Topic 11:

Vertical Mergers (Integration)

EC 3322

Semester I – 2008/2009

Introduction

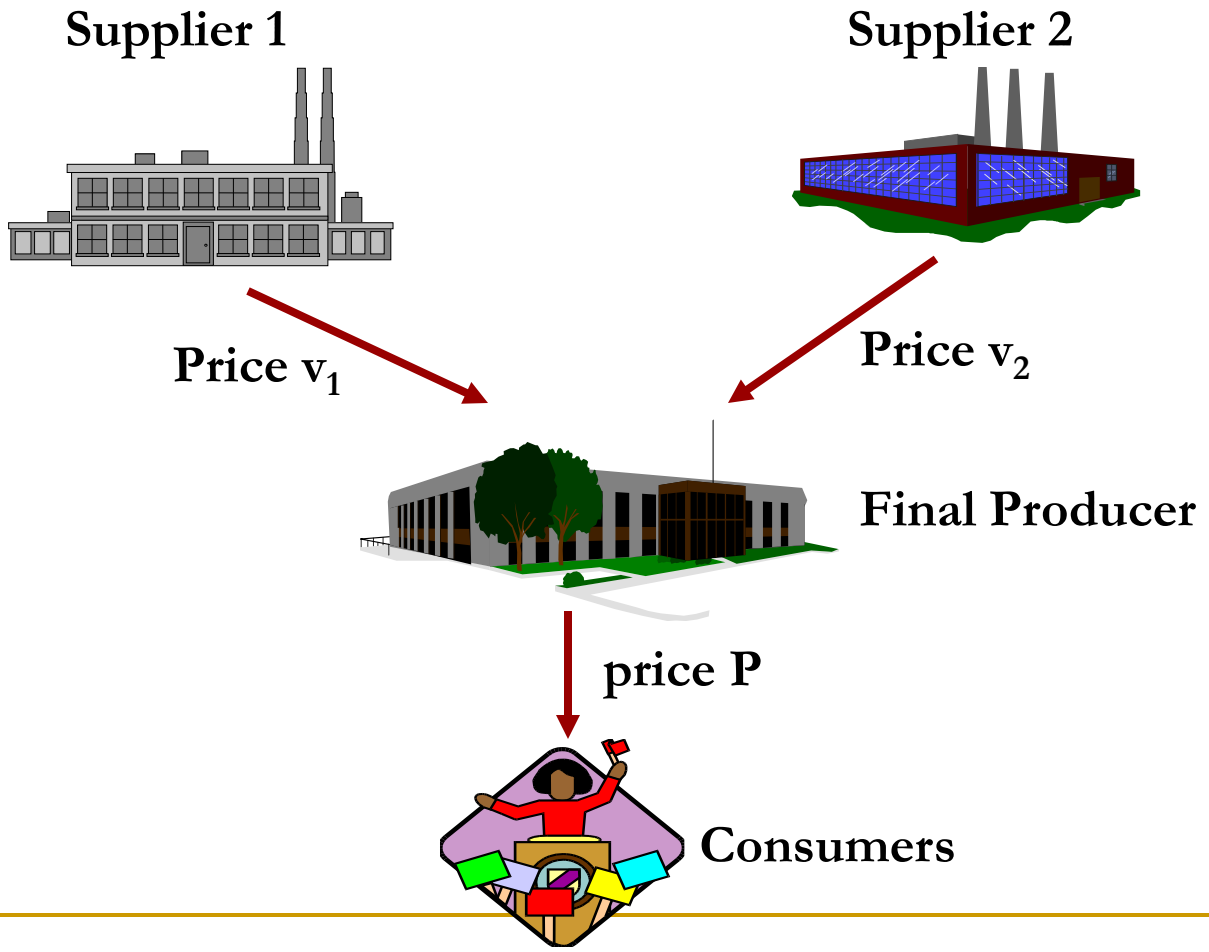
- **General Electric (GE)** and **Honeywell** proposed to **merge** in 2000 → GE planned to acquire Honeywell.
  - GE → a group with diverse businesses (manufactures jet engines for commercial aircraft, television (NBC), financial services (GE Finance).
  - Honeywell → a major aerospace firm producing various electrical and other control systems for jet aircraft.
- The merger deal was approved in the US by FTC/ Dept. of Justice, **but** blocked by the EU Competition Commission.
  - This was a merger of ***complementary*** firms → the more Boeing buys aircraft engines, it will also buy more related aircraft items → It is "like" a vertical merger.
  - Could be beneficial for the merged firms and consumers → remove inefficiencies in pricing → Why was the merger blocked?

Introduction …

- The reason → Although it maybe beneficial (removing market inefficiency) → people argue that vertical mergers can potentially be **detrimental** if they facilitate **market foreclosure** by the merged firms → **refuse to supply** non-merged **rivals**.
- Regulators → **balance** these two forces in deciding on the merger.
- An example:
  - A **final product** requires **two inputs** in **fixed proportions** → e.g. **one unit of each input** is needed to make **one unit of output**.
  - Input producers and the final product producer are **monopolists**.
  - The **demand** for the final product is $P = 140 - Q$.
  - **MCs** of upstream producers and final producer (**other than for the two inputs**) are normalized to **zero**.

Complementary Merger …

- Consider first a **merger between the two upstream producers**? → What is the impact of such merger?



Complementary Merger …

- The profit of the final producer:

$$\pi^f = (P - v_1 - v_2)Q = (140 - Q - v_1 - v_2)Q$$

- Maximize profit with respect to Q.

$$\frac{\partial \pi^f}{\partial Q} = 140 - (v_1 + v_2) - 2Q = 0$$

$$Q^* = 70 - \frac{(v_1 + v_2)}{2}$$

- This gives us the derived demand for each input.

$$Q_1 = Q_2 = 70 - \frac{(v_1 + v_2)}{2}$$

- So the profit of input suppliers 1 and 2 are respectively:

$$\pi^1 = v_1 Q_1 = v_1 (70 - v_1/2 - v_2/2)$$

$$\pi^2 = v_2 Q_2 = v_2 (70 - v_1/2 - v_2/2)$$

Complementary Merger …

- Maximize the profit of input suppliers:

$$\frac{\partial \pi^1}{\partial v_1} = 70 - v_1 - v_2/2 = 0 \quad \text{and} \quad \frac{\partial \pi^2}{\partial v_2} = 70 - v_2 - v_1/2 = 0$$

$$v_1 = 70 - v_2/2 \quad \text{and} \quad v_2 = 70 - v_1/2$$

- Thus,

$$v_1 = 70 - (70 - v_1/2)/2 = 35 + v_1/4$$

$$v_1^* = \$46.67 \quad \text{and} \quad v_2^* = \$46.67$$

- Recall that:

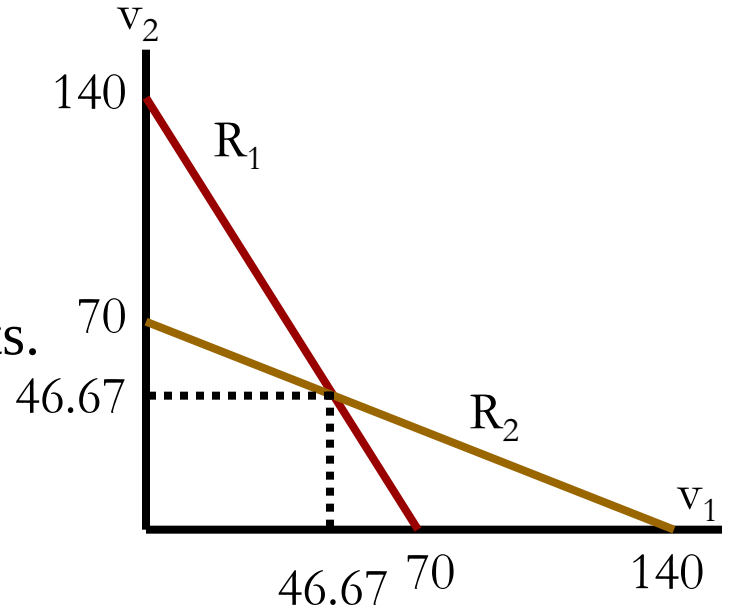
$$Q^* = Q_1^* = Q_2^* = 70 - \frac{(v_1 + v_2)}{2} = 23.33 \text{ units.}$$

- The final product price and profits are:

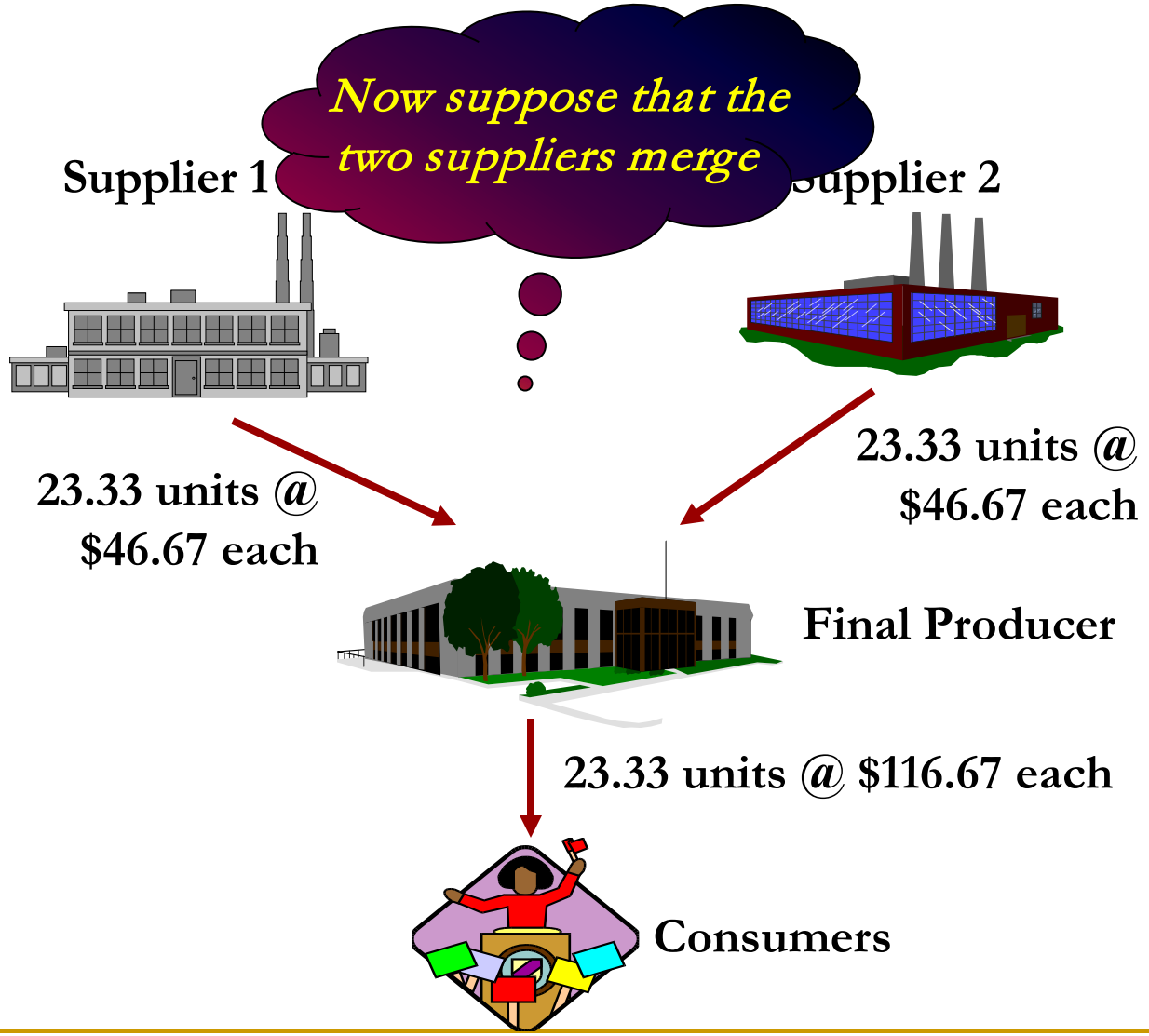
$$P^* = 140 - Q = \$116.67$$

$$\pi^1 = \pi^2 = 46.67(23.33) = \$1,088.91$$

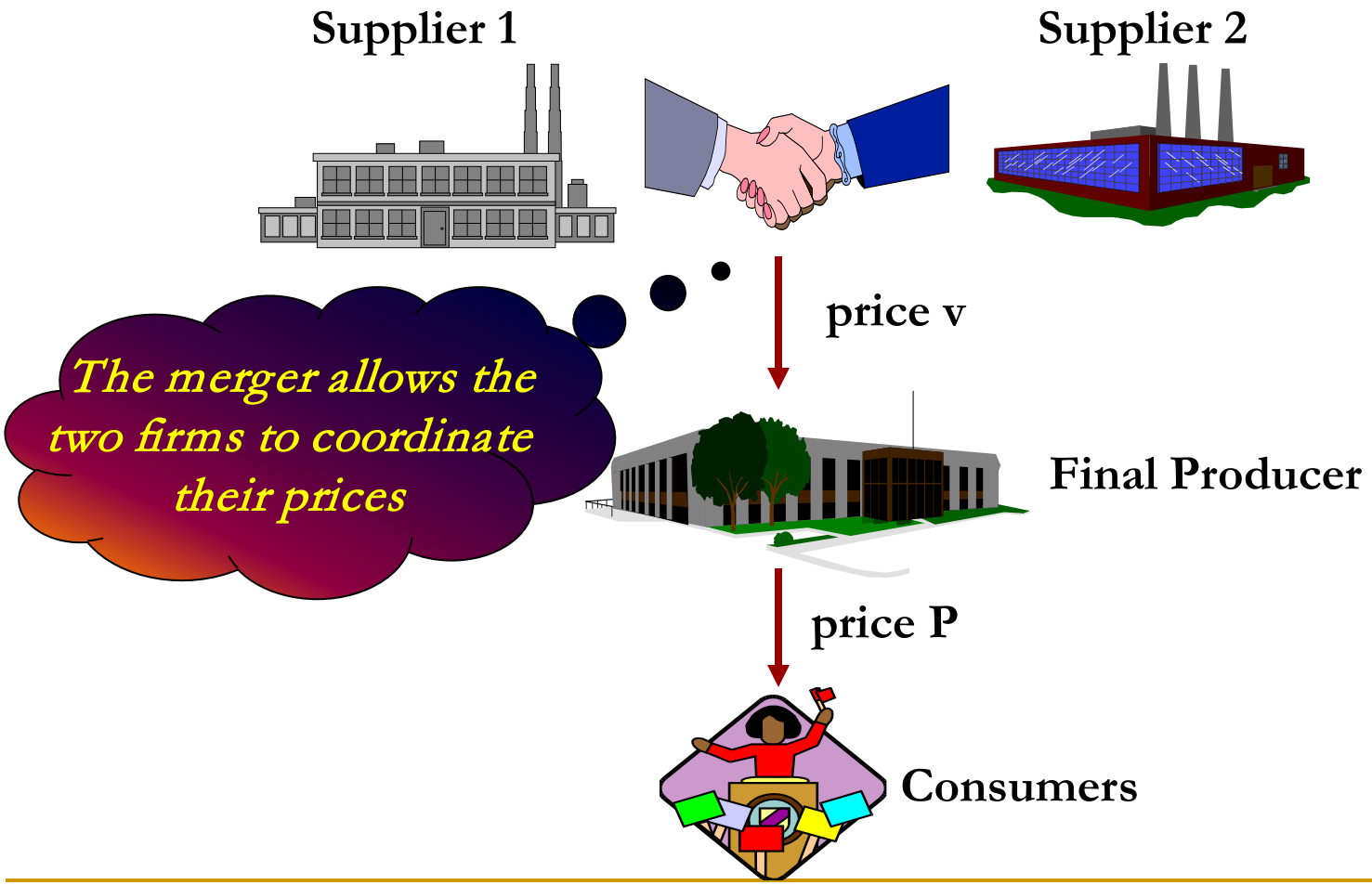
$$\pi^f = (116.67 - 46.67 - 46.67)23.33 = \$544.29$$



Complementary Merger …



Complementary Merger …



Complementary Merger …

- The profit of the final producer:

$$\pi^f = (P - v - v)Q = (140 - Q - 2v)Q$$

- Maximize profit with respect to Q.

$$\frac{\partial \pi^f}{\partial Q} = 140 - 2v - 2Q = 0$$

$$Q^* = 70 - v$$

- This gives us the derived demand for each input.

$$Q_1 = Q_2 = Q_m = 70 - v$$

- So the profit of input suppliers 1 and 2 are respectively:

$$\pi^m = vQ = v(70 - v)$$

Complementary Merger …

- Maximize the profit of input suppliers:

$$\frac{\partial \pi^m}{\partial v} = 70 - 2v = 0$$

$$v = \$35 \quad \text{total combined cost } 2v = \$70$$

This is the cost of the combined input: the merger has reduced costs to the final producer

- Recall that:

$$Q_m^* = Q^* = 70$$

The merger has reduced the final pr… consu…

This is greater than the combined pre-merger

- The final product price a… profit

$$P^* = 140 - Q = \$105$$

$$\pi^m = 2vQ_m^* = 2(35)(35) = \$2,\ldots$$

This is greater than the pre-merger profit

$$\pi^f = (105 - 70)35 = \$1,225$$

Complementary Merger …

- A merger of complementary producers has:
  - Increased profits of the merged firms.
  - Increased profit of the final producer.
  - Reduced the price charged to consumers.

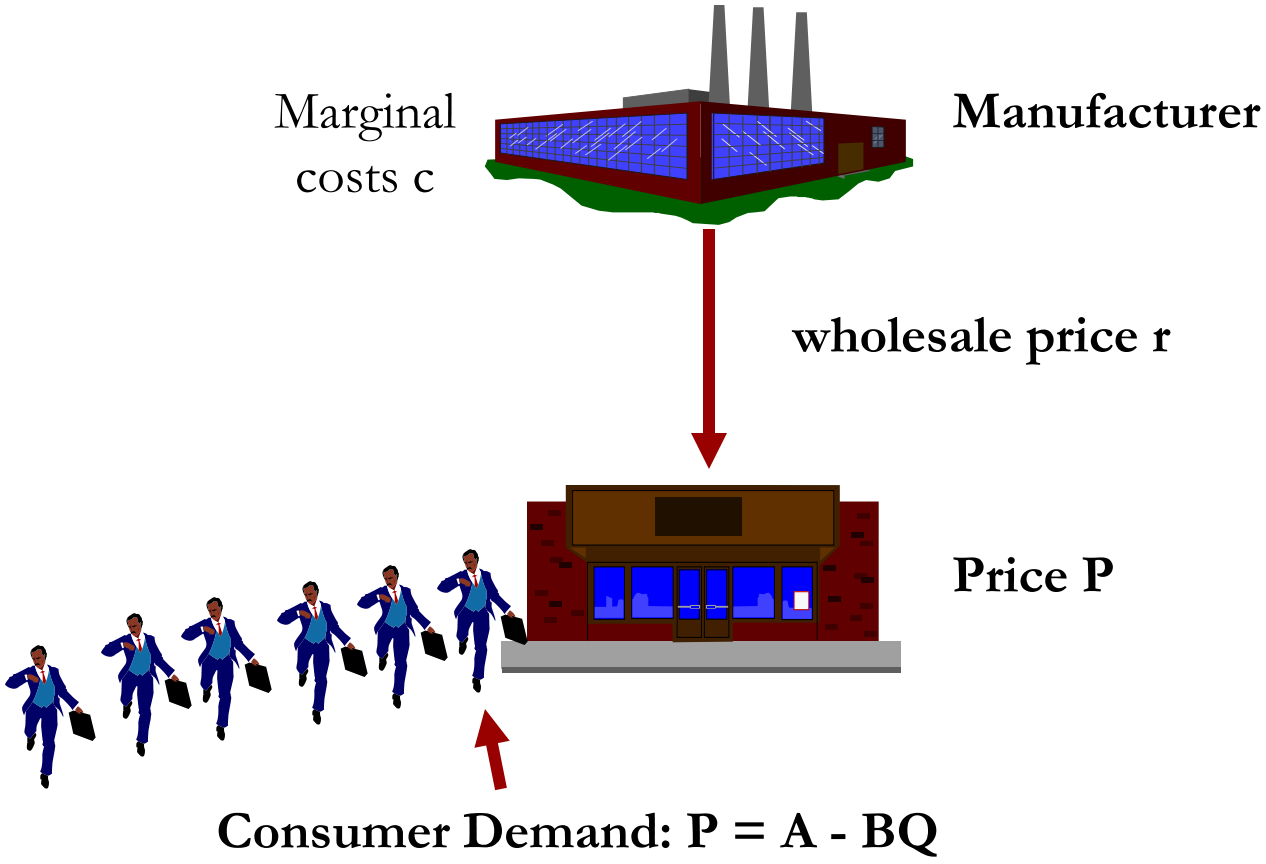
Everybody gains from this merger: a Pareto improvement! Why?

- This merger **corrects a market failure**.
  - Prior to the merger, the upstream suppliers do not take full account of their interdependence.
  - Reduction in price by one of them reduces downstream costs, increases downstream output and benefits the other upstream firm
  - But this is an **externality** and so is ignored → **Merger internalizes the externality**.

Vertical Merger

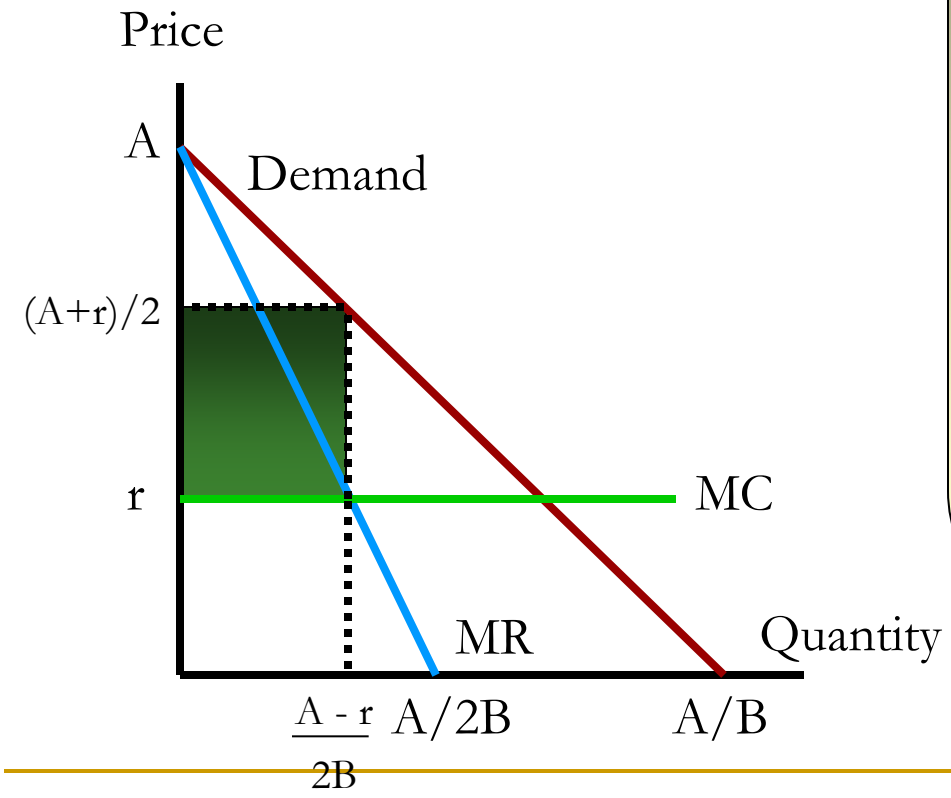
- The **same result** arises in **vertical mergers**: **mergers of upstream and downstream firms**.
- Merger can lead to a general improvement because of the elimination of **double marginalization** (successive mark-up problem).
- An example:
  - 1 upstream and 1 downstream monopolist (e.g. manufacturer and retailer).
  - The upstream firm has **MC=c** → sells its product to the retailer at **retail price r per unit**.
  - The retailer has no other costs → also assume **one unit of input gives one unit of output**.
  - The retail demand is $P = A - BQ$

Vertical Merger …



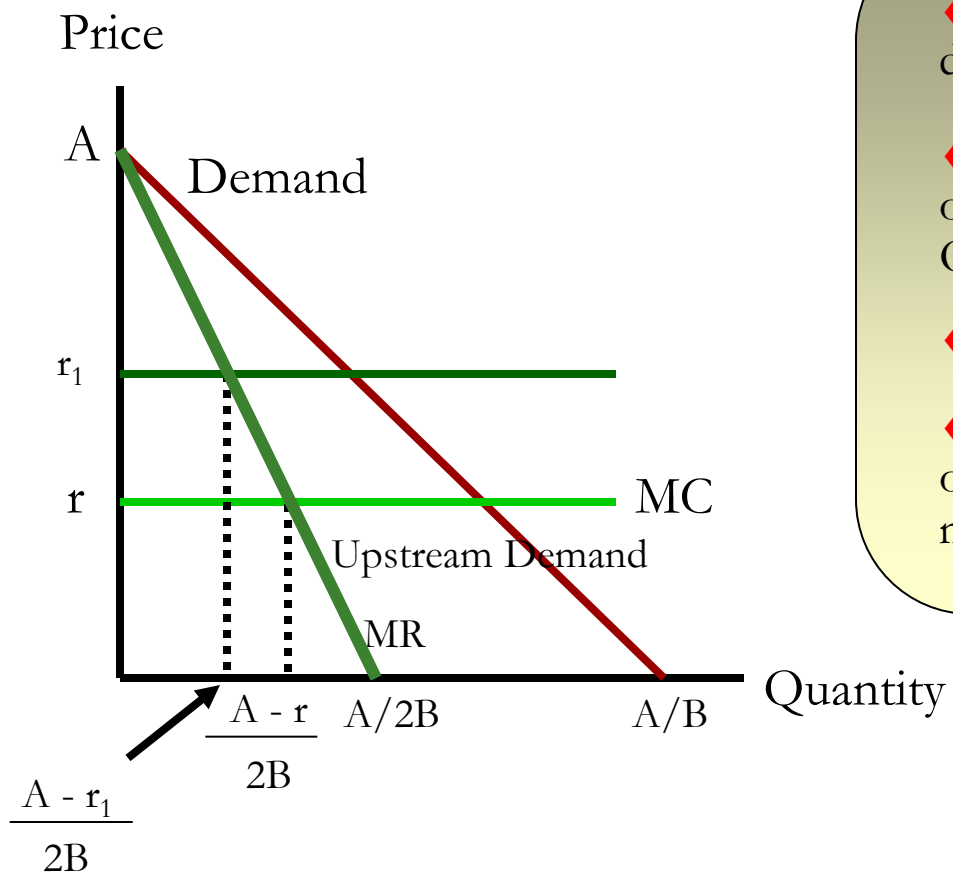
Vertical Merger …

- Consider the retailer's decision
  - Identify profit-maximizing output.
  - Choose the profit maximizing price.



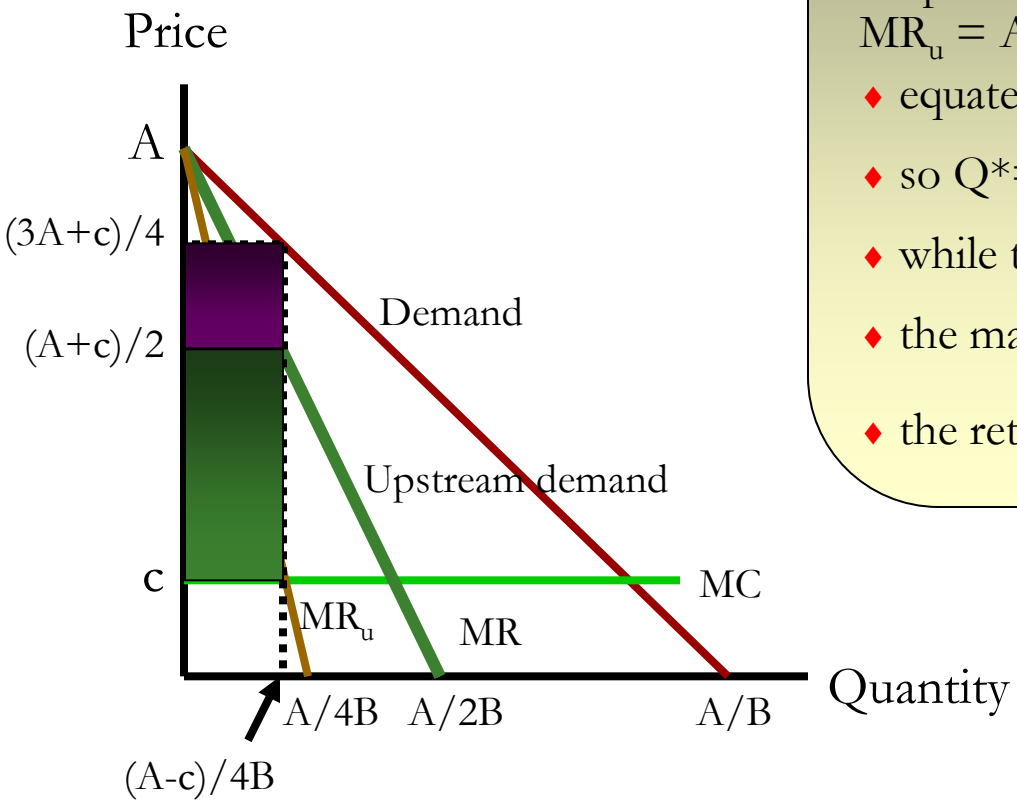
- marginal revenue downstream is MR = A – 2BQ
- marginal cost is r
- equate MC = MR to give the quantity $Q = (A - r)/2B$
- identify the price from the demand curve: $P = A - BQ = (A + r)/2$
- profit to the retailer is $(P - r)Q$ which is $\pi^D = (A - r)^2/4B$
- profit to the manufacturer is $(r-c)Q$ which is $\pi^M = (r - c)(A - r)/2B$

Vertical Merger …



- Suppose the manufacturer sets a different price r_1
- Then the downstream firm's output choice changes to the output $Q_1 = (A - r_1)/2B$
- and so on for other input prices
- demand for the manufacturer's output is just the downstream marginal revenue curve

Vertical Merger …



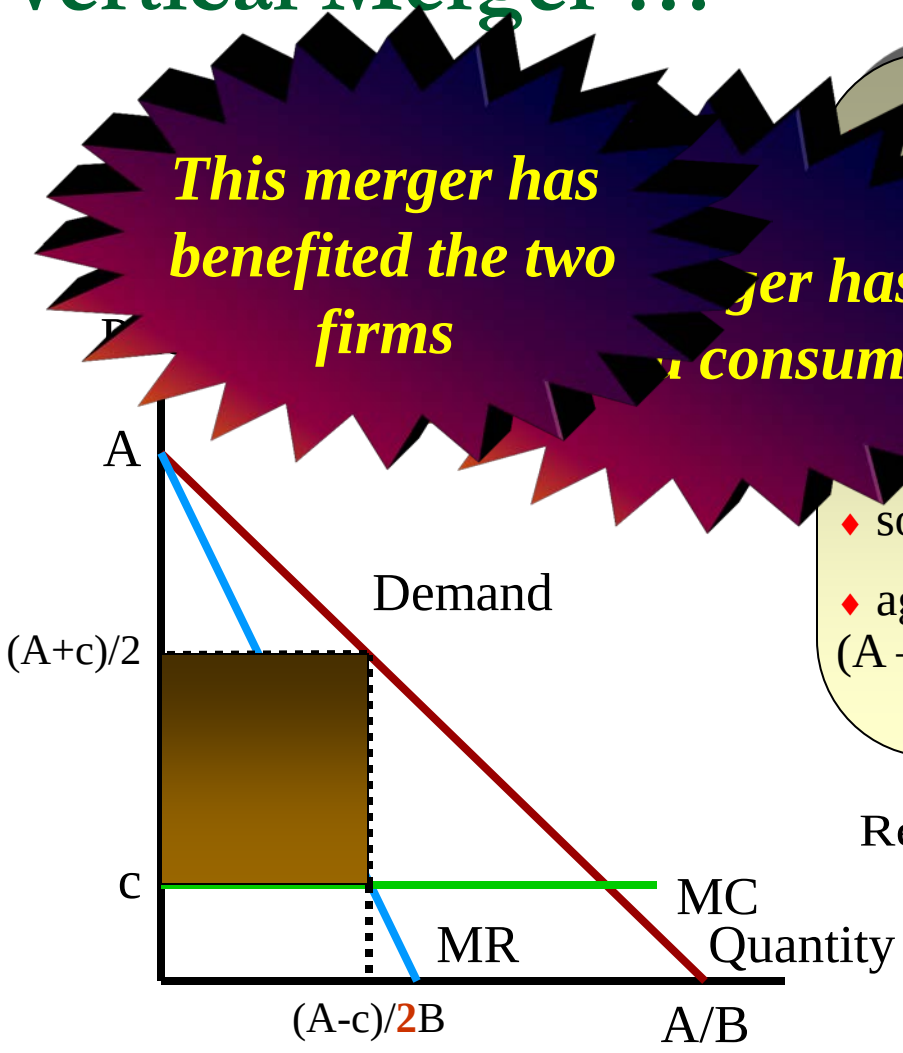
- the manufacturer's marginal cost is c
- upstream demand is $Q = (A - r)/2B$ which is $r = A - 2BQ$
- upstream marginal revenue is, therefore, $MR_u = A - 4BQ$
- equate $MR_u = MC$: $A - 4BQ = c$
- so $Q^* = (A-c)/4B$ the input price is $(A+c)/2$
- while the cons. (retail) price is $(3A+c)/4$
- the manufacturer's profit is $(A-c)^2/8B$
- the retailer's profit is $(A-c)^2/16B$

Vertical Merger …

- Suppose that the **retailer** and **manufacturer merge**.
  - Manufacturer takes over the retail outlet.
  - Retailer is now a downstream division of an integrated firm.
  - The integrated firm aims to maximize total profit.
  - Suppose that the upstream division sets an **internal (transfer) price** of **r** for its product.
  - Suppose that consumer demand is P = P(Q).
  - Total profit is:
    - Upstream division: (r - c)Q
    - Downstream division: (P(Q) - r)Q
    - The aggregate profit: (P(Q) - c)Q

The internal transfer price nets out of the profit calculations

Vertical Merger …



- integrated demand is P(Q) = A - BQ
- al revenue is MR = A – 2BQ
- cost is c
- fit-maximizing output requires BQ = c
- Q* = (A – c)/2B
- so the retail price is P = (A + c)/2
- aggregate profit of the integrated firm is $(A - c)^2/4B$

Retail Price $\frac{(A+c)}{2} < \frac{(3A+c)}{4}$; $A > c$

Profit $\frac{(A-c)^2}{4B} > \frac{(A-c)^2}{8B} + \frac{(A-c)^2}{16B}$

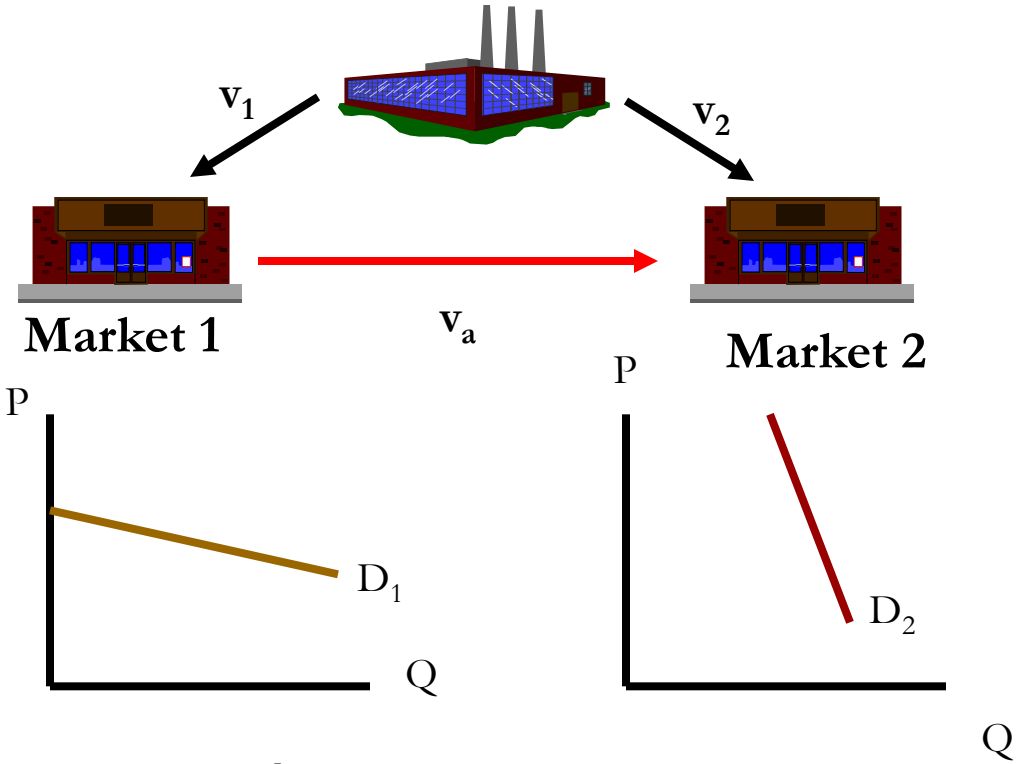
$\frac{4(A-c)^2}{16B} > \frac{3(A-c)^2}{16B}$

Vertical Merger …

- Vertical merger (integration) **increases profits** and **consumer surplus** → How?
  - Firms have some degree of market power (successive monopoly) → when **separated** set **P>MC**.
  - Integration removes **double marginalization**.
- **What if manufacture were competitive**?
  - The retailer plays off manufacturers against each other → obtains input at MC.
  - The retailer obtains the integrated profit without integration.
- **Why worry about vertical integration?**
  - There are two possible reasons: **1) price discrimination** and **2) vertical foreclosure**.

Vertical Merger & Price Discrimination

- Upstream firm selling to two downstream consumer markets → different demands in the two markets.

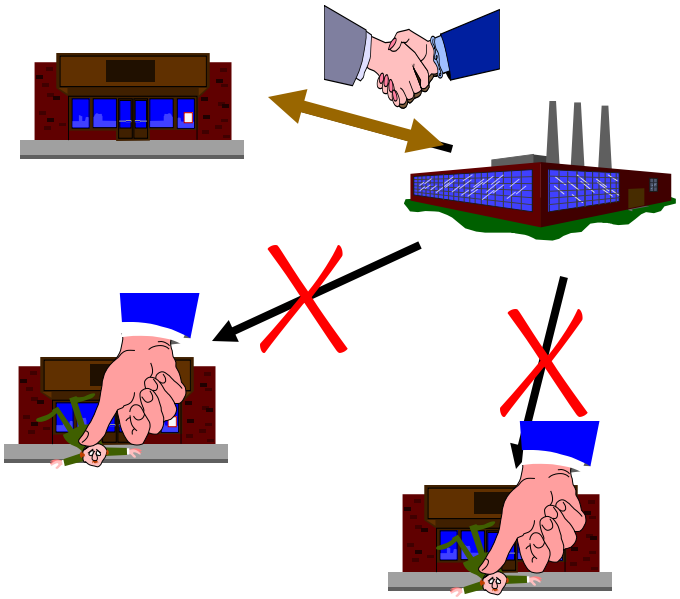


- ♦ the seller wants to price discriminate between these markets
- ♦ set $v_1 < v_2$
- ♦ but suppose that buyers can **arbitrage**
- ♦ then buyer 2 offers to buy from buyer 1 at a price v_a such that $v_1 < v_a < v_2$
- ♦ arbitrage prevents price discrimination
- ♦ if the seller integrates into market 1 arbitrage is prevented

- Merger → leads to price reduction in one but also leads to increased price in the other market → some consumers gain and other loose → ambiguous welfare effect.

Vertical Merger & Foreclosure

- Vertically **integrated firm** may **refuse to supply other firms** → so **integration can eliminate competitors (anti-competitive)**.



- suppose that the seller is supplying three firms with an essential input
- the seller integrates with one buyer
- if the seller refuses to supply the other buyers they are driven out of business
- **is this a sensible thing to do for the integrated firm?**

Vertical Merger & Foreclosure …

- Vertical foreclosure may reduce competition → offsets benefits of removing double marginalization.
- But **for this to work**:
  - Foreclosure has to be **a credible strategy** for the merged firms.
  - Foreclosure must be **subgame perfect**.
- Consider **two models of foreclosure**:
  - Salinger (1988) with Cournot competition.
  - Ordover, Saloner and Salop (1990) with Bertrand competition.
- **Example**: Suppose that there are **some integrated firms** (*i*) and **some independent upstream and downstream producers (n)**.

Vertical Merger & Foreclosure …

- Profit of an integrated firm: $\pi^I = \left(P^D - c_U - c_D\right) q_{D_i}$
- Profit of an independent upstream firm: $\pi^U = \left(P^U - c_U\right) q_{U_n}$
- Profit of an independent downstream firm: $\pi^D = \left(P^D - P^U - c_D\right) q_{D_n}$
- The integrated firm will neither source nor sell in the independent market.
- For the independent upstream firms to survive requires: $P^U - c_U > 0$
- The downstream unit of an integrated firm obtains input at cost c_U.
- Buying from an independent firm costs $P^U > c_U$ → **thus, the downstream division will not source input externally**.
- Now, suppose that an upstream division of an integrated firm is selling to independent downstream firms, it earns $P^U - c_U$ on each unit sold.

Vertical Merger & Foreclosure …

- Divert one unit to its own downstream division: this leaves the downstream price unchanged → it earns $P^D - c_U - c_D$ on this unit diverted.
- An independent downstream firm to survive requires: $P^D - P^U - c_D > 0$.
- Thus for, $P^D - c_U - c_D > P^U - c_U$, we require $P^D - P^U - c_D > 0$.
- Hence, **the upstream division will not sell the input externally (to independent downstream firms)**.
- **<u>Foreclosure exists</u>** → although it may not necessarily be always harmful:
  - It **reduces the number of buyers in the upstream market**.
  - It increases prices charged by independent sellers to non-integrated downstream firms, but integrated downstream divisions obtain input at cost.
  - It puts pressure on non-integrated downstream firms.

Vertical Merger & Foreclosure …

- If there are "enough" independent upstream firms, the anti-competitive effects of foreclosure will be offset by the cost advantages of vertical integration (elimination of double marginalization).
- There are also strategic effects that may prevent foreclosure → **Ordover, Saloner and Salop (1990) → OSS**.
- **Example**: **2 downstream and 2 upstream firms**. → **downstream firms** make **differentiated products** → **upstream firms** make **homogeneous products**.
- Firms engage in price competition.
- Suppose that U_1 merges with D_1, suppose also that they credibly refuse to supply D_2. Hence, U_2 is a monopoly supplier to D_2.
- U_2 and D_2 set prices → reflect double marginalization → so they may well choose to merge also, but U_1 and D_1 can foresee this and so may choose not to merge.

Vertical Merger & Foreclosure …

- The OSS analysis thus far, requires that there is no other source of the input supply. If there is such a source this will constrain U_2's price → may make merger of U_2 and D_2 less likely.
- Also, U_1&D_1 may try to undermine the merger another way, e.g.:
  - By offering to supply D_2 undercutting U_2.
  - Setting a price such that U_2 and D_2 have no incentive to merge.
  - Thus, there will be no complete foreclosure.
- Note that there is a **timing problem** with this analysis:
  - U_1 and D_1 decide whether or not to merge.
    - If they do not, the market continues as is.
    - If they do, they seek to undermine a merger of U_2 and D_2.
  - But if U_1 and D_1 don't merge U_2 and D_2 have a strong incentive to merge

Oligopolistic Vertical Merger

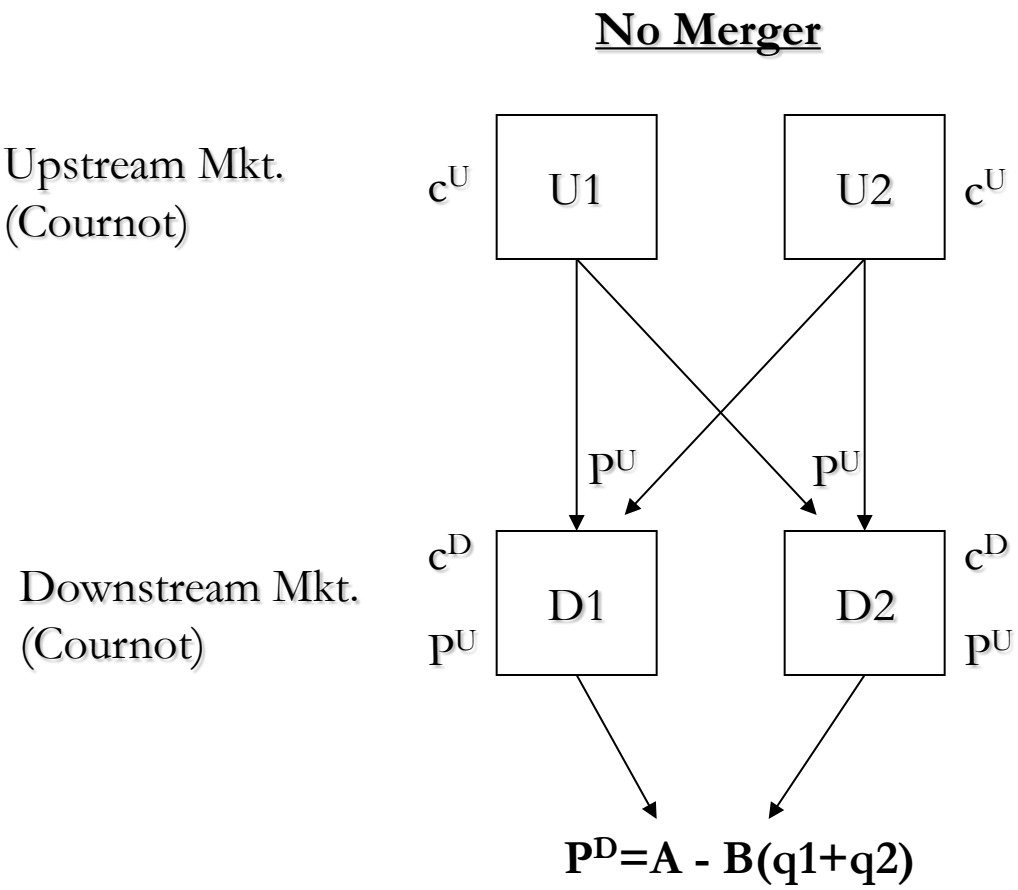
- Consider 2 upstream firms and 2 downstream firms.
- Upstream firms are Cournot competitors and produce a homogenous intermediate good → used in the final good production.
- Downstream firms are also Cournot competitors and are producing a homogenous final good.
- Technology → 1 unit of final good requires 1 unit of intermediate good.
- Each upstream firm has $\mathbf{MC^U=c^U}$ and each downstream firm has $\mathbf{MC^D=c^D}$.
- The demand faced by the final good producers: $\mathbf{P=A - BQ=A - B(q_1+q_2)}$.
- **Three stage game** → solve by **backward induction** for the **subgame perfect Nash equilibrium**.

Oligopolistic Vertical Merger …

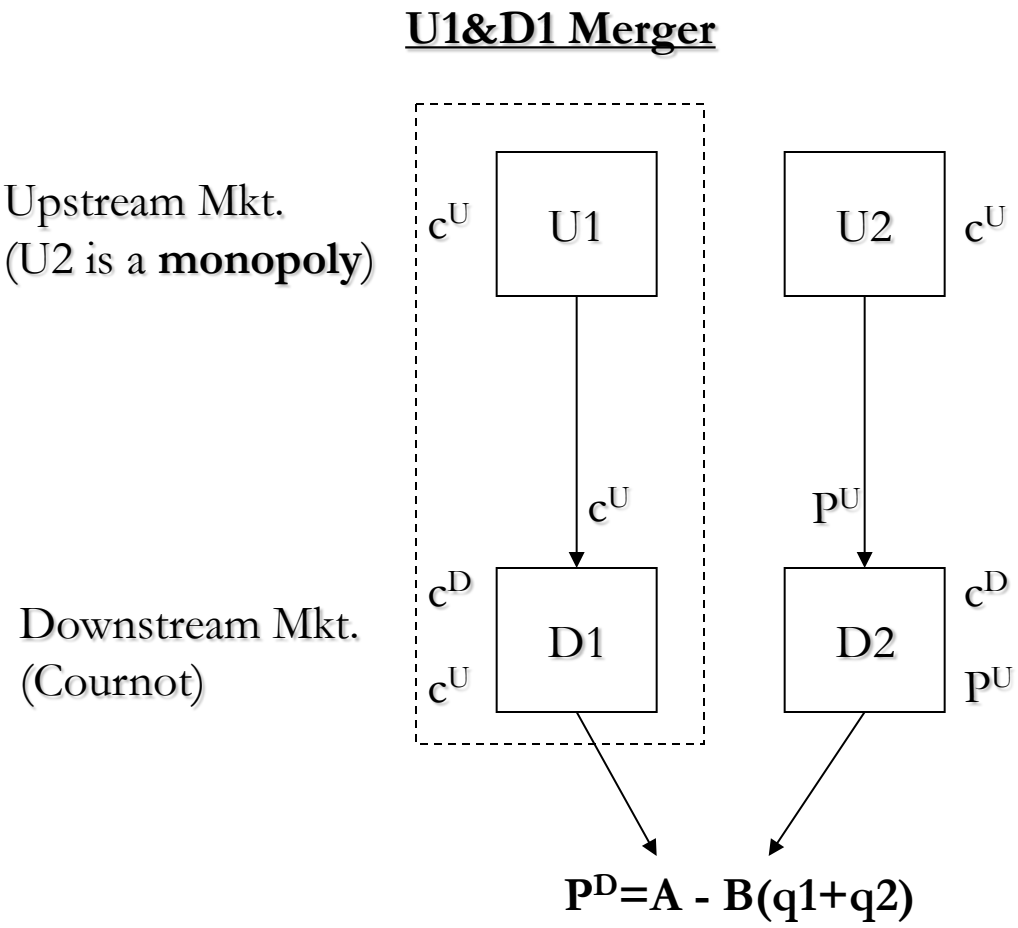
- **1st stage**: Upstream and downstream firms decide simultaneously whether or not to vertically integrate. If vertical mergers take place → assume that downstream firm 1 (2) merges with upstream firm 1 (2).
- **2nd stage**: Non merged upstream firms compete in quantities → generating price P^U for the intermediate good. Merged upstream firms supply the intermediate good to the their downstream divisions at $MC=c^U$.
- **3rd stage**: Downstream firms compete in quantities.
- Two possible cases in stage 3: **without vertical mergers** and **with vertical mergers**.
- **Without vertical mergers**:
  - 3rd stage: each downstream firm faces marginal cost: P^U+c^D. They compete ala Cournot → thus:

$$q_1^D = q_2^D = \frac{A - P^U - c^D}{3B}$$

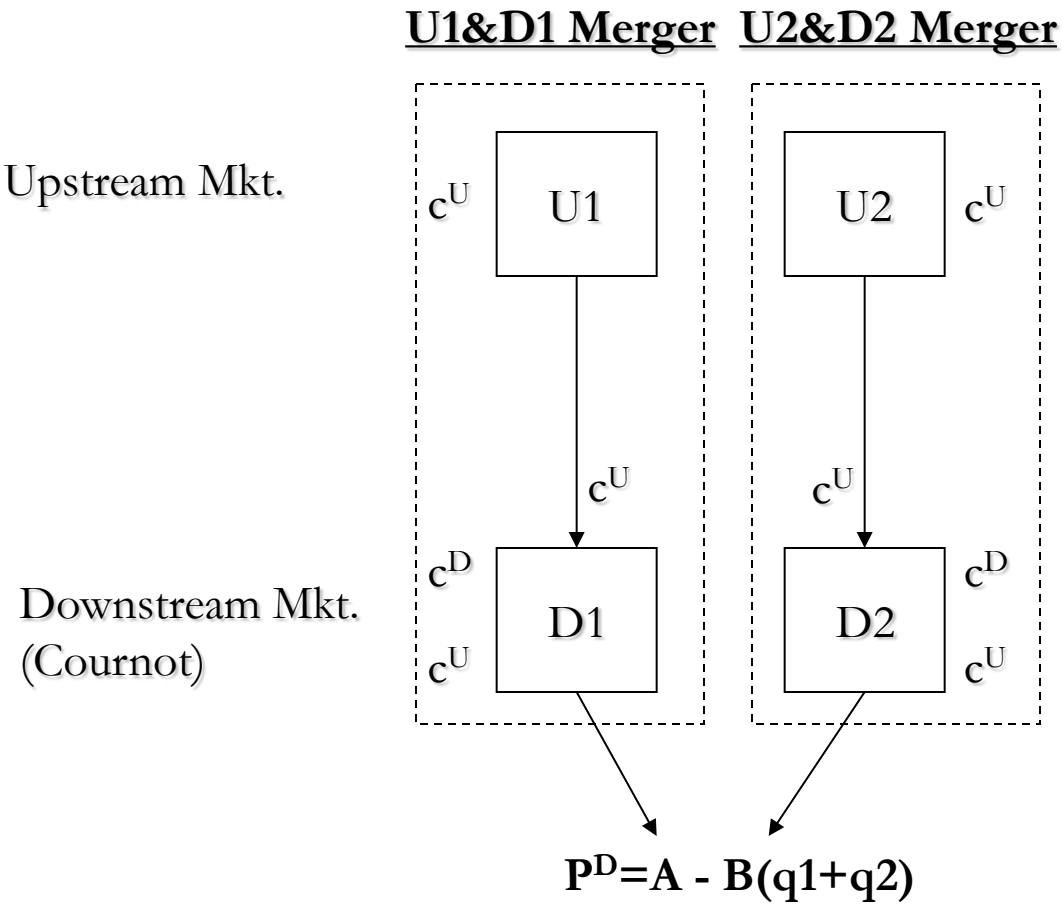
Oligopolistic Vertical Merger …



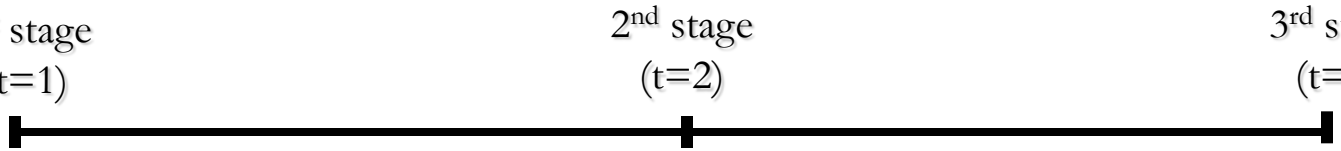
Oligopolistic Vertical Merger …



Oligopolistic Vertical Merger …



Oligopolistic Vertical Merger …



U1 – D1 and U2 – D2 decide whether or not to merge.

Possible configurations:

No merger:

1. No merger

With merger:

2. U1&D1 ; U2&D2
3. U1&D1

Upstream quantities are determined.

If there is no merger → we have Cournot Competition between U1 and U2.

If (U1&D1 ; U2&D2) prevail → U1 supplies D1 and U2 supplies D2 at cost.

If (U1&D1) prevails → U1 supplies D1 at cost, but U2 supplies D2 at a monopoly price.

Downstream quantities are determined.

D1 and D2 compete in a Cournot fashion.

Oligopolistic Vertical Merger …

- **Without vertical mergers …:**
  - The downstream profit can be derived as:

$$\pi_1^D = \pi_2^D = \frac{\left(A - P^U - c^D\right)^2}{9B}$$

  - The derived demand for intermediate good for the upstream firms:

$$Q^D = q_1^D + q_2^D = \frac{2\left(A - P^U - c^D\right)}{3B} \quad \Rightarrow \quad Q^D = Q^U = q_1^U + q_2^U$$

  - We can write the derived demand as:

$$Q^U = \frac{2\left(A - P^U - c^D\right)}{3B} \quad \Rightarrow \quad P^U = \left(A - c^D\right) - \frac{3B}{2}Q^U$$

  - Which is the standard linear demand P=a-bQ, with $a=A-c^D$ and $b=3B/2$.
  - **2nd stage**: The **upstream firms compete ala Cournot →** gives us:

$$q_1^U = q_2^U = \frac{\left(A - c^D\right) - c^U}{9B/2} = \frac{2\left(A - c^U - c^D\right)}{9B}$$

Oligopolistic Vertical Merger …

- **Without vertical mergers …:**
  - The aggregate upstream quantity:

$$Q^U = q_1^U + q_2^U = \frac{4\left(A - c^U - c^D\right)}{9B}$$

  - The equilibrium upstream price:

$$P^U = \left(A - c^D\right) - \frac{3B}{2}\left(\frac{4\left(A - c^U - c^D\right)}{9B}\right) = \frac{\left(A - c^D + 2c^U\right)}{3}$$

  - Profit of each upstream supplier:

$$\pi_1^U = \pi_2^U = \left(P^U - c^U\right) q_i^U = \frac{2\left(A - c^U - c^D\right)^2}{27B}$$

  - Equilibrium output and profit for each downstream firm:

$$q_1^D = q_2^D = \frac{2\left(A - c^U - c^D\right)}{9B} \quad \text{and} \quad \pi_1^D = \pi_2^D = \frac{4\left(A - c^U - c^D\right)^2}{81B}$$

  - Suppose: **A=100, B=1, c^U=c^D=23** →

$$Q^D = Q^U = 24 \text{ units}, \; P^U = \$41, \; P^D = \$76$$

$$\Pi_i = \pi_i^U + \pi_i^D = \$216 + \$144 = \$360$$

Oligopolistic Vertical Merger …

- **With <u>two</u> vertical mergers (U1&D1; U2&D2)**
  - Both downstream divisions are supplied at marginal cost c^U → each downstream firm will have MC=c^U+c^D.
  - **3rd stage**: Cournot output of the downstream divisions:

$$q_1^D = q_2^D = \frac{\left(A - c^U - c^D\right)}{3B}$$

  - Since input is supplied at cost, there will be no profit from the upstream divisions → the profit of each vertically integrated firm is equal to the profit of the downstream division.

$$\pi_1^D = \pi_2^D = \frac{\left(A - c^U - c^D\right)^2}{9B}$$

  - Suppose: **A=100, B=1, $c^U = c^D = 23$** →

$$Q^D = Q^U = 36 \text{ units}, \; P^U = c^U = \$23, \; P^D = \$64$$

$$\Pi = \pi_i^U + \pi_i^D = 0 + \$324 = \$324$$

Oligopolistic Vertical Merger …

- **With <u>one</u> vertical merger (U1&D1)**
  - Suppose that upstream firm 2 sets a price p^U for its intermediate food → hence the downstream firm 2 has $MC=P^U+c^D$, while the downstream firm 1 has $MC=c^U+c^D$.
  - **D1 is a low-cost firm and D2 is a high-cost firm in the final good market**.
  - **3rd stage**: Cournot downstream outputs and profits can be derived:

$$q_1^D = \frac{A-2\left(c^U+c^D\right)+\left(P^U+c^D\right)}{3B} = \frac{A-2c^U-c^D+P^U}{3B}$$

$$q_2^D = \frac{A-2\left(P^U+c^D\right)+\left(c^U+c^D\right)}{3B} = \frac{A-2P^U-c^D+c^U}{3B}$$

$$\pi_1^D = \frac{\left(A-2\left(c^U+c^D\right)+\left(P^U+c^D\right)\right)^2}{9B} = \frac{\left(A-2c^U-c^D+P^U\right)^2}{9B}$$

$$\pi_2^D = \frac{\left(A-2\left(P^U+c^D\right)+\left(c^U+c^D\right)\right)^2}{9B} = \frac{\left(A-2P^U-c^D+c^U\right)^2}{9B}$$

Oligopolistic Vertical Merger …

- **With <u>one</u> vertical merger (U1&D1) …**
  - **2nd stage**: The independent upstream firm has **monopoly power** so we know $P^U > c^U$ and thus $q_1^D > q_2^D$
  - The derived demand for the independent upstream firm can be derived using:

    $q_2^U = q_2^D$ invert this to obtain:

    $$P^U = \frac{A - c^D + c^U}{2} - \frac{3B}{2} q_2^U$$
  - Given this demand function faced by the independent upstream firm, the optimal monopoly quantity is:

    $$q_2^U = \frac{A - c^U - c^D}{6B}$$
  - The equilibrium price for the intermediate product is:

    $$P^U = \frac{A - c^D + c^U}{2} - \frac{3B}{2}\left(\frac{A - c^U - c^D}{6B}\right) = \frac{\left(A + 3c^U - c^D\right)}{4}$$

Oligopolistic Vertical Merger …

- **With <u>one</u> vertical merger (U1&D1) …**
  - Profit of the independent upstream firm is:

$$\pi_2^U = \left(P^U - c^U\right) q_2^U = \frac{\left(A - c^U - c^D\right)^2}{24B}$$

  - Using the resulting optimal P^U, we can derive the optimal equilibrium outputs and profits in the downstream market:

$$q_1^D = \frac{5\left(A - c^U - c^D\right)}{12B} \quad \text{and} \quad q_2^D = \frac{\left(A - c^D - c^U\right)}{6B}$$

$$\pi_1^D = \frac{25\left(A - c^U - c^D\right)^2}{144B} \quad \text{and} \quad \pi_2^D = \frac{\left(A - c^D - c^U\right)^2}{36B}$$

  - Here, the merger (U1&D1) makes U2 a monopoly supplier to D2, however D2 is the high cost firm relative to D1, so profits of U2 falls.

Oligopolistic Vertical Merger …

- **With <u>one</u> vertical merger (U1&D1) …**
  - With our numerical examples: **A=100, B=1, $c^U = c^D = 23$ →**

$$q_2^U = 9 \text{ units}; \quad P^U = \$36.5; \quad \pi_2^U = \$121.5$$

$$q_1^D = q_1^U = 22.5 \text{ units} \quad \text{and} \quad q_2^D = q_2^U = 9 \text{ units}; \quad Q^D = 31.5 \text{ units}$$

$$\pi_1^D = \$506.25; \quad \pi_2^D = \$81 \quad \text{and} \quad \pi_1^U = 0$$

$$\Pi_1 = \pi_1^U + \pi_1^D = \$506.25 \quad \text{and} \quad \Pi_2 = \pi_2^U + \pi_2^D = \$202.5$$

- **<u>1st stage</u>: The choice of organizational form:**

Firms 1 (U1 and D1) \ Firms 2 (U2 and D2)	do not integrate	integrate
do not integrate	\$360; \$360	\$202.5; \$ 506.25
integrate	\$506.25; \$ 202.50	\$324; \$ 324

We have prisoners' dilemma situation.

Oligopolistic Vertical Merger …

- Interpretation of the results:
  - **D2 is high cost firm** when the merger U1&D1 takes place → it **reduces its output** relative to the output when there is no merger U1&D1 → **D1 becomes a low cost firm** due to the merger → it **expands its output** relative to when it does not merge.
    - Output expansion of firm 1 offsets the output contraction of firm 2 → aggregate output rises & the retail price falls → consumers benefit.
  - We have prisoner's dilemma game.
  - Vertical merger (integration) **removes inefficient double marginalization →(1)**
  - Vertical merger (integration) **reduces the downstream cost for an integrated firm** → it makes the downstream market more competitive → **(2)**.
  - Vertical merger (integration) **reduces competitive pressure on non merged firms in the upstream market** → U2 becomes a monopoly vis-à-vis D2 → **(3)**
  - When there is only 1 merger → (1)&(2) dominates (3) → retail price ↓.

Oligopolistic Vertical Merger …

- Interpretation of the results:
  - If there is only 1 merger, the **non-merged rivals suffer** → but **consumers gain**, as the retail price falls → so the **welfare impact is actually ambiguous**.
  - Moreover, U2 and D2 can also merge to mitigate the negative impact of the merger U1&D1 → so it is important to acknowledge that **rivals will respond strategically**.
    - When rivals also merge → welfare impact is positive → retail price ↓↓.
  - Back to GE & Honeywell merger plan → it is puzzling why it was rejected in Europe? → maybe because rivals may not be able to merge? Or maybe because of the fear the GE&Honeywell will be able to price discriminate.
  - Usually, it is more often the case that Horizontal Merger faces tougher scrutiny than Vertical Merger.

Alternative Solutions to Vertical Merger

- Vertical merger is just one solution to remove the double marginalization → it may be costly if we consider the fact that merger is costly.
- Other alternative solutions → the upstream firm can impose vertical restrictions (restraints):
  - Vertical price restraints: → e.g. resale price maintenance (RPM) → retailer agrees to sell at manufactured specified price.
  - Restrictions on the right of retailers:
    - Cannot carry other brands → exclusive dealing.
    - Exclusive territory.
  - Franchising.
  - Others …