

MERGER ANTITRUST LAW

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Georgetown University Law Center
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Tuesdays and Thursdays, 3:30 am – 5:30 pm
Dale Collins

wdc30@georgetown.edu
www.appliedantitrust.com

CLASS 12 WRITTEN ASSIGNMENT—INSTRUCTOR’S ANSWER

Instructions

Submit by email by 3:30 pm on Thursday, October 3

Send to wdc30@georgetown.edu

Subject line: Merger Antitrust Law: Assignment for Class 12

Calls for answers to questions (not in a memo form)

1. Products A and B are being tested as a candidate market. The market price for each unit of either product is \$300, each type of product as a constant incremental cost of \$160 per unit and each product type has aggregate sales of 1000 units (i.e., 1000 units of Product A and 1000 units of Product B). When the price for both products is increased by \$15, each firm loses 100 units to products other than A and B. What is the critical loss for the candidate market of products A and B? Do A and B constitute a relevant market under the hypothetical monopolist test using critical loss analysis and SSNIP of 5%?

2. In *FTC v. Occidental Petroleum Corp.*, No. 86-900, 1986 WL 952 (D.D.C. Apr. 29, 1986), the FTC challenged the pending acquisition by Occidental Petroleum, a major producer of polyvinyl chloride (“PVC”), of Tenneco’s PVC business. Both companies produced PVC in plants in the United States. The parties agreed that the relevant product markets were suspension homopolymer PVC and dispersion PVC, and the PI proceeding focused largely on the relevant geographic market. The FTC alleged that the relevant geographic market was the United States for both types of products; the merging parties argued that the relevant geographic market was worldwide. In the Section 13(b) proceeding for a preliminary injunction, the evidence showed that if the price of all suspension homopolymer PVC produced in the United States was increased by 5%, U.S. customers would divert about 17% of their purchases to imports from foreign suppliers (who were ready to serve these customers). The evidence also showed that if the price of all dispersion PVC produced in the United States was increased by 5%, U.S. customers would divert about 12% of their purchases to imports from foreign suppliers (again, who were ready to serve these customers).¹ The evidence in the hearing also showed that the percentage gross margins for homopolymer PVC and dispersion PVC were 28% and 45%, respectively. Was the FTC correct that the relevant geographic market was the United States using the hypothetical monopolist test and a SSNIP of 5%?

3. Premium ice cream sells at \$4.00/pint and has a constant marginal cost of \$2.25/pint. The own-elasticity of aggregate demand for premium ice cream is -1.9, with almost all diversion going to regular ice cream. Two premium ice cream manufacturers proposed to merge. Is

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premium ice cream a relevant product market under the hypothetical monopolist test under a 5% SSNIP, or should the market be expanded to include regular ice cream?

INSTRUCTOR'S ANSWER

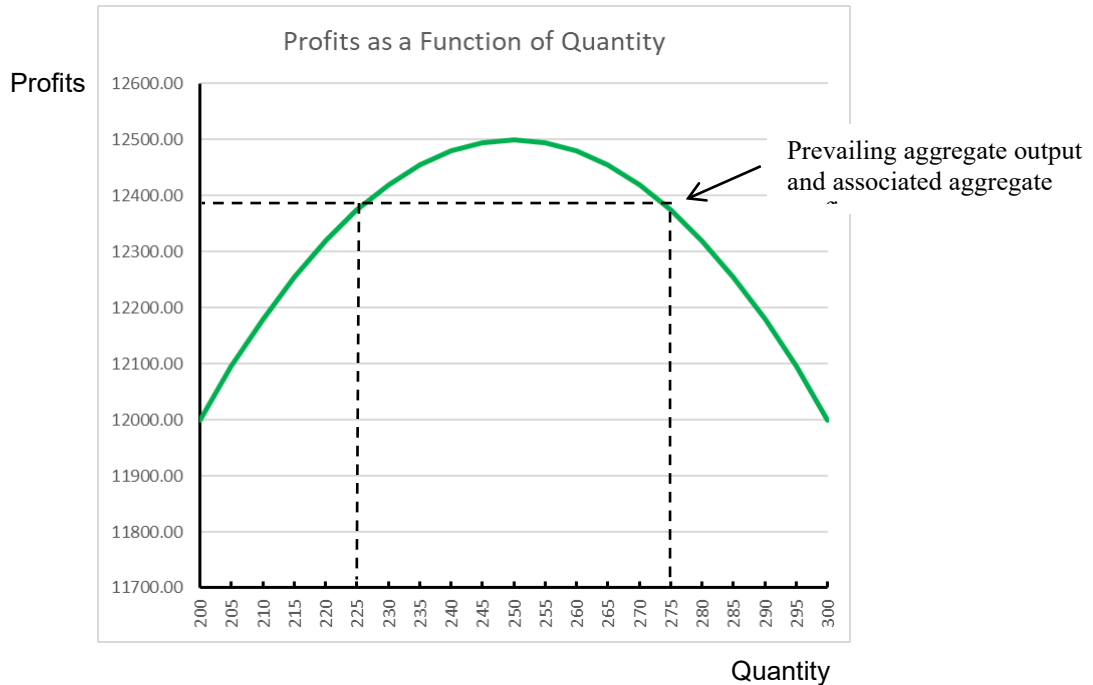
1. Products A and B are being tested as a candidate market. The market price for each unit of either product is \$300, each type of product as a constant incremental cost of \$160 per unit and each product type has aggregate sales of 1000 units (i.e., 1000 units of Product A and 1000 units of Product B). When the price for both products is increased by \$15, each firm loses 100 units to products other than A and B. What is the critical loss for the candidate market of products A and B? Do A and B constitute a relevant market under the hypothetical monopolist test using critical loss analysis and SSNIP of 5%?

Answer

Critical loss is the maximum loss Δq a hypothetical monopolist can sustain without reducing profits at current prices and output. Assuming that the market is not already monopolized (so that current prices are below the monopoly price and aggregate production is above the monopolist's output²), a small decrease in output by a hypothetical monopolist from current levels will increase its profits. At some point as further reductions are made, the hypothetical monopolist will reach a level of reduction that maximize its profits. After that point, a continued reduction in output will decrease profits below the profit-maximizing level but still maintain them above the profits earned at current prices and output. Again, as reductions continue, at some point the reduction will be sufficient large that profits will equal current profits and a further reduction will reduce profits below current profits. This reduction in output beyond the profit-maximizing level that just breaks even with current profits is called the "critical loss."

A diagram may be helpful. Say the current price (p_1) is 145, the current output is 275, fixed costs are zero, and marginal costs are constant at 100. Accordingly, current profits are 12,375, as shown in the graph below:

² This makes aggregate output to the right of the top of the profit "hill." Remember, firms with monopoly power produce more than firms with monopoly power when they both face the same (residual) demand curve.



As the chart illustrates, the same profits could be made by reducing the output to 225. Any further reduction would reduce profits below the prevailing level (that is, below the horizontal dotted line). The difference in output between the prevailing level and the lower breakeven output—here, 50 ($= 275 - 225$)—is the *critical loss*. If the output reduction associated with a given price increase exceeds the critical loss, the price increase is unprofitable. If the output reduction associated with the price increase is less than the critical loss, the price increase is profitable.

Applied to the hypothetical monopolist test, if the actual output loss from a SSNIP is less than the critical loss, then the profits resulting from a SSNIP will be greater than current profits. Consequently, under the profitability version of the hypothetical monopolist test, the candidate market would be a relevant market. If the actual loss from a SSNIP is greater than the critical loss, then the profits resulting from a SSNIP will be less than current profits, and the candidate market will not be a relevant market.

Here, $p_1 = \$300$, $q_1 = 2000$ units (1000 units of product A plus 1000 units of product B), and the marginal cost of production is \$160 per unit. The gross margin on each sale is \$140 per unit ($= \text{price } (\$300) - \text{marginal cost } (\$160)$). A price increase of \$15 is 5% of the current price ($\$15/\$300 = 5\%$), so a price increase of \$15 is a 5% SSNIP. At a 5% SSNIP, the problem states that the actual loss would be 200 units (100 units of product A plus 100 units of product B).

The breakeven condition for the critical loss Δq_{cl} requires that profits at current prices and output is equal to profits with a SSNIP and the associated critical loss:

$$p_1 q_1 - c q_1 = (p_1 + \Delta p_1)(q_1 - \Delta q_{cl}) - c(q_1 - \Delta q_{cl})$$

Collecting terms:

$$(p_1 - c) q_1 = (p_1 + \Delta p_1 - c)(q_1 - \Delta q_{cl}) \leftarrow$$

BTW, when fixed costs are zero and marginal costs are constant, the dollar gross marginal $\$m$ times sales q is equal to profit ($\$mq = \pi$).

Applying the parameters in the hypothetical:

$$(300 - 160)2000 = (300 + 50 - 160)(2000 - \Delta q_{cl})$$

Solving, critical loss $\Delta q_{cl} = 193.55$ units.³

We know from the statement of the problem that the actual loss for a 5% SSNIP is 200 units.

Since the actual loss is greater than the critical loss, A and B do not constitute a relevant market under the hypothetical monopolist test using critical loss analysis and SSNIP of 5%.

NOTE: Neither precision nor accuracy is a hallmark of market definition. Although actual loss is greater critical than critical loss, the difference is so small that it is unlikely a court would reject A and B as a relevant market if the qualitative evidence had convinced the judge that A and B are a proper relevant market.

Alternative 1. We can use another “brute force” approach to the problem that does not use critical loss. Using the template on slide 43 of the Market Definition class notes:

Parameters from problem

| | | |
|---------------|------------|------|
| Price | p | 300 |
| Cost | c | 160 |
| Market output | Q | 2000 |
| SSNIP | Δp | 15 |
| Customer loss | ΔQ | -200 |

Gain on inframarginal sales = $(Q + \Delta Q)\Delta p$

| | | |
|------------------|--------|--------------|
| $(Q + \Delta Q)$ | 1800 | = 2000 - 200 |
| Δp | 15 | |
| Gain | 27,000 | |

Loss on marginal sales = $m\Delta Q$

| | | | |
|---------------|------------|---------|----------------|
| \$Margin | $\$m$ | 140 | = price - cost |
| Customer loss | ΔQ | -200 | |
| Loss | | -28,000 | |

Since the gain on the inframarginal sales is less than the loss on the marginal sales, Products A and B do not satisfy the hypothetical monopolist test and hence are not a relevant market under the Merger Guidelines (subject to the above caution).

Alternative 2. Use the unit critical loss formula

$$\begin{aligned} \Delta q_{cl} &= \frac{Q\Delta p}{(p + \Delta p) - c} \\ &= \frac{2000 \cdot 15}{(300 + 15) - 160} \\ &= 193.55 \end{aligned}$$

³ If you do not want to do the math, just plug the equation into [MathPapa](#) (but using x rather than Δq_{cl} which MathPapa will not understand).

This is the same critical loss we calculated originally. This is the most efficient way of implementing the hypothetical monopolist test given the parameters in the problem.

2. In *FTC v. Occidental Petroleum Corp.*, No. 86-900, 1986 WL 952 (D.D.C. Apr. 29, 1986), the FTC challenged the pending acquisition by Occidental Petroleum, a major producer of polyvinyl chloride (“PVC”), of Tenneco’s PVC business. Both companies produced PVC in plants in the United States. The parties agreed that the relevant product markets were suspension homopolymer PVC and dispersion PVC, and the PI proceeding focused largely on the relevant geographic market. The FTC alleged that the relevant geographic market was the United States for both types of products; the merging parties argued that the relevant geographic market was worldwide. In the Section 13(b) proceeding for a preliminary injunction, the evidence showed that if the price of all suspension homopolymer PVC produced in the United States was increased by 5%, U.S. customers would divert about 17% of their purchases to imports from foreign suppliers (who were ready to serve these customers). The evidence also showed that that if the price of all dispersion PVC produced in the United States was increased by 5%, U.S. customers would divert about 12% of their purchases to imports from foreign suppliers (again, who were ready to serve these customers).⁴ The evidence in the hearing also showed that the percentage gross margins for homopolymer PVC and dispersion PVC were 28% and 45%, respectively. Was the FTC correct that the relevant geographic market was the United States using the hypothetical monopolist test and a SSNIP of 5%?

Answer

This problem gives the actual loss in percentages, so we can use the percentage critical loss formula to calculate the percentage critical loss $\% \Delta q_{cl}$:

$$\% \Delta q_{cl} = \frac{\delta}{\delta + m},$$

where δ is the percentage SSNIP and m is the percentage gross margin (NOT the dollar gross margin). Substituting the parameters from the statement of the problem:

$$\% \Delta q_{cl-suspension\ PVC} = \frac{5\%}{5\% + 28\%} = 15.15\%$$

$$\% \Delta q_{cl-dispersion\ PVC} = \frac{5\%}{5\% + 45\%} = 10.00\%$$

The actual loss was 17% for suspension PVC and 12% for dispersion PVC. Consequently, under the hypothetical monopolist test (profitability version), technically neither was a relevant product market under a 5% SSNIP.

NOTE: Same caution as in Note 1 to Answer 1

⁴ I have made up some of the facts here, but the hypothetical is consistent with the results in the case.

3. Premium ice cream sells at \$4.00/pint and has a constant marginal cost of \$2.25/pint. The own-elasticity of aggregate demand for premium ice cream is -1.9, with almost all diversion going to regular ice cream. Two premium ice cream manufacturers propose to merge. Is premium ice cream a relevant product market under the hypothetical monopolist test under a 5% SSNIP or should the market be expanded to include regular ice cream?

Answer

This problem gives actual own-elasticities, so we can use the percentage critical elasticity formula to calculate the critical elasticity ε_{cl} :

$$|\varepsilon_{cl}| = \frac{1}{\delta + m}.$$

The percentage gross margin m is equal to 43.75% (= (4.00 – 2.25)/4.00)

Substituting the parameters from the statement of the problem:

$$|\varepsilon_{cl}| = \frac{1}{5\% + 43.75\%} = 2.05.$$

The problem gives the actual own-elasticity as -1.9 or, in absolute value, 1.9. Since the absolute value of the actual own-elasticity is less than the absolute value of the critical elasticity, then technically premium ice cream is a relevant product market under the hypothetical monopolist test (profitability version) with a 5% SSNIP.

NOTE: Same caution as in Note 1 to Answer 1 (except the other way around).