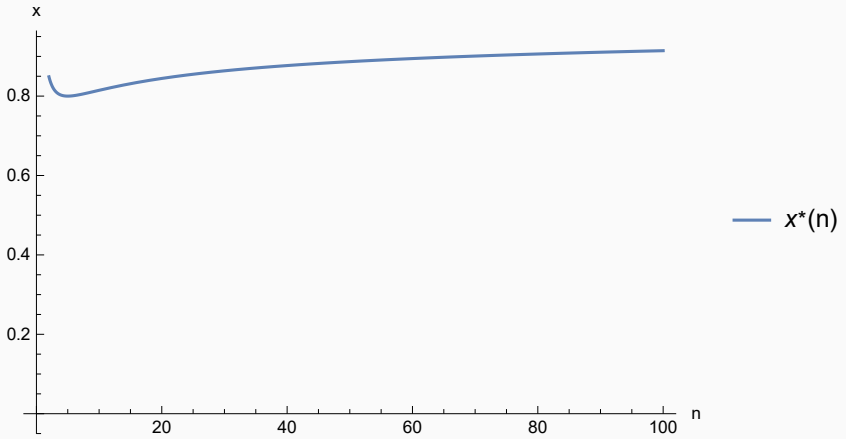


Figure 1: Lower bound of "market share" of firms being involved in the merger such that merger pays off, $x^*(n)$, with $n \in [2, 100]$.

Mergers & Merger Control – Horizontal Mergers

- *Merger Paradox*: merger pays off if at least 80% of all firms in the market merge.
  - Merger reduces intensity of competition.
  - Pre-merger profits higher than $\frac{1}{m}$ of post-merger profits.
  - Firms not involved in the merger benefit from merger (positive externality)
- Merger reduces consumer surplus:

$$\frac{1}{2}\left(\frac{n(a-c)}{n+1}\right)^2 \geq \frac{1}{2}\left(\frac{(n-m+1)(a-c)}{n-m+2}\right)^2 \Leftrightarrow m \geq 2.$$

Extension 1: cost efficiencies

- Extension 1.1: merger reduces fixed costs
  - Fixed cost F. Merger pays off iff

$$\left(\frac{a-c}{n-m+2}\right)^2 - F \geq m\left(\left(\frac{a-c}{n+1}\right)^2 - F\right).$$

  - Duplication of fixed cost pre merger increases incentive to merge.
  - With $m = xn$: minimum share of firms involved in the merger $x_F(n)$ (Slide 12).
  - Consumer Standard: block merger as there are no price reductions
- Extension 1.2: merger reduces variable costs
  - Efficient and inefficient firms in the market $\Rightarrow$ inefficient firm adopts efficient technology post merger
  - Increases in productive efficiency can lead to lower prices (higher quality or innovation; learning effects possible)
  - Merging parties have to proof efficiencies!

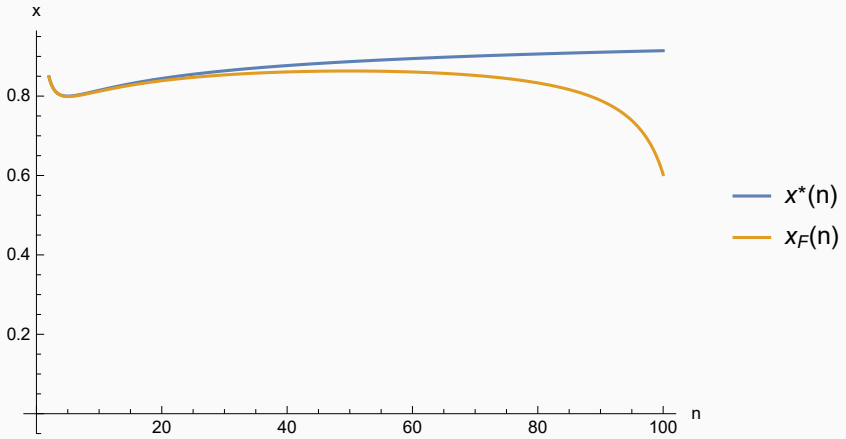


Figure 2: $x^*(n)$ and $x_F(n)$ for $(a, c, F) = (1000, 0, 90)$ and $n \in [2, 100]$.

Extension 2: merged entity acts as Stackelberg-leader

- Sequential quantity competition: Stackelberg model
- Pre merger: n symmetric firms competing á la Cournot
- Post merger: merged firm acts as *Stackelberg Leader*, l, and $n - m$ as *Stackelberg Follower*, f.
- Backwards induction:

$$\max_{q_f} \ \pi_f(q_f, q_l, q_{-f}) = p(q_f, q_l, q_{-f})q_f - C(q_f).$$

- FOC: q_{-f} is output of all other followers/non-merging parties. Symmetry: $q_{-f} = (n - m - 1)q_f$. A follower's reaction function reads $r_f(q_l)$.
- *Stackelberg leader* anticipates followers' behavior such that

$$\max_{q_l} \ \pi_l(q_l) = p(q_l, r_f(q_l))q_l - C(q_l).$$

- With demand function $q(p) = a - p$ and constant marginal costs c, FOC reads

$$q_f(q_l, q_{-f}) = \frac{a - c - q_{-f} - q_l}{2}.$$

- From symmetry, we have $q_{-f} = (n - m - 1)q_f$ such that a follower's reaction function reads:

$$r_f(q_l) = \frac{a - c - q_l}{n - m + 1}.$$

- From profit maximization problem, we get

$$\max_{q_l} \ \pi_l(q_l) = (a - q_l - (n - m)r_f(q_l) - c)q_l \ \Rightarrow \ q_l^* = \frac{a - c}{2}.$$

- Merged entity produces monopoly output.
- From reaction function, we get $q_f^* = \frac{a-c}{2(n-m+1)}$.

- Profits and consumer surplus in equilibrium:

$$(\pi_l, \pi_f, CS_{SB}) = \left(\frac{(a-c)^2}{4(n-m+1)}, \frac{(a-c)^2}{(2(n-m+1))^2}, \frac{(a-c)^2(2(n-m)+1)^2}{8(n-m+1)^2} \right)$$

- Merger pays off iff

$$\underbrace{\frac{(a-c)^2}{4(n-m+1)}}_{\text{SB-leader's profit}} \geq \underbrace{m\left(\frac{a-c}{n+1}\right)^2}_{\text{pre-merger profits of } m \text{ firms}} .$$

- Merger raises consumer surplus as $CS_{SB}(n,m) > CS(n)$ for all $n \geq 2$ and $n \geq m$ ($CS(n)$, Slide 7).
- Stackelberg followers in a disadvantaged position $\Rightarrow$ merger between followers, (*Merger Waves*)?

Extension 3: differentiated goods

- $n = 3$ firms compete á la Bertrand and produce differentiated goods
- Each firm $i \in \{1, 2, 3\}$ produces own variant i
- Firms have identical constant marginal costs of c
- Demand for variant i:

$$q_i(p_i, p_j, p_k) = \alpha - \beta p_i + \gamma(p_j + p_k) \ , i \in \{1, 2, 3\}, i \neq j, k.$$

- Assume that $\beta > \gamma$, such that demand for variant i reacts more strongly to changes in p_i than to changes in p_j, p_k.

Pre merger equilibrium

- From firm i's optimality condition, we get:

$$\max_{p_i} \ \pi_i(p_i, p_j, p_k) = (\alpha - \beta p_i + \gamma(p_j + p_k))\,(p_i - c).$$

- Accordingly, i's reaction function reads:

$$p_i(p_j, p_k) = \frac{\alpha + \beta c + \gamma(p_j + p_k)}{2\beta}.$$

- Everywhere continuously differentiable reaction function as in Cournot, however, with strategic complements, $\left(\frac{\partial p_i(p_j, p_k)}{\partial p_j} > 0\right)$.
- Equilibrium price (intersection between reaction functions):

$$p_{pre} = \frac{\alpha + \beta c}{2(\beta - \gamma)}.$$

Merger between two firms

- Firms i and j merge to $i\&j$.
- Variants i and j are still produced, but $i\&j$ maximizes **sum of each firm's profits**.
- Profit maximization of merged firm:

$$\max_{p_i,p_j} \pi_{i\&j}(p_i,p_j,p_k) = \underbrace{(\alpha-\beta p_i+\gamma(p_j+p_k))(p_i-c)}_{\text{Profit firm } i} + \underbrace{(\alpha-\beta p_j+\gamma(p_i+p_k))(p_j-c)}_{\text{Profit firm } j},$$

- From this, we get i's reaction function post merger:

$$p_i'(p_j,p_k) = \frac{\alpha+\beta c+\gamma(p_j+p_k)+\gamma(p_j-c)}{2\beta} > p_i(p_j,p_k).$$

- Firm i internalizes positive externality on j in the form of higher prices $\Rightarrow$ avoid "cannibalization" within merged entity (cf. UPP in Chapter F).

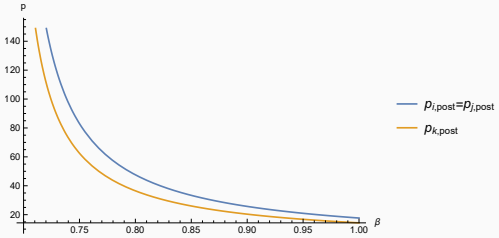
Merger between two firms

- Firm k maximizes own profits over prices (Slide 17)
- Equilibrium prices post merger

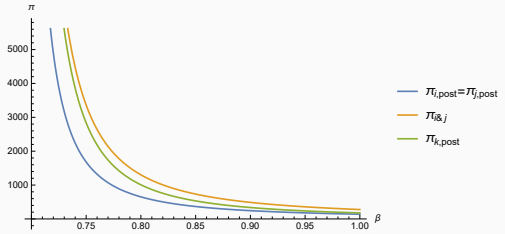
$$p_{i,post} = p_{j,post} = \frac{2\beta(\alpha + \beta c) + (\alpha - \beta c)\gamma}{2(2(\beta^2 - \beta\gamma) - \gamma^2)}, \; p_{k,post} = \frac{\alpha\beta + c(\beta^2 - \gamma^2)}{2(\beta^2 - \beta\gamma) - \gamma^2}.$$

- Umbrella Effect: merger between i and j is positive externality to k such that k increases price, too.
- Business Stealing: k's price increase is weaker than that of i and j. From the viewpoint of the firms, externalities are not perfectly internalized when 2 out of 3 firms merge!
- Prices and profits increase, consumers surplus decreases.

Merger between two firms (with $(\alpha, \beta, c) = (10, 1, 1)$ and $\gamma \in [0, 0.7]$)



(a) Equilibrium prices



(b) Equilibrium profits.

Merger simulation

- Structural model requires assumptions regarding
  - Demand, costs, mode of competition
  - Choose method based on market characteristics and available data: Logit, Nested Logit, Berry Levinson Pakes (BLP), Almost Ideal Demand System (AIDS), simulation/calibration of theory model, ...
  - Case-by-case!
- Pre-merger conditions as starting point
- Counterfactual: What would happen w/o merger?
  - Process/product innovation
  - Efficiency effects
  - Foreclosure/Market entry
  - Failing firm defence ...

End – First Part

Mergers & Merger Control – Vertical Mergers

- Mergers along the value chain:
  - Manufacters 1,2,3,... serve retailers 1,2,3,...
  - Effect of merger between manufacturers and retailers?
- Following EC's Guidelines on the assessment of non-horizontal mergers (2008/C 265/07), par. 23, "(n)on-horizontal mergers pose no threat to effective competition unless the merged entity has a significant degree of market power (...) in at least one of the markets concerned." No such concern if
  - Post-merger market share in each of the markets below 30%
  - Post-merger HHI below 2000
  - Exception: strong growth of one of the merged entities, cross-shareholding, elimination of a maverick, coordination/collusion in the past

Double marginalization

- Upstream (e.g., production, wholesaler): Monopolist
  - Constant marginal costs c, no fixed costs
  - Sell to downstream firm at wholesale price w
- Downstream (e.g., retailer): Monopolist
  - Buys good for wholesale price w
  - No further costs
  - Sell to final customer at retail price p
- Demand of final customers: $q(p) = a - p$.
- First, determine quantity of downstream monopolist for given w:

$$\max_q \ \pi_D(q, w) = (a - q - w)q \ \Rightarrow \ q(w) = \frac{a - w}{2}.$$

- This gives inverse demand for upstream monopolist: $w(q) = a - 2q$

Double marginalization

- Equilibrium

$$\max_q \ \pi_U(q) = (\underbrace{a - 2q}_{w(q)} - c)q \ \Rightarrow \ q_{pre} = \frac{a-c}{4},$$

- such that

$$(p_{pre}, w_{pre}, \pi_{D,pre}, \pi_{U,pre}) = \left(\frac{3a+c}{4}, \frac{a+c}{2}, \frac{(a-c)^2}{16}, \frac{(a-c)^2}{8} \right).$$

- Pre merger: double marginalization
  - Monopolistic overcharges on every level of value chain
  - Retail prices inefficiently high (from social and firm perspective)

Double marginalization

- Merger between upstream and downstream monopolist
- Joint profits:

$$\pi_G(q) = \underbrace{(p - w)q}_{\text{Gewinn } \textit{Downstream}} + \underbrace{(w - c)q}_{\text{Gewinn } \textit{Upstream}}$$

- Maximize joint profits

$$\max_q \ \pi_G(q) = (a - q - c)q \Rightarrow q_{post} = \frac{a - c}{2}$$

- Equilibrium prices fall to $\frac{a+c}{2}$ and joint profit increases to $\frac{(a-c)^2}{4}$
- Merger eliminates double marginalization, which increases profits and consumer surplus!

Mergers & Merger Control – Vertical Mergers

- Elimination of double marginalization potential efficiency effect of vertical mergers:
  - Does not occur with Bertrand competition upstream, where $w = c$ in equilibrium.
  - Does not occur with Bertrand competition upstream, where $p = w$ in equilibrium.
- Further possible efficiency effects
  - Internalize horizontal externalities, e.g., service competition downstream (free-riding)
  - Long-term project between upstream and downstream firms, e.g., align production processes (special inputs, norms, etc.)
- Problem with vertical mergers: foreclosure!

Input foreclosure

- Upstream monopolist, homogeneous product, constant marginal cost c, sell product to downstream firm for price w
- Downstream Corunot-duopoly with symmetric firms $i \in \{1, 2\}$, buy product from upstream monopolist for price w, sell to final customer for price p without further costs.
- Demand of final customers: $q(p) = a - p$.
- Anaylze merger between upstream monopolist and one downstream firm

Input foreclosure

- Pre merger: reaction function of one downstream firm:

$$\max_{q_i} \ \pi_i(q_i, q_j, w) = (a - q_i - q_j - w)q_i, i \in \{1,2\}, i \neq j, \ \Rightarrow \ q_i(q_j, w) = \frac{a - w - q_j}{2}.$$

- Symmetry: $q_i(w) = \frac{a-w}{3}$
- Demand of downstream firms reads $Q(w) = 2q_i(w) = \frac{2(a-w)}{3}$ such that $w(Q) = a - \frac{3}{2}Q$
- Optimality condition of upstream monopolist:

$$\max_{Q} \ \pi_U(Q) = \left(a - \frac{3}{2}Q - c\right) Q \ \Rightarrow \ Q_{pre} = \frac{a-c}{3}$$

- Equilibrium:

$$(q_{i,pre}, p_{pre}, w_{pre}, \pi_U, \pi_i, CS_{pre}) = \left(\frac{a-c}{6}, \frac{2a+c}{3}, \frac{a+c}{2}, \frac{(a-c)^2}{6}, \left(\frac{a-c}{6}\right)^2, \frac{(a-c)^2}{18}\right)$$

Iinput foreclosure

- No symmetry post merger
- Suppose firm $i = 1$ mergers with upstream monopolist.
- Profit function of vertically integrated firm:

$$\pi_{VI} = \underbrace{(a - q_1 - q_2 - w_1)q_1}_{\text{profit own downstream}} + \underbrace{(w_1 - c)q_1}_{\text{profit selling to other downstream}} + \underbrace{(w_2 - c)q_2}_{\text{profit selling to own downstream}}.$$

- Optimality condition of downstream firm 2:

$$\max_{q_2} \ \pi_2(q_1, q_2, w_2) = (a - q_1 - q_2 - w_2)q_2 \ \Rightarrow \ w_2(q_1, q_2) = a - q_1 - 2q_2.$$

- Insert $w_2(q_1, q_2)$ into π_{VI} such that $q_{1,post} = \frac{a-c}{2}$ and $q_{2,post} = 0$.
- Firm 2 no longer served: foreclosure!

Input foreclosure

- Downstream competition weakened/eliminated
- Efficiency: Merger eliminates double marginalization
- Merger raises industry profits: $\pi_{VI} = \left(\frac{a-c}{2}\right)^2 > \frac{(a-c)^2}{6} = \pi_1 + \pi_2 + \pi_U$.
- Merger raises consumer surplus: $p_{post} = \frac{a+c}{2} < p_{pre}$ und $CS_{post} = \frac{(a-c)^2}{8} > CS_{pre}$.
- Thus,
  - merger leads to input foreclosure and
  - increases welfare by eliminating double marginalization
- In Bertrand competition, merger has no effect as $p_{pre} = w$.

Customer foreclosure

- Symmetric Cournot-duopolists $i \in \{1, 2\}$ upstream produce homogeneous good at constant marginal costs c, sell to downstream firm for price w
- Downstream monopolist buys product at w and sells for p to final customers
- Demand of final customers: $q(p) = a - p$.
- Analyze merger between one upstream firm with downstream monopolist

Customer foreclosure

- Pre merger
- Profit maximization of downstream monopolist implies

$$\max_{Q} \ \pi_D(Q, w) = (a - Q - w)Q \ \Rightarrow \ Q(w) = \frac{a - w}{2},$$

- such that inverse demand upstream reads $w(Q) = a - 2Q$.
- In equilibrium,

$$\max_{q_i} \ \pi_i(q_i, q_j) = \underbrace{(a - 2(q_i + q_j)}_{w(Q), Q = q_i + q_j} - c)q_i \ \overset{symmetry}{\Longrightarrow} \ q_{pre} = \frac{a - c}{6}$$

- such that

$$(p_{pre}, w_{pre}, \pi_U, \pi_i, CS_{pre}) = \left(\frac{2a + c}{3}, \frac{a + 2c}{3}, \frac{(a - c)^2}{18}, \left(\frac{a - c}{3} \right)^2, \frac{(a - c)^2}{18} \right).$$

Customer foreclosure

- Suppose upstream firm $i = 1$ with downstream monopolist
- Profit function of vertically integrated firm:

$$\pi_{VI}(q_1, q_2, w_2) = \underbrace{(a - q_1 - q_2 - w_1)q_1}_{\text{profit sale own product}} + \underbrace{(a - q_1 - q_2 - w_2)q_2}_{\text{profit sale firm 2's product}} + \underbrace{(w_1 - c)q_1}_{\text{profit production}}$$

- Optimality implies

$$\max_{q_1, q_2} \ \pi_{VI}(q_1, q_2, w_2) \ \Rightarrow \ q_1(q_2) = \frac{a - c - 2q_2}{2}, w_2(q_1, q_2) = a - 2(q_1 + q_2).$$

- Reaction function of upstream firm $i = 2$ thus reads

$$\max_{q_2} \ \pi_2(q_1, q_2) = (\underbrace{a - 2(q_1 + q_2)}_{w_2(q_1, q_2)} - c)q_2 \ \Rightarrow \ q_2(q_1) = \frac{a - c - 2q_1}{4}.$$

Customer foreclosure

- Determine equilibrium quantity using reaction functions $q_1(q_2)$ and $q_2(q_1)$ such that $q_{1,post} = \frac{a-c}{2}$ and $q_{2,post} = 0$.
- Downstream monopolist only buys from own, vertically integrated firm. Other upstream firm is foreclosed from customers.
- Merger raises industry profits and consumer surplus
- Efficiency effect from elimination of double marginalization overcompensates suppression of upstream competition

- EC's Guidelines on the assessment of non-horizontal mergers (2008/C 265/07), par. 29:
  A merger is said to result in foreclosure where actual or potential rivals' access to supplies or markets is hampered or eliminated as a result of the merger, thereby reducing these companies' ability and/or incentive to compete. Such foreclosure may discourage entry or expansion of rivals or encourage their exit. Foreclosure thus can be found even if the foreclosed rivals are not forced to exit the market: It is sufficient that the rivals are disadvantaged and consequently led to compete less effectively. Such foreclosure is regarded as anti-competitive where the merging companies – and, possibly, some of its competitors as well – are as a result able to profitably increase the price charged to consumers.
- EC assesses ability (IV, 1.A and 2.A) and incentive (IV, 1.B and 2.B) to foreclose as well as effect of foreclosure (IV, 1.C and 2.C).
- In our examples, efficiency effects (from elimination of double marginalization) c. p. outweighs negative effects of foreclosure.
- Further aspects: dynamic effects, entry, exit, innovation, quality, etc.

Mergers – Conglomerate Mergers

- Conglomerate mergers: merger between firms that produce unrelated products/goods in different product markets
  - *Time Warner*/ AT&T.
  - Axel Springer/ProSiebenSat.1.
- Potentially covers complementary products
- Economies of Scope: joint inputs and/or distribution
- Managerial incentives: *Empire Building*.
- Risk diversification
- Tying and bundling

Calculations Slides 33–34

$$\max_{q_1,q_2} \pi_{VI}(q_1,q_2,w_2) = (a-q_1-q_2-c)q_1 + (a-q_1-q_2-w_2)q_2.$$

$$\frac{\partial \pi_{VI}}{\partial q_1} = a - 2q_1 - 2q_2 - c \overset{!}{=} 0 \;\Leftrightarrow\; q_1(q_2) = \frac{a-c-2q_2}{2}. \tag{1}$$

$$\frac{\partial \pi_{VI}}{\partial q_2} = a - 2q_1 - 2q_2 - w_2 \overset{!}{=} 0 \;\Leftrightarrow\; w_2(q_1,q_2) = a - 2(q_1+q_2). \tag{2}$$

$$\max_{q_2} \pi_2(q_1,q_2) = (w_2(q_1,q_2)-c)q_1 \overset{(2)}{=} (a-2(q_1+q_2)-c)q_2.$$

$$\frac{\partial \pi_2}{\partial q_2} = a - 2q_1 - 4q_2 - c \overset{!}{=} 0 \;\Leftrightarrow\; q_2(q_1) = \frac{a-2q_1+c}{4}. \tag{3}$$

$$(1)\ \&\ (3) \;\Rightarrow q_{2,\text{post}} = 0, q_{1,\text{post}} = \frac{a-c}{2}. \tag{4}$$