Three economist's tools for antitrust analysis: A non-technical introduction

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Beograd, Serbia, June 2016

Three popular additions to the economist's toolbox in recent years

- Critical loss analysis
- Upward pricing pressure
- Vertical arithmetic
- The first two may be used for both market definition and competitive effects analysis.
- The third analyzes the possible incentives for foreclosure that may arise from a vertical merger or a vertical restraint.

1st Tool: Critical loss analysis

- Useful for focusing on specific questions in both market definition and competitive effects analysis
- Market definition: Would a hypothetical monopolist find it profitable to raise price?
- Competitive effects: Would the merged firm find it profitable to raise price?
  - Current profits are
    - $\pi = (P - C)\, Q$
  - New profits would be
    - $\pi' = (P + \Delta P - C)\, (Q - \Delta Q)$
  - Which is greater?
  - (Assume costs are constant and unchanged)

Doing the math…

- Critical loss point is

$$\frac{\Delta Q}{Q} = \frac{\Delta P / P}{M + \Delta P / P}$$

- where

$$M = \frac{P - C}{P}$$

- If ΔQ that results from ΔP is too high, the price increase would not be profitable.
- If we know elasticity of demand, we have the answer (assuming it doesn't change).
- If we don't, focus on where the demand "goes".

For example…

- Suppose 3 firms X, Y, and Z
- X and Y propose to merge

Firm	Current output	Capacity	Price	Variable cost
X	100	105	$50	$30
Y	80	85	$50	$30
Z	60	85	$50	?

Profitable to raise price?

- Would merged firm XY raise price by, say, 5%?
- Gain $2.50 on each unit still sold, but lose $20 on each unit sale lost
- $\Delta P/P = 5\%$, $m = 40\%$
- So critical $\Delta Q/Q = 5/(40+5) = 1/9 = 11\%$
- 11% of 180 is 20
- To investigate: Would the merged firm lose sales of 20 if it raised price by $2.50?

And now the hard part: Where would those lost sales of 20 go?

- Demand side: How sensitive are customers to price?
- Supply side: Are there other likely sources for the 20?
  - Z has "excess capacity" of 25, but at what cost? And wouldn't Z like the higher price too?
  - Imports, but at what cost? Tariffs or quotas?
  - Increasingly imperfect substitutes?
  - Remember that neither the 25 of Z nor imports nor other substitutes are being sold now: Inferior in some way? How much?

Thus…

- "Critical loss" is 20
- If we believe that "actual loss" < 20, **Δ**P looks profitable; worry about unilateral anticompetitive effects from merger
- If we believe that "actual loss" > 20, ΔP looks unprofitable; less worry
- Alternatively, if this were a market definition exercise, if "actual loss" < 20, XY looks like a market; if "actual loss" > 20, market must include Z.

Another perspective

- Not “critical loss” but “critical elasticity”: At what elasticity of demand would a post-merger price increase be profitable?
- Solve same equation for critical elasticity: $\varepsilon = 1/(M + \Delta P/P) = 1/.45 = 2.2$
  - Test for this econometrically?
  - Natural experiments from past?
  - Customer surveys of switching behavior?
- Footnote for critical loss AND critical elasticity:
  - If margins are high, companies will point to them and say that post-merger the firms wouldn’t consider raising prices and endangering those existing high margins.
  - But the standard profit-maximization calculation (the “Lerner index”, $M = 1/\varepsilon$) suggests that if margins are high, that means that demand is inelastic – otherwise the firms would have to lower their margins to compete.

2nd tool: Upward pricing pressure

- What are the incentives for a firm to raise its price following its merger with a competitor?
- Some simple analytics:
  - Premerger: $\pi_A = (P_A - C_A)Q_A$, so to maximize profits,
  - $\delta\pi_A/\delta P_A = (P_A - C_A)(\delta Q_A/\delta P_A) + Q_A = 0$
  - Postmerger, $\pi_M = (P_A - C_A)Q_A + (P_B - C_B)Q_B$, so to maximize profits,
  - $\delta\pi_M/\delta P_A = (P_A - C_A)(\delta Q_A/\delta P_A) + Q_A + (P_B - C_B)(\delta Q_B/\delta P_A) = 0$.
  - The CHANGE in equilibrium P_A is $(P_B - C_B)D_{AB}$, where
  - D_{AB} is the DIVERSION RATIO from firm A to firm B, defined as the proportion of the sales that A loses when it raises price that are diverted to/recaptured by B.

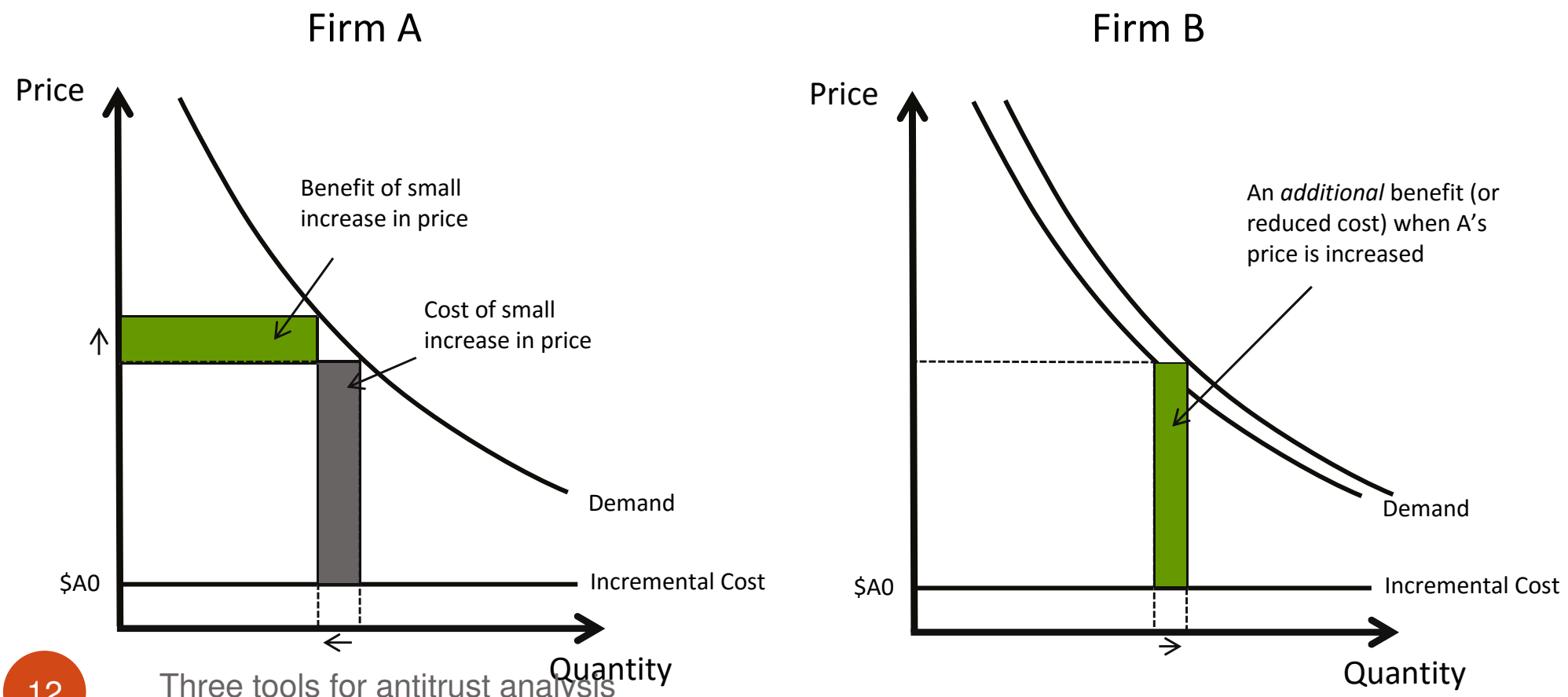
How estimate D_{AB}, the diversion ratio from firm A to firm B?

- Default first approximation is firm B's market share, adjusted by elasticity of demand for the overall market.
- Other important factors:
  - Available capacity of firm B
  - Available capacity of other competitors
  - Other possible sources of the product, including imports or production substitution by manufacturers of other goods
  - Potential substitutes for the product, and their availability

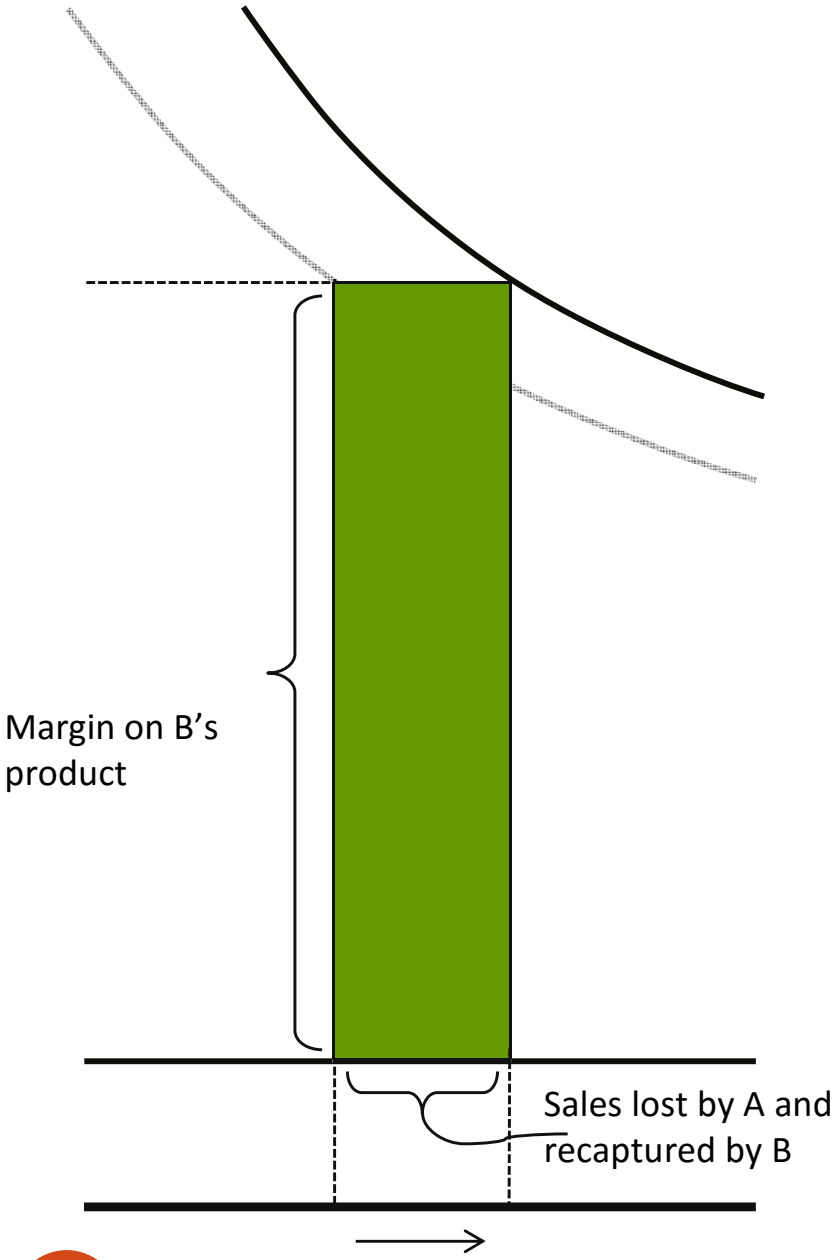
A Merger (Without Efficiencies)

- Firms A and B merge
- Consider the merged entity's incentive to raise the price of A's product

POST-MERGER



A Closer Look at Recaptured Sales



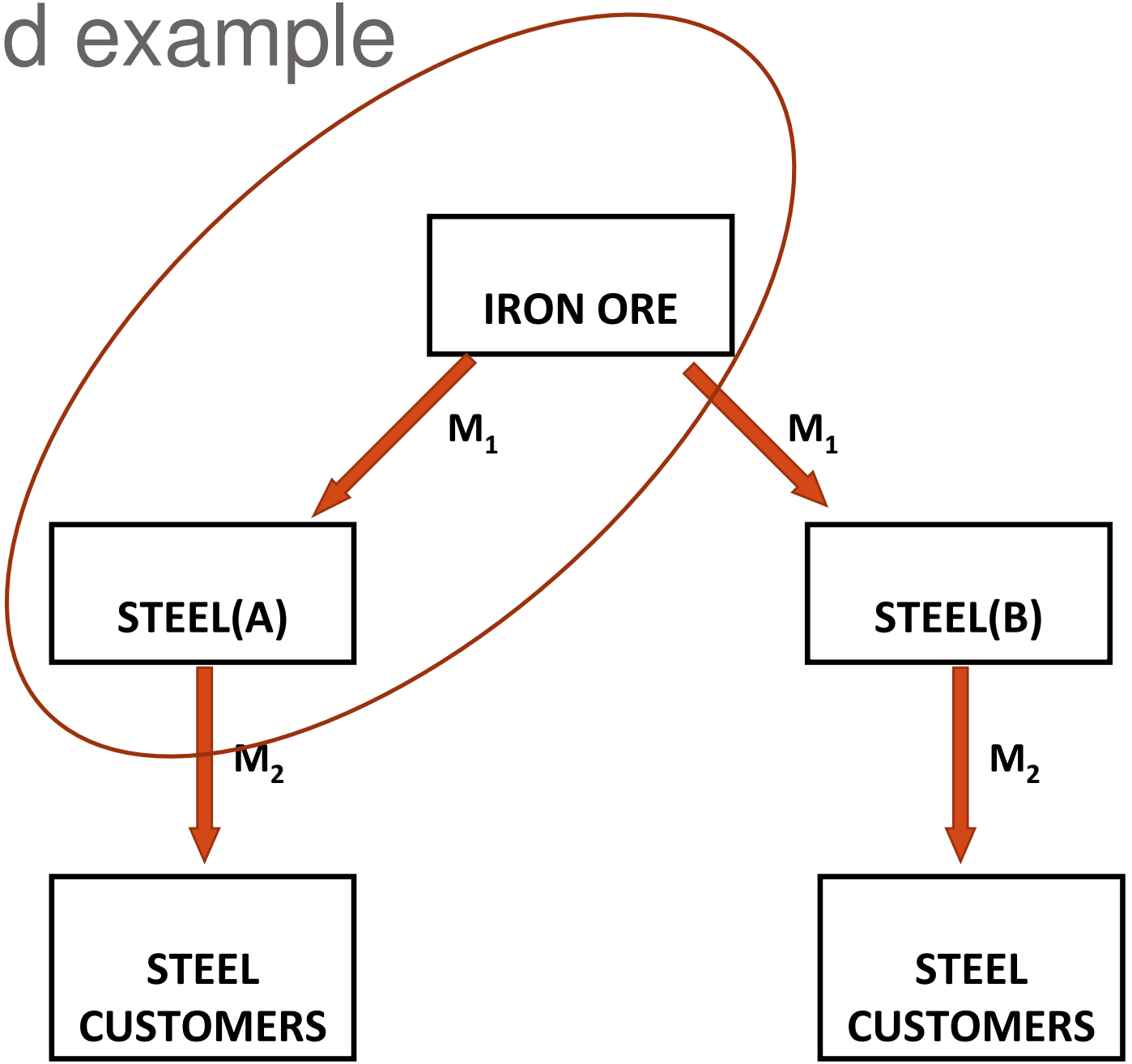
- The green rectangle is the *value of diverted sales*
- It is the product of two separate terms
  - The sales lost by A that are subsequently recaptured by B. All else equal, the greater the diversion between A and B, the greater the size of this term.
  - The margin on product B
- The second term is entirely intuitive, even if it receives less attention than diversion in the 1992 HMGs
- Both terms must be non-trivial for significant effect

3rd tool: The "vertical arithmetic"

- Consider a vertical merger – for example, a manufacturer buying its supplier of raw materials
  - Note that similar analysis is appropriate for potentially exclusionary vertical *restraints* as well
- How much should we be worried about competitive problems?
- In particular, is the merged, newly integrated firm likely to engage in anticompetitive foreclosure – i.e., to deny access to important inputs to its non-integrated rivals?
  - Non-integrated rivals to agency: They will never treat us fairly.
  - Merger partners to agency: We would only be hurting ourselves by treating a customer badly.

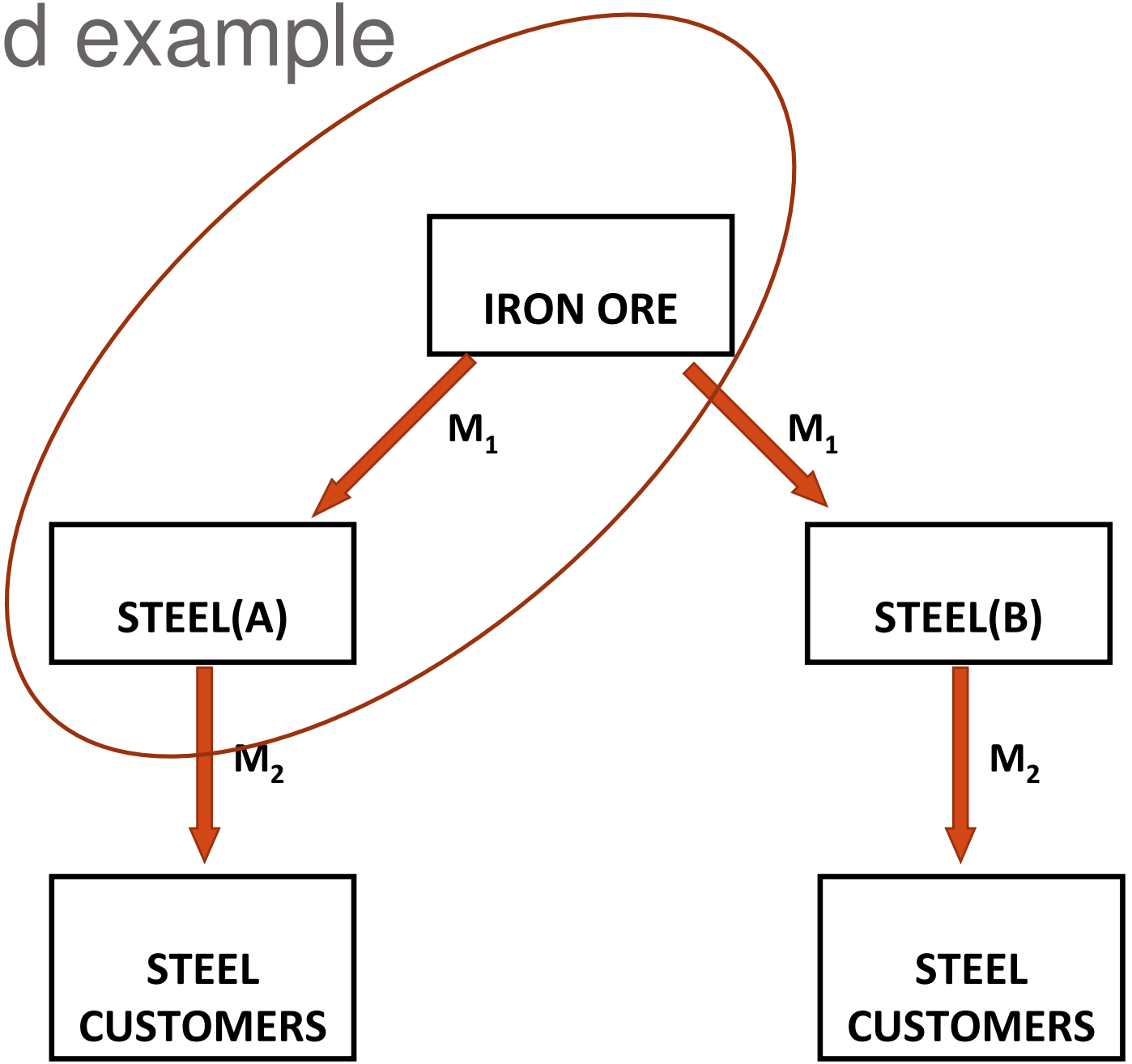
A stylized example

- M_1 = margin for selling iron ore to steel producers
- M_2 = margin for selling steel to steel customers
- I_B = sales of iron ore to steel producer B
- δ = share of any steel sales lost by steel producer B that are recovered by the integrated firm



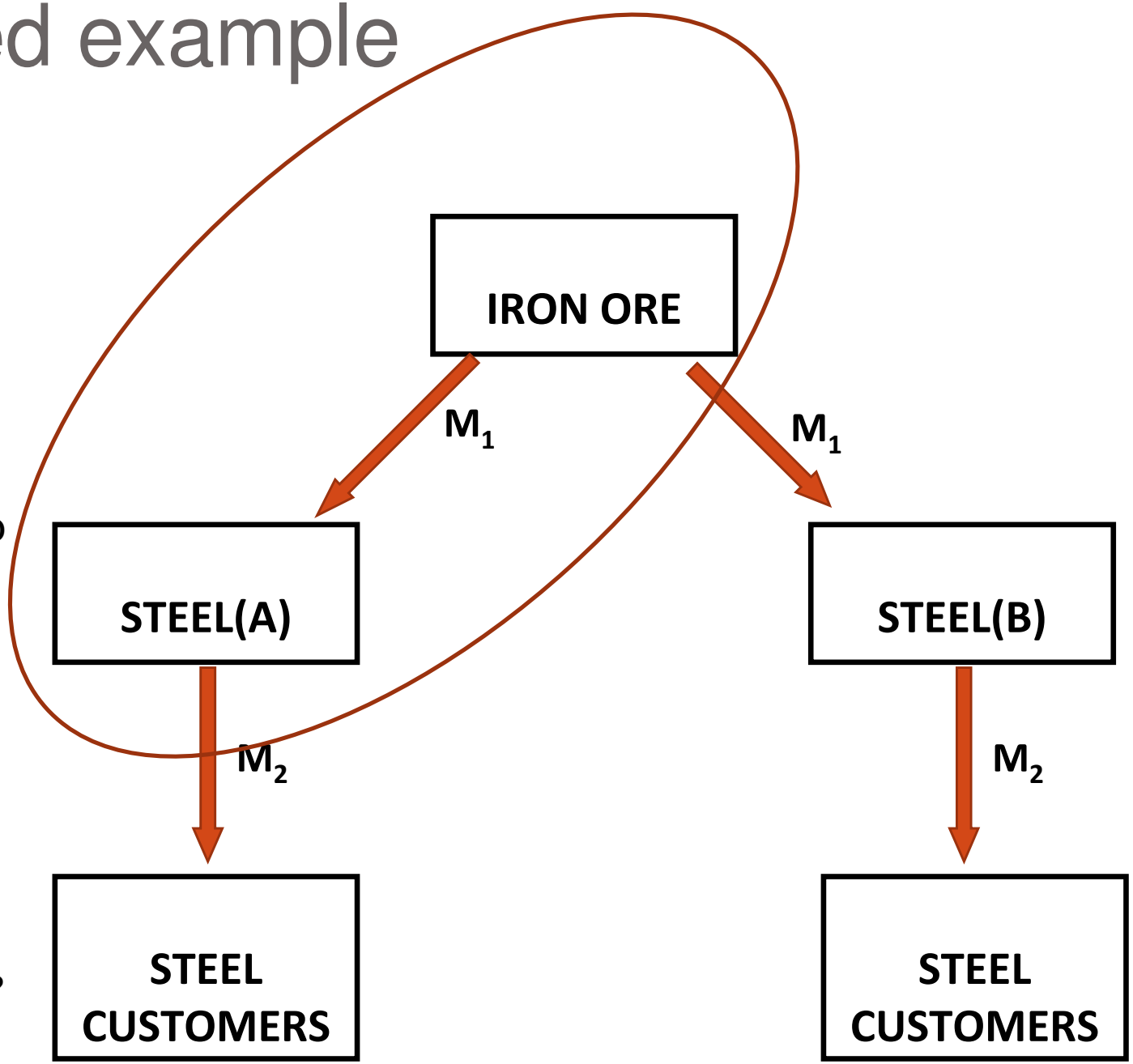
A stylized example

- If integrated firm refuses to supply iron ore to B, it loses $I_B M_1$
- However, it gains $\delta I_B(M_1 + M_2)$
- If $\delta = 0$, then on net integrated firm would *lose* $I_B M_1$ from refusal to supply
- If $\delta = A$, then on net integrated firm would *gain* $I_B M_2$ from refusal to supply
- Breakeven point for integrated firm to refuse to supply is $\delta = M_1/(M_1+M_2)$



A stylized example

- Again, breakeven point for profitable foreclosure is $\delta = M_1/(M_1 + M_2)$
- If M_1 much larger than M_2, foreclosure looks unlikely: δ must be very high to make the strategy work
- If M_2 much larger than M_1, foreclosure looks more likely: even small δ can make the strategy work
- But how estimate δ?



How estimate δ?

- Recall the definition: δ = share of any steel sales lost by steel producer B that are recovered by the integrated firm
- This looks like a diversion ratio! So...
- Default first approximation is firm A's market share in steel, adjusted by elasticity of demand for steel overall.
- Other important factors:
  - Available steel capacity of firm A
  - Excess capacity of other steel producers (though might they be cut off by the integrated firm as well?)
  - Other possible sources of iron ore, including entry and imports
  - Other possible sources of steel, including imports
  - Potential substitutes for steel
- Conclusion: M_1 and M_2 provide clues as to the likelihood that foreclosure would be a profitable strategy. Then focus on δ to learn even more.