Efficiencies in vertical mergers

- Elimination of double marginalization
  - A potential benefit of vertical integration: lower retail prices and greater output
- The idea
  - A manufacturer and a retailer each exercise pricing discretion
    - The retailer treats the wholesale payment, including the upstream markup, as an incremental cost
    - Its pricing decision does not internalize the upstream profit generated by an additional retail sale
    - Both must mark up; if only one does, there is no double markup to eliminate
  - Integration brings those profits into a joint pricing decision
    - The incentive changes even when production and distribution costs do not
  - The simple model below has one manufacturer selling only to one retailer
    - When the supplier also serves competing retailers, lost upstream profits can limit EDM (cannibalized sales; slide 30)

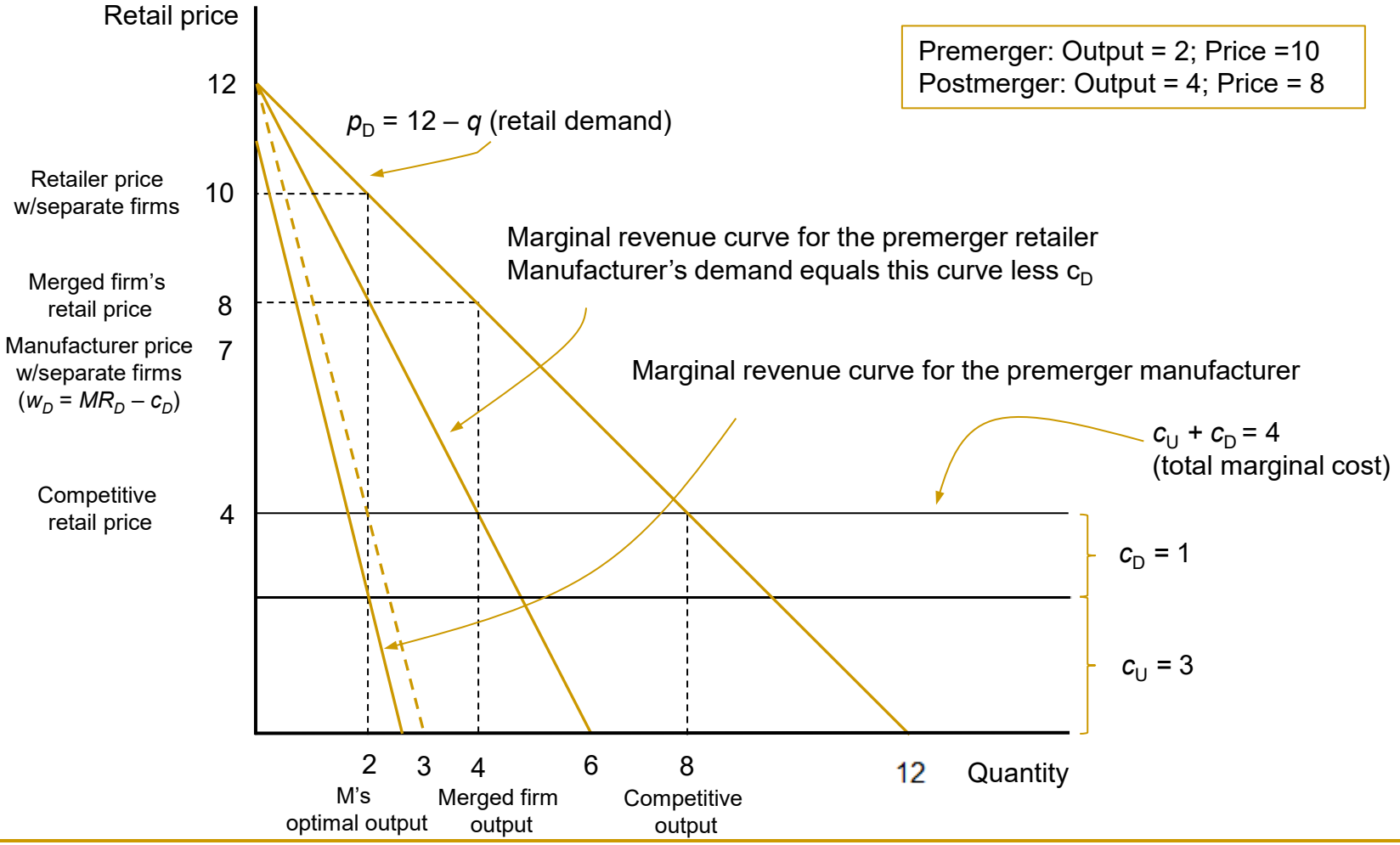
NB: The consumer benefit depends on opportunity cost and pass-through—EDM need not outweigh RRC

Efficiencies in vertical mergers

- Elimination of double marginalization: The model
  - Consider a simple model in which:
    - There is only one manufacturer, which sells to only one retailer
    - There is a one-to-one correspondence between input purchases and retail sales; the manufacturer faces demand derived from the retailer's pricing response
    - The manufacturer has constant marginal costs c_U
    - The retailer has constant marginal costs c_D (which for simplicity may be zero) in addition to the price w_D it pays the manufacturer
    - Retailer's total marginal cost: $w_D + c_D$
  - The manufacturer recognizes the incentive of the retailer to mark up its price and takes that into account in determining its own price and output
  - The retailer raises price above the competitive level so that its marginal revenue equals its marginal cost
  - *Key insight*: The retailer's marginal revenue curve is the demand curve for the manufacturer (adjusted for the retailer's other marginal costs)
    - Let MR_D denote the retailer's marginal revenue
    - The retailer is willing to purchase from the manufacturer up to the point where the retailer's total marginal cost equals its marginal revenue, that is, where $w_D + c_D = MR_D$
    - Rearranging, $w_D = MR_D - c_D$, which is the demand function for the manufacturer

Efficiencies in vertical mergers

- Elimination of double marginalization: The model



Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: Clock example (Class 22 note)

Premerger

Manufacturer
Marginal cost: $8
Price to the retailer: $20
Margin: $20 − $8 = $12
Unit sales: 300 a month

Sells at $20

Retailer
Other marginal cost: $4
Total marginal cost: $20 + $4 = $24
Retail price: $30
Margin: $30 − $24 = $6
Unit sales: 300 a month

Sells at $30

Customers
Sales response: 50 per $1

	Postmerger
Prices	
Price to the retailer	$8 (transfer price)
Retailer's marginal cost	$8 + $4 = $12
Retail price	$30 − $12/2 = $24
Unit sales (per month)	
Added unit sales (Δq)	50 × $6 = 300
Unit sales	300 + 300 = 600
Profits (per month)	
Manufacturer	$0
Retailer	($6 + $6) × 600 = $7,200
Combined	($6 + $6) × 600 = $7,200

	Premerger	Postmerger	Change
Price to the retailer	$20	$8	−$12
Retail price	$30	$24	−$6
Unit sales per month	300	600	+300
Combined profit per month	$5,400	$7,200	+$1,800

Assumptions: Linear residual demand and constant marginal costs. The retailer's $30 starting price is its best price ($6 = 300/50). All additional sales are new purchases, none taken from rival retailers the manufacturer supplies (slide 30 relaxes this).

Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: Why $24, and who gains

Merged firm's profit at each price (cost $12 a clock)

Retail price	Clocks sold per month	Margin (price − $12)	Monthly profit
$30	300	$18	$5,400
$28	400	$16	$6,400
$26	500	$14	$7,000
$24	**600**	**$12**	**$7,200**
$22	700	$10	$7,000
$20	800	$8	$6,400

Why it stops at $24. Cutting from $26 to $24 adds 100 clocks at a $12 margin (+$1,200) but gives up $2 on the 500 clocks already selling (−$1,000): profit rises $200. Cutting from $24 to $22 adds 100 clocks at $10 (+$1,000) but gives up $2 on 600 clocks (−$1,200): profit falls $200.

Where the gains come from (per month)

	Merged firm	Customers	Total
300 existing clocks	−$1,800	+$1,800	$0
300 added clocks	+$3,600	+$900	+$4,500
Total	**+$1,800**	**+$2,700**	**+$4,500**

A transfer and a real gain. The merger saves no resources. On existing sales, the $6 price cut only moves $1,800 from the firm to customers. The net gain of $4,500 comes from the added output: customers value those 300 clocks more than the $12 each costs to make and sell.

The $900. The 300 new buyers would pay between $24 and $30 for a clock, so at $24 each gains $3 on average: 300 × $3 = $900.

NB: Measuring the price reduction on existing purchases gives $1,800, a transfer from the firm; including the $900 on additional purchases, part of the real gain, gives $2,700. Some commentators call EDM only a "pecuniary" economy because it saves no resources (Kwoka & Slade 2020).

Assumptions: Linear residual demand and constant marginal costs. The retailer's $30 starting price is its best price ($6 = 300/50). All additional sales are new purchases, none taken from rival retailers the manufacturer supplies (slide 30 relaxes this).

Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: Notation and three rules

Notation (as in the RRC slides): U is the manufacturer, D the retailer, and R a rival retailer.

Symbol	Meaning	Slide 23	Clock
c_U	Manufacturer's marginal cost	$3	$8
w_D	Manufacturer's price to the retailer	$7	$20
$m_U = w_D - c_U$	Manufacturer's margin	$4	$12
c_D	Retailer's other marginal cost	$1	$4
$w_D + c_D$	Retailer's total marginal cost	$8	$24
p_D	Retail price	$10	$30
$m_D = p_D - w_D - c_D$	Retailer's margin	$2	$6
q_0	Retailer's unit sales before the merger	2	300
k_D	Added unit sales for each $1 cut in the retail price	1	50
a	Retail price at which the retailer's unit sales would fall to zero	$12	$36

Three rules (linear demand, constant marginal costs), each matching the graph on slide 23 and the clock example:

1. The merger removes the manufacturer's margin: the retailer's cost $w_D + c_D$ falls by m_U to $c_U + c_D$ (slide 23: $8 → $4; clock: $24 → $12).
2. The retail price falls by half of that reduction (50% pass-through). The retailer's best price is halfway between its marginal cost and a: $p_D = (a + w_D + c_D)/2$ (slide 23: $10 → $8; clock: $30 → $24).
3. Unit sales rise by k_D × the price cut (slide 23: 2 → 4; clock: 300 → 600).

Other demand shapes can give pass-through above or below 50%, changing the 1/2 in the formulas (Class 22 note, appendix).

NB: The merger saves no resources, and the merged firm still exercises market power. Combined profit rises from $12 to $16 (clock: from $5,400 to $7,200).

Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: The results at a glance

	Premerger	Postmerger	Change	Clock example (Class 22 note)
Retailer's marginal cost	$w_D + c_D$	$c_U + c_D$	$-m_U$	\$24 → \$12 (−\$12)
Retail price	p_D	$p_D - m_U/2$	$-m_U/2$	\$30 → \$24 (−\$6)
Unit sales	q_0	$q_0 + \Delta q$	$\Delta q = k_D \times m_U/2$	300 → 600 (+300)
Combined profit	$(m_U + m_D) \times q_0$	$(m_D + m_U/2) \times (q_0 + \Delta q)$	$(m_U/2) \times \Delta q^*$	\$5,400 → \$7,200 (+\$1,800)
Savings to existing customers	—	—	$q_0 \times m_U/2$	\$1,800
Gain to new customers	—	—	$\Delta q \times m_U/4$	\$900

*The worksheet (next slide) gives $(m_D + m_U/2) \times \Delta q - q_0 \times m_U/2$. Because the retailer starts at its best price, $m_D \times \Delta q = q_0 \times m_U/2$, so the gain is simply the price cut times the added unit sales.

Analyzing a hypothetical in four steps (under the assumptions of these slides)

1. Find the manufacturer's margin m_U, the retailer's unit sales q_0, and its sales response k_D. (Clock: \$12, 300, and 50.)
2. Price cut = $m_U/2$. (Clock: \$12/2 = \$6.)
3. Added unit sales = k_D × price cut. (Clock: 50 × \$6 = 300.)
4. Profit gain = price cut × added unit sales; existing customers save q_0 × price cut. (Clock: \$1,800 each. They match only because output doubles, as it does when both firms start at their best prices.)

With cannibalized sales (slides 30–33), step 2 becomes $(1 - s_C) \times m_U/2$, and steps 3 and 4 are unchanged. At 50%: a \$3 price cut, 150 added unit sales, a \$450 profit gain, and \$900 in savings to existing customers.

Assumptions: Linear residual demand and constant marginal costs. The retailer's starting price is its best price ($m_D = q_0/k_D$). All additional sales are new purchases, none taken from rival retailers the manufacturer supplies (slide 30 relaxes this).

Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: Worksheet (general formulas)

	Premerger	Postmerger
Manufacturer		
Marginal cost (c_U)	c_U	c_U
Price to the retailer (w_D)	w_D	c_U (transfer price)
Margin (m_U)	$m_U = w_D - c_U$	0
Unit sales	q_0	$q_0 + \Delta q$
Retailer		
Other marginal cost (c_D)	c_D	c_D
Total marginal cost	$w_D + c_D$	$c_U + c_D$
Retail price (p_D)	p_D	$p_D - m_U/2$
Margin (m_D)	$m_D = p_D - w_D - c_D$	$m_D + m_U/2$
Added unit sales (Δq)	—	$k_D \times m_U/2$
Unit sales	q_0	$q_0 + \Delta q$
Profits		
Manufacturer	$m_U \times q_0$	0
Retailer	$m_D \times q_0$	$(m_D + m_U/2) \times (q_0 + \Delta q)$
Combined	$(m_U + m_D) \times q_0$	$(m_D + m_U/2) \times (q_0 + \Delta q)$
EDM profit gain	—	$(m_D + m_U/2) \times \Delta q - q_0 \times m_U/2$
Customers		
Savings to existing customers	—	$q_0 \times m_U/2$
Gain to new customers	—	$\Delta q \times m_U/4$
Total gain to customers	—	$(2q_0 + \Delta q) \times m_U/4$

Reading the last rows. EDM profit gain = margin on the added sales minus the price cut on existing sales. Existing customers save the full cut; new customers gain half of it on average, since each values the product between the old and new prices.

Assumptions: Linear residual demand and constant marginal costs. The retailer's starting price is its best price ($m_D = q_0/k_D$). All additional sales are new purchases, none taken from rival retailers the manufacturer supplies (slide 30 relaxes this).

Efficiencies in vertical mergers

All additional sales are new purchases

- EDM: Premerger and postmerger values (general formulas)

Premerger

Manufacturer
Marginal cost: c_U
Price to the retailer: w_D
Margin: $m_U = w_D - c_U$
Unit sales: q_0

Sells at w_D

Retailer
Other marginal cost: c_D
Total marginal cost: $w_D + c_D$
Retail price: p_D
Margin: $m_D = p_D - w_D - c_D$
Unit sales: q_0

Sells at p_D

Customers
Sales response: k_D per \$1

	Postmerger
Prices	
Price to the retailer	c_U (transfer price)
Retailer's marginal cost	$c_U + c_D$
Retail price	$p_D - m_U/2$
Unit sales	
Added unit sales (Δq)	$k_D \times m_U/2$
Unit sales	$q_0 + \Delta q$
Profits	
Manufacturer	0
Retailer	$(m_D + m_U/2) \times (q_0 + \Delta q)$
Combined	$(m_D + m_U/2) \times (q_0 + \Delta q)$

With the transfer price set at c_U, the manufacturing division records no profit, and all of the merged firm's profit appears in the retail division.

Assumptions: Linear residual demand and constant marginal costs. The retailer's starting price is its best price ($m_D = q_0/k_D$). All additional sales are new purchases, none taken from rival retailers the manufacturer supplies (slide 30 relaxes this).

Efficiencies in vertical mergers

Some additional sales are cannibalized

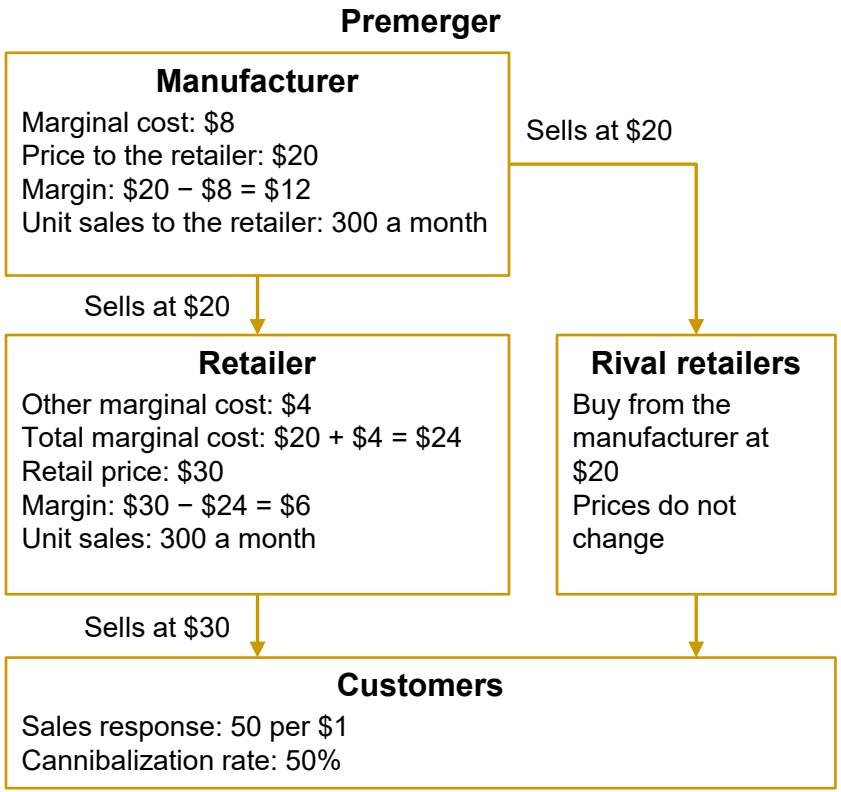
- EDM: How cannibalized sales change the analysis
  - **Cannibalized sales:** added retail sales that come from rival retailers the manufacturer supplies. The **cannibalization rate** s_C is their share of the retailer's added sales.
  - **Before the merger,** the retailer ignores them: a sale it takes from a rival costs the manufacturer its margin, not the retailer.
  - **After the merger,** each cannibalized sale costs the merged firm the manufacturer's margin m_U: an opportunity cost of cutting the price.
  - **Net cost reduction.** The merger removes the m_U markup, but the opportunity cost adds back $s_C \times m_U$ per added sale. The effective input cost is $c_U + s_C \times m_U$, so the merged firm prices as if each unit cost $c_U + s_C \times m_U + c_D$: a net reduction of $(1 - s_C) \times m_U$.
  - **Effects.** The price falls by $(1 - s_C) \times m_U/2$, added sales and customer savings shrink in proportion, and the profit gain shrinks with $(1 - s_C)^2$. In this example, at 100% there is no EDM.
  - **Rivals.** Sales taken from rivals the manufacturer does not supply cost the merged firm nothing. Rivals' lost sales are not themselves a Section 7 harm.
  - **Evidence.** The cannibalization rate must be estimated: switching data, customer surveys, win/loss records, and company documents.

Assumptions: Linear residual demand and constant marginal costs. Starting prices are given; the retailer's is its best price ($m_D = q_0/k_D$). Rivals pay $w_R = w_D$ (the same margin m_U on every unit) and hold their prices; s_C is constant over the range.

Efficiencies in vertical mergers

Some additional sales are cannibalized

- EDM: Clock example with cannibalized sales



	Postmerger
Prices	
Effective input cost	$8 + 50% × $12 = $14
Cost used to set price	$14 + $4 = $18
Retail price	$30 − 50% × $12/2 = $27
Unit sales (per month)	
Added unit sales (Δq)	50 × $3 = 150
Retailer's unit sales	300 + 150 = 450
Cannibalized units	50% × 150 = 75
Profits (per month)	
Retail division	($27 − $12) × 450 = $6,750
Lost margin on rivals' sales	−75 × $12 = −$900
Change in combined profit	$6,750 − $900 − $5,400 = +$450

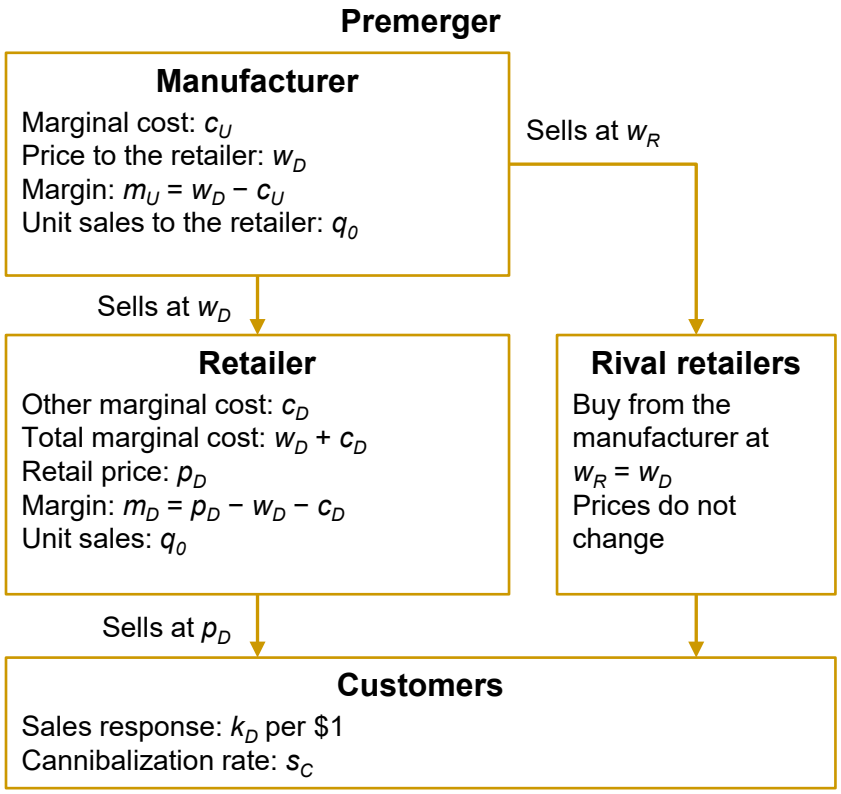
Two different costs. Making and retailing a clock still costs $12. Each added retail sale also costs an expected $6 of upstream profit on sales lost by rival retailers (50% × $12), so the firm uses $18 to set its price. To compute profit, subtract the $12, then subtract the lost upstream profit separately ($900). Subtracting $18 as well would count the opportunity cost twice.

Assumptions: Linear residual demand and constant marginal costs. The retailer's $30 is its best price ($6 = 300/50). Rivals pay $20 (a $12 margin on every unit) and hold their prices; the 50% rate holds over the whole range.

Efficiencies in vertical mergers

Some additional sales are cannibalized

- EDM: Premerger and postmerger values (general formulas)



	Postmerger
Prices	
Effective input cost	$c_U + s_C \times m_U$
Cost used to set price	$c_U + s_C \times m_U + c_D$
Retail price	$p_D - (1 - s_C) \times m_U/2$
Unit sales	
Added unit sales (Δq)	$k_D \times (1 - s_C) \times m_U/2$
Retailer's unit sales	$q_0 + \Delta q$
Cannibalized units	$s_C \times \Delta q$
Profits	
Retail division	$(m_D + (1 + s_C) \times m_U/2) \times (q_0 + \Delta q)$
Lost margin on rivals' sales	$-s_C \times \Delta q \times m_U$
Change in combined profit	$(m_D + (1 - s_C) \times m_U/2) \times \Delta q$ $- q_0 \times (1 - s_C) \times m_U/2$

Assumptions: Linear residual demand and constant marginal costs. Starting prices are given; the retailer's is its best price ($m_D = q_0/k_D$). Rivals pay $w_R = w_D$ (the same margin m_U on every unit) and hold their prices; s_C is constant over the range.

Efficiencies in vertical mergers

Some additional sales are cannibalized

- EDM: Clock example at cannibalization rates of 0% to 100%

Cannibalization rate	Effective input cost	Retail price	Price cut	Added unit sales	Change in combined profit	Savings to existing customers
0%	$8	$24.00	$6.00	300	+$1,800	$1,800
25%	$11	$25.50	$4.50	225	+$1,012.50	$1,350
50%	**$14**	**$27.00**	**$3.00**	**150**	**+$450**	**$900**
75%	$17	$28.50	$1.50	75	+$112.50	$450
100%	$20	$30.00	$0	0	$0	$0

Price cut, added sales, and customer savings. The merger removes only $(1 - s_C)$ of the manufacturer's $12 markup, so all three shrink in proportion.

Profit gain. It shrinks faster, with the square of $(1 - s_C)$, because the price cut and the added sales both shrink. At 50%, the gain is one-quarter of the $1,800 with no cannibalization.

No EDM at 100% (in this example). If every added sale would otherwise have been made through a rival the manufacturer supplies, the lost margin offsets the removed markup entirely.

Assumptions: Linear residual demand and constant marginal costs. The retailer's $30 starting price is its best price. Rivals pay $20 (a $12 margin on every unit) and hold their prices; each rate holds over the whole range, and other added sales are new purchases.

Efficiencies in vertical mergers

- EDM by contract: Two-part tariffs
  - A **two-part tariff** combines a per-unit price with a fixed fee that does not depend on how many units the retailer buys. In this example, setting the per-unit price equal to the manufacturer's marginal cost, c_U, eliminates double marginalization.
  - The retailer's marginal cost falls to $c_U + c_D$, the merged firm's cost, so the retailer charges the merged firm's price. The fee does not affect pricing; it divides the joint profit. The manufacturer earns nothing per unit: all of its profit is the fee.

Clock example (per month): all additional sales are new purchases	**Separate firms, $20 per clock**	**Two-part tariff, $8 + $4,500 fee**	**Merged firm**
Price per clock charged to the retailer	$20	$8	$8 (internal)
Fixed monthly fee	—	$4,500	—
Retailer's cost per clock	$24	$12	$12
Retail price	$30	$24	$24
Clocks sold	300	600	600
Manufacturer's profit	$3,600	$4,500	$0
Retailer's profit	$1,800	$2,700	$7,200
Combined profit	$5,400	$7,200	$7,200
Gain to customers	—	$2,700	$2,700

NB: Any fee strictly between $3,600 and $5,400 a month leaves both firms better off than the $20 per-clock price; at either end, one firm is indifferent. Where the fee falls depends on bargaining; it does not change the retail price.

Efficiencies in vertical mergers

- EDM by contract: When it works and why it matters
  - **The contractual fix works only if three conditions hold:**
    - **The per-unit price equals the manufacturer's marginal cost** or, with cannibalized sales, its effective cost $c_U + s_C \times m_U$. With no cannibalization, $14 a clock plus a fee would leave the retailer's cost at $18 and its price at $27. A merger could remove the remaining $6 markup, but that benefit would be merger-specific only if a practical contractual alternative could not achieve it. At 50% cannibalization, $14 is the effective cost, so a merger would have nothing left to remove.
    - **The fee is fixed over the sales that matter.** A fee that rises with volume works like a per-unit charge. Volume limits are fine if current sales, and the sales after the price cut, stay within them.
    - **The arrangement would continue without the merger.** Ask whether the efficient contract would likely continue or be renewed absent the merger. If not, a merger that prevents a return to a per-unit markup can claim some EDM benefit.
  - **Merger specificity.** If the firms already have such a contract, the merger has no EDM to eliminate. If they do not, the question is whether they could; the merging parties must show why a contract would not work (2023 Merger Guidelines § 2.5 n.31). Other contracts can also do the job, such as a maximum resale price or a minimum quantity (quantity forcing).
  - **Rivals.** A two-part tariff with one retailer does nothing for rivals still paying a per-unit markup. Common ownership does not itself eliminate the markup charged to unaffiliated rivals, and it may give the merged firm an incentive to raise the rivals' price (raising rivals' costs).

Efficiencies in vertical mergers

- EDM: The legal tests
  - **EDM is an efficiency claim.** The merging parties must show that it is (2023 Merger Guidelines § 3.3):
    - verifiable: supported by reliable evidence, rather than unsupported management predictions;
    - merger-specific: not achievable by a contract such as a two-part tariff;
    - passed on: the cost reduction will lead to lower customer prices than would otherwise prevail. The prediction must account for how the merged firm makes pricing decisions, including opportunity costs from cannibalized sales; and
    - measured net of cannibalized sales: only $(1 - s_C) \times m_U$ of the markup is removed.
  - **How the benefit is measured.** Measuring the price reduction on existing purchases gives the clock example's $1,800; including the benefit from additional purchases gives $2,700. Courts—and, to my knowledge, the agencies—do not attempt to account for the gain on additional purchases. A compelling showing might persuade the agencies to credit it, but I am not aware of any precedent for doing so.
  - **Burden.** The Guidelines and *Illumina* put the burden of substantiating efficiencies, including EDM, on the merging parties. *AT&T* does not establish a different rule: there the government's own expert included EDM (next slide).
  - **Defense versus deal rationale.** Even if not credited as a defense, EDM raises the merged firm's profit and supports the business rationale for the deal.
  - **Weighing.** Any EDM benefit must be weighed against raising rivals' costs and other harms (Class 23 note; Class 24).

Efficiencies in vertical mergers

- EDM: The cases and the evidence
  - ***Illumina/Grail*.** The Fifth Circuit upheld the FTC's rejection of Illumina's EDM claim: Illumina offered only an "illustrative" model, and the information needed to prove efficiencies is largely in the merging firms' hands. *Illumina, Inc. v. FTC*, 88 F.4th 1036 (5th Cir. 2023).
  - ***AT&T/Time Warner*.** The government's expert built EDM into his estimate of net consumer price effects, and the government conceded about $352 million a year in EDM cost savings to AT&T (not to consumers). The courts never weighed harms against savings: the government failed to show that the merger would likely raise rivals' costs or consumer prices at all, so the district court's description of the savings was harmless error. *United States v. AT&T Inc.*, 310 F. Supp. 3d 161 (D.D.C. 2018), *aff'd*, 916 F.3d 1029 (D.C. Cir. 2019).
  - **Evidence on passing on.** Common ownership does not guarantee joint pricing. In their study of multichannel television, Crawford and coauthors estimated that the divisions of integrated firms took into account about 79¢ of each dollar of profit earned by their affiliated divisions. This measures recognition of affiliated profits, not the share of a cost reduction passed through to customers. Gregory S. Crawford et al., 86 *Econometrica* 891 (2018).
  - **The lesson.** EDM can enter as part of the government's own price-effects analysis or as the parties' efficiency defense. Either way, it must rest on evidence about how the merged firm will actually price.

Efficiencies in vertical mergers

- EDM: A checklist for analyzing a claim

1. Set up

Identify the supplier, the downstream firm, and the supplier's margin m_U: the most the merger can remove.

Check the starting point: the retailer at its best price before the merger. With linear demand, $m_D = q_0/k_D$.

Find the sales response k_D.

2. Is there EDM to claim?

Two markups? Nothing to remove if the downstream firm has no markup or the supplier already sells at cost.

Contract? Only what a two-part tariff or other contract could not remove is merger-specific (slides 34–35).

True-cost pricing? Managers paid on divisional profit may keep the old transfer price.

Cannibalized sales? The net markup removed is $(1 - s_C) \times m_U$ (slides 30–33).

3. Effects (in this model)

Price cut = half the net markup removed.

Added unit sales = k_D × price cut.

Savings to existing customers = q_0 × price cut.

Profit gain = price cut × added unit sales.

4. Test and weigh

Every input is a question of evidence: margins, sales response, pass-through, cannibalization rate, contracts, internal pricing.

The parties must show the efficiency is verifiable, merger-specific, and passed on; the benefit is usually measured on existing purchases.

Weigh any benefit against raising rivals' costs (Class 23).