

Market Definition

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Product Market Definition

Horizontal Merger Guidelines

Market: “A product or group of products and a geographic area in which it is produced or sold such that a hypothetical profit-maximizing firm [a “hypothetical monopolist”]... likely would impose at least a ‘small but significant and nontransitory’ increase in price ...” (the “SSNIP test”)

Relevant market: “A group of products and a geographic area that is no bigger than necessary to satisfy this test.” [the “smallest market” principle]

“Market definition focuses solely on demand substitution factors ...”

“A firm is viewed as a participant if, in response to a SSNIP, it likely would enter rapidly into production or sale of a market product in the market’s area, without incurring significant sunk costs of entry and exit.”

Uncommitted entrants: firms likely to make supply response – market participants
Hypothetical price increase – 5% (this does not set a floor for tolerable price effects).
Sufficient time for entry – 1 year

The Shape of the Demand Curve

For a demand relationship, the greater the increase in the magnitude of the elasticity of demand as price increases, the smaller the price increase that will be imposed by a hypothetical monopolist.

A linear demand curve will lead to smaller price increase than a log-linear demand curve.

Market Definition Issues

Which price? For mergers, the prevailing price, unless there is pre-merger evidence of coordinated interaction. In non-merger cases, the “competitive price.”

If price discrimination? Markets may be defined more narrowly.

Critical Loss Analysis

Determining the Critical Loss

Critical Loss (CL): For a given price increase by a hypothetical monopolist, what is the smallest loss of sales (in percentage terms) that would make the increase unprofitable? If the Actual Loss (AL) is greater than the CL, the price increase would not be profitable and the proposed market is not a relevant antitrust market.

Critical Loss Arithmetic

Let P = current price of the hypothetical monopolist
 $\Delta P/P$ = proposed percentage price increase (e.g., 5%)

MC = marginal (incremental) cost of production

m = percentage profit margin of the hypothetical monopolist = $(P-MC)/P$

Q = sales volume of the hypothetical monopolist

ΔQ = lost sales volume (diversion)

Increased profit (from higher margins on the initial volume sold): $Q(\Delta P)$

Lost profit associated with lost sales: $\Delta Q (P + \Delta P - MC)$

CL is the percentage volume diverted, $\Delta Q/Q$, which equates $Q\Delta P$ to $\Delta Q (P + \Delta P - MC)$.

Solving, $CL = (\Delta P/P)/(\Delta P/P + m)$

Suppose, that the hypothetical price increase $(\Delta P/P) = 5\%$ and the margin, m , is 50%.

Then, $CL = .05/ (.05 + .50) = .091 = 9.1\%$. (If $m = 100\%$, $CL = 4.8\%$)

Note: The critical loss depends, among other things, on the shape of the market demand curve.

An Alternative View

Let E_d = market elasticity of demand at the current price

The Rule of Thumb for Pricing (Pindyck and Rubinfeld, pp. 344-346)

$(P-MC)/P = m = -1/E_d$, where $E_d = (\Delta Q/Q)/(\Delta P/P)$.

Then, the critical loss can also be written as: $CL = (\Delta P/P)/(\Delta P/P + m)$

Elasticities

Critical Elasticity of Demand

Critical demand elasticity, i.e., the demand elasticity which generates the critical loss (if the actual elasticity is greater in magnitude, the proposed market is not a relevant market).

The critical price elasticity is: $1/(m + \Delta P/P)$.

Critical Elasticity – An Example

Suppose as before that the hypothetical price increase is 5% and the margin is 50%. Then the critical price elasticity is $1/(.05+.50) = 1.82$.

Note: The industry elasticity facing the hypothetical monopolist should be smaller in magnitude than the elasticity of demand facing the merged entity because the hypothetical monopolist will face less competition than an individual firm

Methods for Identifying the Structure of Demand

1. Econometric (e.g., using scanner data)
2. Using auction models to infer valuations from bidding records
3. Inferring buyer preferences from market shares
4. Using conjoint (survey) methods

Cross-Price Elasticities

Cross-price elasticity of the demand for product Y with respect to the price of product X:

$$E_{QY, PX} = (\Delta Q_Y / Q_Y)(\Delta P_X / P_X).$$

When the cross-price elasticity of demand is positive, the two products are substitutes.

The effect of a change in the price of good X on the quantity demanded of good X (which reflects the own-elasticity of demand and the diverse of sales of X when its price is increased) can also be seen as the sum of the diversions of sales to all goods that compete with X. Those diversions, in turn, are related to (but not the same as) the cross-price elasticities of demand.

Consider the effect of an increase in the price of good X, assuming that Y and Z are the only two goods that are competitive with X. Let s represent the share of expenditure on goods in the market represented by each good. Then (see, for example, Werden (1998, p. 415)):

$$E_{QX, PX} = 1 + E_{QY, PX} (s_Y / s_X) + E_{QZ, PX} (s_Z / s_X).$$

Own versus Cross-Price Elasticity

While the own-elasticity of market demand offers the most direct approach to market definition, cross-price elasticities can provide useful information as to:

- (i) whether a particular product should or should not be in a proposed relevant market;
- (ii) the order in which products should be added as the size of proposed market grows.

Key: the *magnitude* of switching in response to a hypothetical price increase.

Diversification Ratios

When looking at whether Y is substitutable with X, multiply the cross-price elasticity Y with respect to X by the pre-merger quantity of Y to obtain ΔY , the quantity of Y diverted by an increase in the price of X. Then, calculate the diversion ratio, $\Delta Y/\Delta X$, the proportion of the diversion in X that goes to good Y.

Merger Simulation

Merger simulation - a quantitative technique that allows one to predict the price effects of mergers with differentiated goods. Simulation takes as a starting point a model of equilibrium pricing (typically Bertrand), calibrates that model to the available industry data (such as prices and shares), and uses the model to predict post-merger price changes.

Two stages of merger simulation: (i) The estimation of a demand model (generates own and cross-price elasticities of demand. (ii) Assuming, profit maximization, calibrate the model using existing prices, and then calculate the post-merger prices.

Merger Simulation and Market Definition

Consider a possible relevant market definition which consists of the merging products plus the products of other competitors. Merger simulation can test whether these competitors are sufficient to constrain unilateral price increases. If the simulated price effects are small, then one might infer that the merging firms do not constitute a market and that the merger does not pose a threat to competition. If the simulated effects are large, then one should investigate whether any uncommitted entrants can constrain pricing.

Merger Simulation: Another Perspective

If a merger simulation analysis for a proposed market generates small unilateral effects, then the proper relevant market is likely to be broad. If the unilateral effects are large, then the proposed market is a viable candidate to be a relevant market (an even smaller set of products may be the relevant market)

Geographic Market Definition

Merger Guidelines

“A region such that a hypothetical monopolist that was the only present or future producer of the relevant product at locations in that region would profitably impose at least a SSNIP, holding constant the terms of sale for all products produced elsewhere.

Four Types of Evidence for Geographic Market Analysis

- (1) evidence that buyers have shifted or have considered shifting purchases between different geographic locations in response to relative changes in price or other competitive variables;
- (2) evidence that sellers base business decisions on the prospect of buyer substitution between geographic locations in response to relative changes in price or other competitive variables;
- (3) the influence of downstream competition faced by buyers in their output markets;
- (4) the timing and costs of switching suppliers.

The Approach to Geographic Market Definition

- (1) Identify the number, size, and locations of firms that compete with the merging parties (the economic market).
- (2) Identify the additional competition in response to a hypothetical price increase (which yields the antitrust market).

Alternative “Tests” for Market Definition

Elzinga-Hogarty

LIFO (“Little In From Outside”) measures the importance of imports; LIFO equals 1 minus the ratio of imports to domestic consumption. As imports fall, LIFO approaches unity.

LOFI (“Little Out From Inside”), which measures exports, is defined as 1 minus the ratio of exports to domestic production. As exports fall, LOFI also approaches unity.

Elzinga-Hogarty: Rules of Thumb

A region is a geographic market if *both* LIFO and LOFI exceed a prescribed threshold. EH have proposed two thresholds: 75% (“weak” market) and 90% (“strong” market). Intuition: When imports and exports are relatively small, then prices are determined by domestic competition.

Another Approach - Price Correlations

Stigler-Sherwin: When the prices of similar goods in the same geographic market should tend towards equality after making allowance for transportation and other arbitrage costs.

More Sophisticated Alternatives

Granger Causality and Cointegration

Granger: If there is direct causality between product X and product Y and also direct causality between Y and X, then X and Y are in the same relevant market.

Cointegration: Accounts for the possibility that two unrelated price series, associated with two different products, may nevertheless be highly correlated and possibly in the same relevant market.

A Case Study: U.S. v. Oracle

Product Market

DOJ: Markets for “High-function HRM (human resources management) and FMS (financial management services) software”

1. Needed to efficiently maintain business processes
2. Mid-market and niche software products did not compete

Oracle: DOJ market was “fictional.” Market should include a wide range of software packages, including:

1. Comparable software from vendors besides Oracle, PeopleSoft and SAP;
2. Stitched together software products from various vendors; and/or
3. Outsourced HRM and FMS services.

Geographic Market

DOJ: U.S. Market

1. No evidence that U.S. customers could effectively turn outside of the United States for alternative sources of the product.
2. Licensing high function software involves on-going customer relationships that require (domestic) on-site evaluations and demonstrations, as well as product support and continuing maintenance and upgrades.
3. Arbitrage not possible – geographic price discrimination.
4. Rejected the application of an Elzinga-Hogarty test: the test “was designed for product markets that are literally shipped from factory to customer, that have substantial transportation costs relative to the value of the product, and for which there are no legal impediments to shipment across geographic boundaries.”

Oracle: Worldwide Market

1. SAP is dominant globally and provides an effective alternative source of supply.

2. Sellers such as SAP, Oracle, PeopleSoft, Siebel, and Microsoft market their software globally;
3. The Elzinga-Hogarty test indicates a worldwide market;
4. Software transportation costs are minimal;
5. Prices in the U.S. tend to move uniformly with prices outside the U.S.

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