
Market Definition

Merger Antitrust Law

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Market Definition Generally

An essential element of the prima facie case

- Section 7 of the Clayton Act provides:

No person engaged in commerce or in any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no person subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another person engaged also in commerce or in any activity affecting commerce, where *in any line of commerce* or in any activity affecting commerce *in any section of the country*, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.¹

- Market definition as an element of the prima facie case

- The Supreme Court has interpreted this language to require as part of the plaintiff's prima facie case a showing of:
 - the “line of commerce: (relevant product market), and
 - the “section of the country” (relevant geographic market)
 - in which the alleged anticompetitive effect is reasonably probable
- The courts have extended this requirement to merger antitrust cases under the Sherman and FTC Acts

¹ 15 U.S.C. § 18.

An essential element of the prima facie case

- Some good quotes for use in briefs:
 - “Determination of the relevant product and geographic markets is ‘a necessary predicate’ to deciding whether a merger contravenes the Clayton Act.”¹
 - “Statistics reflecting the shares of the market controlled by the industry leaders and the parties to the merger are, of course, the primary index of market power; but only a further examination of the particular market—its structure, history and probable future—can provide the appropriate setting for judging the probable anticompetitive effect of the merger.”²

¹ United States v. Marine Bancorporation, Inc., 418 U.S. 602, 618 (1974) (quoting United States v. E. I. Du Pont De Nemours & Co., 353 U.S. 586, 593 (1957)).

² Brown Shoe Co. v. United States, 370 U.S. 294, 322 n.28 (1962); *accord* United States v. General Dynamics Corp., 415 U.S. 486, 498 (1974).

Market definition procedurally

- Question of fact
 - The determination of the boundaries of the relevant market is a question of fact
- Burden of proof
 - The plaintiff bears the burden of proof on market definition
- Motion to dismiss: Twombly applies
 - The complaint must contain sufficient factual allegations to make the alleged market definition plausible under the market definitions standards in the case law
 - The plaintiff's failure to adequately plead market definition in a complaint will result in the complaint's dismissal
 - However, Twombly challenges are not always brought, especially where (which is usually the case) it is easy to replead the complaint and fix the deficiency
- Appeal
 - As a finding of fact, district court ruling reviewed under the "clearly erroneous" rule
 - FTC findings reviewed under the "substantial evidence" rule

Product Markets

Product markets generally

■ Definition

- A relevant product market defines the product boundaries within which competition meaningfully exists¹
- Although discussed in terms of products, equally applies to services or a mixed combination of a product with accompanying services

■ Modern concept of relevant markets

- Products in the relevant market should exert significant price pressure on one another
 - That is, an increase in price of one of the products in the market should cause customers to switch to other products in the market, and this loss of customer should result in the price increase being unprofitable.
 - Remember, with a price increase—
 - The firm earns additional profits (by the amount of the price increase) on the units it continues to sell
 - BUT loses the full margin on the units that customers refuse to buy because the new price is too high
 - Some definitions
 - Inframarginal customers continue to buy the product after the price increase
 - Marginal customers would buy the product at the original price but not at the increased price

¹ United States v. Continental Can Co., 378 U.S. 441, 449 (1964).

Brown Shoe

- *Brown Shoe* provides the starting point for market definition analysis:

The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it. However, within this broad market, well-defined submarkets may exist which, in themselves, constitute product markets for antitrust purposes. The boundaries of such a submarket may be determined by examining such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors. Because § 7 of the Clayton Act prohibits any merger which may substantially lessen competition "in *any* line of commerce" (emphasis supplied), it is necessary to examine the effects of a merger in each such economically significant submarket to determine if there is a reasonable probability that the merger will substantially lessen competition. If such a probability is found to exist, the merger is proscribed.¹

¹ *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962) (internal citations and footnotes omitted).

Brown Shoe “outer boundaries”

■ *Brown Shoe*:

The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it.¹

- This remains the prevailing definition of a relevant product market in the case law
- Key indicia—
 - Reasonable interchangeability of use
 - [High] cross-elasticity of demand

■ Core concept

- The idea is that the relevant product market should—
 - contain all products that exhibit a reasonable interchangeability of use and a high cross-elasticity of demand with one another, *and*
 - exclude all products that lack reasonable interchangeability of use and have a low cross-elasticity of demand with products in the relevant product market

¹ *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962).

Brown Shoe product submarkets

■ *Brown Shoe*:

However, within this broad market, well-defined submarkets may exist which, in themselves, constitute product markets for antitrust purposes. The boundaries of such a submarket may be determined by examining such practical indicia as [1] industry or public recognition of the submarket as a separate economic entity, [2] the product's peculiar characteristics and uses, [3] unique production facilities, [4] distinct customers, [5] distinct prices, [6] sensitivity to price changes, and [7] specialized vendors.¹

- Brown Shoe listed some “practical indicia” of submarkets but did not indicate how to apply these factors to determine the boundaries of submarkets
 - This created an enormous amount of confusion, bad analysis, and bad decisions
- Additional factors that courts typically consider
 - Relative prices of products in the provisional market
 - A Timex and a Rolex both tell time, but they are unlikely to exhibit a high cross-elasticity of demand with on another
 - Different functional attributes that might appeal to different classes of buyers
 - Differences in reputation

¹ Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962).

Brown Shoe: The modern view

- Submarkets (surprisingly) remain a valid concept in antitrust law
 - Courts still employ the concept, but with decreasing regularity
- But most courts view submarkets as no different than a relevant market
 - Under this view, the *Brown Shoe* “practical indicia” are simply circumstantial evidence probative of reasonable interchangeability of use and cross-elasticity of demand
 - “The requirements for establishing a relevant submarket are no different than those for establishing a relevant market.”¹
 - Courts routinely rely on the *Brown Shoe* factors to define the relevant product market in merger and other antitrust cases²
- Since 1982, the merger guidelines have rejected submarkets as distinct from markets

¹ *Flovac, Inc. v. Airvac, Inc.*, 817 F.3d 849, 855 (1st Cir. 2016); *accord* *PSKS, Inc. v. Leegin Creative Leather Prods., Inc.*, 615 F.3d 412, 418 (5th Cir. 2010); *Geneva Pharm. Tech. Corp. v. Barr Labs., Inc.*, 386 F.3d 485, 496 (2d Cir. 2004).

² See, e.g., *FTC v. Staples, Inc.*, No. CV 15-2115 (EGS), 2016 WL 2899222, at *9 (D.D.C. May 17, 2016); *United States v. H & R Block*, 833 F. Supp. 2d 36, 51-60 (D.D.C. 2011); *FTC v. CCC Holdings*, 605 F. Supp. 2d 26, 39-44 (D.D.C. 2009); *FTC v. Swedish Match*, 131 F. Supp. 2d 151, 159-64 (D.D.C. 2000); *FTC v. Cardinal Health, Inc.*, 12 F. Supp. 2d 34, 46-48 (D.D.C. 1998); *FTC v. Staples, Inc.*, 970 F. Supp. 1066, 1075-80 (D.D.C. 1997).

Supply-side substitutability

- *Brown Shoe*:
 - Also suggested that “cross-elasticity of production facilities” may be an important factor in defining markets¹
 - Supply-side substitutability can constrain prices by encouraging producers to shift into the production of a higher margin product and thereby compete the price of that product down
 - Many courts have used supply-side substitutability as a factor in market definition
 - Since 1982, the merger guidelines have used only demand-side substitution to define markets

¹ *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 n.42 (1962).

Hypothetical monopolist test

■ Basic idea

- The relevant market should be the smallest group of products containing the products of interest (say, the products of the merging firms in a horizontal merger) in which a hypothetical monopolist of those products would raise prices profitably over the current level by at least “small but significant nontransitory” amount (typically 5%)
 - Introduced in the 1982 DOJ Merger Guidelines
- “Could” v. “would”
 - The 1982 guidelines asked whether a hypothetical monopolist “could” raise prices by at least a SSNIP¹
 - The 1992 Guidelines clarified that this meant that the hypothetical monopolist “would likely impose at least” a SSNIP (i.e., that such a price increase would be profit-maximizing)
 - As long as the profit-maximizing price increase is above a SSNIP, the difference in the formulations does not matter
 - Where the profit-maximizing price increase is below the SSNIP, however, the candidate market fails the hypothetical monopolist test
 - Consequently, in using the hypothetical monopolist test you should always check to see if the profit-maximizing price is at least as large as the SSNIP
 - Courts, and even the enforcement agencies, often tend to use the “could” formulation, so it is important that you check for that as well.

¹ 1983 DOJ Merger Guidelines § II.1.

² 1992 DOJ/FTC Horizontal Merger Guidelines § 1.11; see 2010 DOJ/FTC Horizontal Merger Guidelines § 4.1.1..

Hypothetical monopolist test

- Basic idea (introduced in the 1982 DOJ Merger Guidelines)
 - Propositions:
 - If a hypothetical monopolist would not have market power with respect to a group of products to be able to profitably raise prices for those products, then a fortiori a merger of firms producing products within that group could not produce in an anticompetitive price increase
 - Find the smallest group of products for which a hypothetical monopolist would have market power to raise prices and then assess whether a merger of two firms producing products within this group would likely result in an anticompetitive price increase because of either—
 - Unilateral effects, or
 - Coordinated interaction
 - Adoption
 - The hypothetical monopolist test is the basis for market definition in both the 1992 and 2010 merger guidelines, although the details of implementing the test differ
 - Courts today have essentially adopted the hypothetical monopolist test as the defining attribute of a relevant antitrust market

Hypothetical monopolist test

- “Hypothetical monopolist” paradigm for market definition

- A little arithmetic

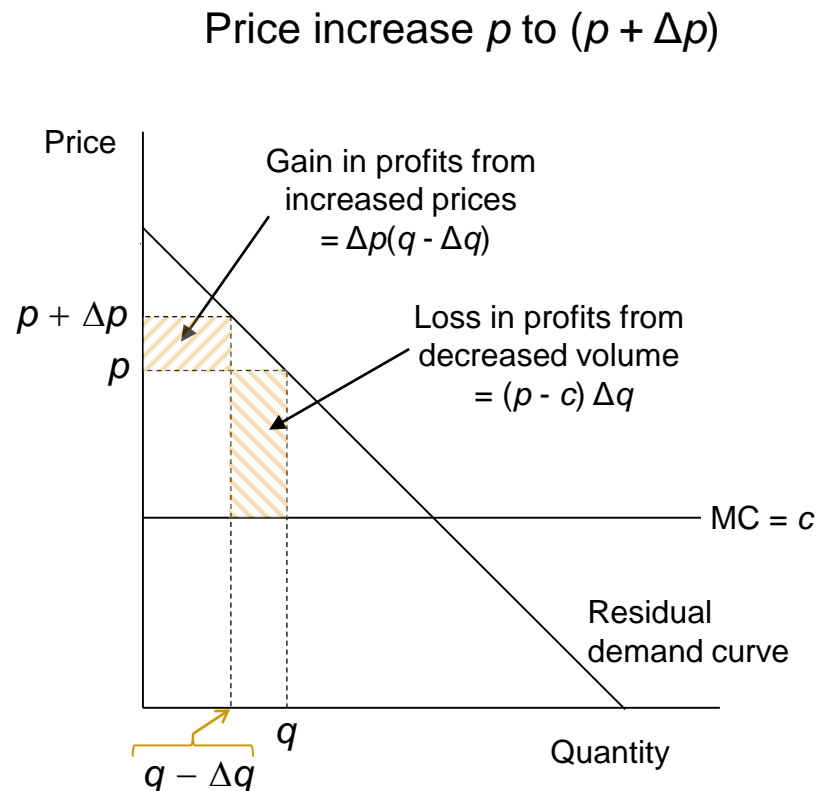
- A price increase of Δp —which will result in a quantity decrease of Δq —is profitable if the firm’s profits before the price increase are greater than the firm’s profits after the price increase:

$$(p + \Delta p - c)(q - \Delta q) > (p - c)q$$

- Rearranging, this implies

$$\Delta p(q - \Delta q) > (p - c)\Delta q$$

that is, the gain in profits on the sales that are not lost is greater than the loss of margin on the lost sales



1992 Merger Guidelines

■ Methodology

[T]he Agency will begin with each product (narrowly defined) produced or sold by each merging firm and ask what would happen if a hypothetical monopolist of that product imposed at least a "small but significant and nontransitory" increase in price, but the terms of sale of all other products remained constant. If, in response to the price increase, the reduction in sales of the product would be large enough that a hypothetical monopolist would not find it profitable to impose such an increase in price, then the Agency will add to the product group the product that is the next-best substitute for the merging firm's product.

...

The price increase question is then asked for a hypothetical monopolist controlling the expanded product group. In performing successive iterations of the price increase test, the hypothetical monopolist will be assumed to pursue maximum profits in deciding whether to raise the prices of any or all of the additional products under its control. This process will continue until a group of products is identified such that a hypothetical monopolist over that group of products would profitably impose at least a "small but significant and nontransitory" increase, including the price of a product of one of the merging firms. The Agency generally will consider the relevant product market to be the smallest group of products that satisfies this test.¹

¹ 1992 Horizontal Merger Guidelines § 1.11.

1992 Merger Guidelines

■ Methodology (con't)

□ Definitions

- Any group of products being tested is called a provisional product market
- The first group of products that satisfies the hypothetical monopolist test is the relevant product market

□ Prices

- In the ordinary course, the agencies will use premerger prices
- If premerger circumstances are strongly suggestive of coordinated interaction, the agency will use prices more reflective of the competitive price
- If changes in the prevailing prices can be predicted with reasonable reliability, the agency may use likely future prices (assuming no merger)

□ SSNIP

- A "small but significant and nontransitory" increase in price (known as a SSNIP) is usually 5%

□ Profit-maximizing

- The question under the hypothetical monopolist test is whether the hypothetical monopolist "would likely impose at least" a SSNIP, not whether it could. The difference matters when a SSNIP would be profitable, but the profit-maximizing price increase would be below the SSNIP.

1992 Merger Guidelines

■ Methodology (con't)

- Factors identified in the 1992 guidelines to consider in assessing buyer reactions to a SSNIP:¹
 - Evidence that buyers have shifted or have considered shifting purchases between products in response to relative changes in price or other competitive variables
 - Evidence that sellers base business decisions on the prospect of buyer substitution between products in response to relative changes in price or other competitive variables
 - The influence of downstream competition faced by buyers in their output markets
 - This is sometimes called “derived demand”
 - The timing and costs of switching products
- These factors are nonexclusive: Any evidence probative of buyer switching reactions may be considered

¹ 1992 Horizontal Merger Guidelines § 1.11.

1992 Merger Guidelines

■ Methodology (con't)

- “Where the rubber meets the road”—Customer testimony
 - In practice, actual evidence of switching behavior in response to changes in relative prices is rarely available
 - In the absence of actual switching evidence, the agencies usually ask customers what they would do in the event of a SSNIP and then use the response in assessing buyer reactions
 - This is true only when the buyers are somewhat sophisticated
 - Usually intermediate product buyers (i.e., business firms that are buying products or services as an input into the production of another product)
 - The agencies do not survey average consumers in retail products mergers
 - Instead, use econometric analysis of point-of-sale scanner data for consumer products to estimate cross-elasticities for use in the hypothetical monopolist test
 - Customer interview responses have proven notoriously unreliable for three reasons:
 - Even sophisticated customers often do not know what they would actually do if faced with a SSNIP
 - Still, often will give the agency an answer just to make them go away
 - Customers that understand the merger antitrust game may give an answer that is designed to achieve a strategic objective (such as stopping the merger or forcing a significant divestiture)
 - Prices are determined at the margin; hence only the responses of marginal customers should count. But there is no way for the agencies to distinguish between marginal and inframarginal customers and therefore are likely to credit all responses equally.
 - This leads to a significant bias in favor of narrower markets

1992 Merger Guidelines

- Methodology (con't)
 - “Where the rubber meets the road”—Significant head-to-head bidding competition
 - Where firms in the provisional market (especially the merging firms) engage in significant bidding competition with each other, that competition would be eliminated by a hypothetical monopolist—along with any price decreases that resulted from the bidding competition
 - Sophisticated customers can become very expert at “playing firms off of one another” in bidding competitions in order to minimize price
 - Evidence of significant head-to-head bidding competition is probative of competitive effects as well as market definition
 - Where the merging firms compete with each other frequently, especially in the so-called “best and final” round, and customers say (with supporting reasons) that no other supplier could replace this competition after the merger, the merger will almost certainly be challenged

2010 Merger Guidelines

- Adopts the 1992 Merger Guidelines methodology with some very significant changes
 - Relegates market definition to one of several tools useful in merger antitrust analysis
 - May not be necessary or even helpful in all cases
 - Was the point of departure for all merger antitrust analysis under the 1992 guidelines
 - Abandons the “smallest market” principle and unique relevant markets
 - 1992 guidelines considered the relevant product market to be the smallest group of products that satisfied the hypothetical monopolist test
 - 2010 guidelines accept as a relevant product market any group of products that satisfies the hypothetical monopolist test
 - This permits “cherry-picking” of products to include in the relevant product market
 - Also makes it difficult for defendants to argue in court that prosecuting agency misspecified the relevant product market

2010 Merger Guidelines

■ Examples of “cherry-picking” under the 2010 guidelines¹

□ Motorcycles and cars

Example 4: Firms A and B, sellers of two leading brands of motorcycles, propose to merge. If Brand A motorcycle prices were to rise, some buyers would substitute to Brand B, and some others would substitute to cars. However, motorcycle buyers see Brand B motorcycles as much more similar to Brand A motorcycles than are cars. Far more cars are sold than motorcycles. Evaluating shares in a market that includes cars would greatly underestimate the competitive significance of Brand B motorcycles in constraining Brand A's prices and greatly overestimate the significance of cars.

Example 7: In Example 4, including cars in the market will lead to misleadingly small market shares for motorcycle producers. Unless motorcycles fail the hypothetical monopolist test, the Agencies would not include cars in the market in analyzing this motorcycle merger.

□ Exclusion of closer substitutes

Example 5: Products A and B are being tested as a candidate market. Each sells for \$100, has an incremental cost of \$60, and sells 1200 units. For every dollar increase in the price of Product A, for any given price of Product B, Product A loses twenty units of sales to products outside the candidate market and ten units of sales to Product B, and likewise for Product B. Under these conditions, economic analysis shows that a hypothetical profit-maximizing monopolist controlling Products A and B would raise both of their prices by ten percent, to \$110. Therefore, Products A and B satisfy the hypothetical monopolist test using a five percent SSNIP, and indeed for any SSNIP size up to ten percent. This is true even though two-thirds of the sales lost by one product when it raises its price are diverted to products outside the relevant market.

¹ For examples, see 2010 Merger Guidelines § 4.1.1.

Product markets: Special cases

■ Cluster markets

- Courts sometime define markets around collections of products that are almost always offered for a sale at a single location
 - Examples: Commercial banking services, supermarkets, office supply stores, department stores, sporting equipment, acute care inpatient hospital services
- Concept
 - Not well defined in the case law
 - Lazy justification: Too often accepted “for analytical convenience” when market shares are likely to be the same across products¹
 - WDC: The best justification for combining diverse products and services into a single relevant product market is where there exist substantial economies of scope in purchasing, so that sellers tend to offer for sale at a single location the entire collection of products and customers tend to select sellers more on the basis of their aggregate offerings and less on the offerings of single products
 - If customers are attracted by the totality of the products offered at the seller’s location, then sellers have some flexibility in setting the prices of individual products without being constrained by competition from partial line or single product sellers, provided that the sellers remain competitive within their product offering as a whole
 - In a properly defined cluster market, specialty dealers that offer a limited selection of products should only be able to operate in narrow niches and should not be able to compete successfully for a large fraction of the total sales of their particular products

¹ See, e.g., *FTC v. Staples, Inc.*, No. CV 15-2115 (EGS), 2016 WL 2899222, at *8 (D.D.C. May 17, 2016).

Product markets: Special cases

- Cluster markets
 - Product subsets in a store
 - Typically, cluster markets include all products or services offered at the location.
 - Exceptions
 - In *Staples/Office Depot*, the district court sustained an FTC cluster market that included all general office supplies except toner, ink, and BOSS (“beyond office supplies”) products¹
 - Court found that the excluded products were subject to significantly different competitive conditions than the other products in the alleged cluster market and hence properly excluded

Product markets: Special cases

■ Price discrimination markets

- Ordinarily, the SSNIP is applied uniformly to all products in the provisional market
- However, if the market is or can be subject to price discrimination, the agency may apply a discriminatory price increase on sales to targeted buyers
 - Introduced in the 1992 Merger Guidelines

Example: Consider a merger of two string bean producers. Assume that a hypothetical monopolist could not profitably raise prices because of diversion to carrots, so that carrots must be included in the provisional market. Assume further that spinach is a close substitute for carrots but not as close a substitute for string beans, and that a hypothetical monopolist could not profitably implement a SSNIP to both string beans and carrots.

Under the usual pre-1992 approach, spinach would be added to the provisional market. But under the new approach of the 1992 guidelines, if the hypothetical monopolist finds it maximally profitably to raise string bean prices by a SSNIP but carrots by something less than the same SSNIP (to avoid diversion to spinach), string beans and carrots would be a relevant market.¹

■ Implications

- Price discrimination can narrow a market considerably
- In some years, the FTC aggressively used price discrimination to narrow markets even when there was no historical occurrences of price discrimination

¹ Janusz A. Ordover & Robert D. Willig, *Economics and the 1992 Merger Guidelines: A Brief Survey*, 8 Rev. Indus. Org. 139, 140-41 (1993).

Product markets: Special cases

■ Price discrimination markets

□ Modern examples

■ Large business customers in the Staples/Office Depot merger²

- Large B2B customers solicit multiyear contracts through “requests for proposals” (RFPs), which permits customized (and often nonlinear) pricing terms not available to retail customers
- The volume of large B2B customers allows them to purchase office supplies at about one-half of the price paid by the average retail customer

■ Customers requiring nationwide service in Sysco/US Foods merger²

- Nationwide distribution network important to these customers
- Require national contracts and use RFPs to solicit bids
- Require a single technology platform to interface with distributor
- Require nationwide product consistency (especially in private label)
- Sysco and US Foods each have broad distribution networks and a dedicated sales sole to handle national accounts
- Cooperatives of geographically dispersed regional distributors formed to compete for these customers

¹ FTC v. Staples, Inc., No. CV 15-2115 (EGS), 2016 WL 2899222 (D.D.C. May 17, 2016)

² FTC v. Sysco Corp., 113 F. Supp. 3d 1 (D.D.C. 2015).

Product markets: Special cases

- Research and development markets
 - There have been occasional efforts by the enforcement agencies to define markets around the R&D activities of firms
 - The leading effort is *United States v. General Motors Corp.*, where the DOJ alleged, among other things, that the proposed acquisition by ZF Friedrichshafen AG of the Allison Transmission Division of General Motors Corporation would violate Section 7 because it would eliminate actual and potential competition worldwide “in the market for technological innovation in the design, development, and production” of medium and heavy automatic transmissions for commercial and military vehicles. The DOJ alleged that this technological competition “has resulted in improved products, new products, lower costs of manufacture, and lower prices to consumers.”¹
 - The concept is both unnecessary and legally unsound
 - More sensible to define markets around the products that the R&D seeks to create or improve
 - A decrease in innovation competition would result in a decrease in the rate of technological innovation or improvement in the underlying product, which is a cognizable anticompetitive harm
 - Since Section 7 is forward looking, true even if the products do not yet exist (e.g., two pharmaceutical companies racing against each other to develop a vaccine for Ebola)
 - If companies are not selling their R&D services, then in what sense is this a “line of commerce” for Section 7 purposes?

¹ Complaint, *United States v. General Motors Corp.*, Civ. Action No. 93-530 (D. Del. filed Nov. 11, 1993) (withdrawn upon voluntary termination of transaction).

Product markets: Special cases

■ Single manufacturer products

- The idea is that the product of a single manufacturer is by itself a relevant product market
 - Rarely arises in merger antitrust cases
 - But arises frequently in other areas of antitrust
 - *Possible example*: Kodak replacement parts for high-speed Kodak printers
- Practice
 - No rule that single manufacturer product markets cannot exist¹
 - Usual rules for defining markets apply
 - But courts are reluctant to find manufacturer product markets absent compelling evidence
 - The problem is that the manufacturer will always have monopoly power in a single manufacturer product market, which removes a major hurdle in proving antitrust liability. The courts are concerned that this might result in significant overinclusiveness errors in the finding of liability.

¹ Eastman Kodak Co. v. Image Tech. Servs., Inc., 504 U.S. 451 (1992).

Geographic Markets

Geographical markets generally

- Definition

- For each relevant product market, there is one or more associated relevant geographic markets
- A single firm may operate in a number of different geographic markets
 - E.g., a dialysis firm operating in a retail dialysis product market can operate in multiple distinct geographic markets

Judicial tests

■ *Philadelphia National Bank*

- Defined the relevant geographic market to be “the area of effective competition . . . in which the seller operates, and to which the purchaser can practically turn for supplies.”¹
- The Court also observed that an element of “fuzziness would seem inherent in any attempt to delineate the relevant geographic market” and that the market need not be defined by “metes and bounds as a surveyor would lay off a plot of ground.”²

■ General rules

- Proponents cannot rely on political boundaries (such as towns, counties, or states) to establish the boundaries of a relevant geographic market without providing evidence of the competitive forces within these boundaries
- Actual sales and shipment patterns are most often used by courts to determine the dimensions of the geographic market
- In many cases, the geographic boundaries of the relevant market are well understood and are often the subject of stipulations by the parties

¹ *United States v. Philadelphia Nat'l Bank*, 374 U.S. 321, 359 (1963) (emphasis removed) (quoting *Tampa Elec. Co. v. Nashville Coal Co.*, 365 U.S. 320, 327 (1961) (Sherman Act § 2).

² *Id.* at 360 n.37.

1992 Merger Guidelines

■ Methodology

In defining the geographic market or markets affected by a merger, the Agency will begin with the location of each merging firm (or each plant of a multiplant firm) and ask what would happen if a hypothetical monopolist of the relevant product at that point imposed at least a "small but significant and nontransitory" increase in price, but the terms of sale at all other locations remained constant. If, in response to the price increase, the reduction in sales of the product at that location would be large enough that a hypothetical monopolist producing or selling the relevant product at the merging firm's location would not find it profitable to impose such an increase in price, then the Agency will add the location from which production is the next-best substitute for production at the merging firm's location.

...

The price increase question is then asked for a hypothetical monopolist controlling the expanded group of locations. In performing successive iterations of the price increase test, the hypothetical monopolist will be assumed to pursue maximum profits in deciding whether to raise the price at any or all of the additional locations under its control. This process will continue until a group of locations is identified such that a hypothetical monopolist over that group of locations would profitably impose at least a "small but significant and nontransitory" increase, including the price charged at a location of one of the merging firms.¹

¹ 1992 Horizontal Merger Guidelines § 1.21.

1992 Merger Guidelines

- Methodology (con't)
 - Analogy to product market definition
 - Provisional geographic markets, prices, SSNIPs, and price discrimination markets are treated analogously to their treatment in product market definition
 - Factors identified in the 1992 guidelines to consider in assessing buyer reactions to a SSNIP: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
 - 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
 - The influence of downstream competition faced by buyer in their output markets
 - The timing and costs of switching suppliers
 - These factors are nonexclusive: Any evidence probative of buyer switching reactions may be considered

¹ 1992 Horizontal Merger Guidelines § 1.21.

1992 Merger Guidelines

■ Methodology (con't)

- Geographic markets are often stipulated by the parties
 - In many mergers, there is no serious dispute over geographic market definition
 - Many geographic markets are national or even worldwide
 - Notable exceptions where geographic market definition can be highly contentious:
 - Products sold in retail stores and purchased by end-user consumers
 - So that consumers have to travel to the retail stores
 - Broadly defined to include, for example, grocery stores, department stores, banks, hospitals, dialysis clinics
 - Intermediate products with high transportation costs relative to their prices
 - So that it is costly to ship products to customers (e.g., glass beer bottles shipped to breweries)

¹ 1992 Horizontal Merger Guidelines § 1.21.

2010 Merger Guidelines

- Adopts the 1992 Merger Guidelines methodology with some very significant changes
 - As with product markets
 - Relegates geographic market definition to one of several tools useful to merger antitrust analysis and which may not be necessary in all cases
 - Abandons the “smallest market” principle and unique relevant markets
 - 2010 guidelines helpful distinguish two cases:
 - Geographic markets based on the locations of suppliers
 - Here, customers travel to the supplier’s location, so the relevant question is to which supplier locations is the customer willing to travel in the event that a hypothetical monopolist of the locations in the provisional market raises price
 - In other words, how much farther would a customer be willing to travel to avoid a SSNIP
 - Geographic markets based on the locations of customers
 - Here, suppliers ship to the customer’s location, so the relevant question is which suppliers are willing to compete for a customer at a given location in the event that a hypothetical monopolist of the suppliers in the provisional market raises price
 - The usual idea is that an increase in a local price increases the margin earned by a supplier, and a more distant supplier can use the additional margin to offset its shipping costs (that is, how much farther would a supplier be willing to ship in the event if prices increased).
 - This usually entails a straightforward calculation of the additional shipping distance that could be funded by a SSNIP (keeping in mind that the loading and unloading costs are already covered)

Critical Loss Analysis

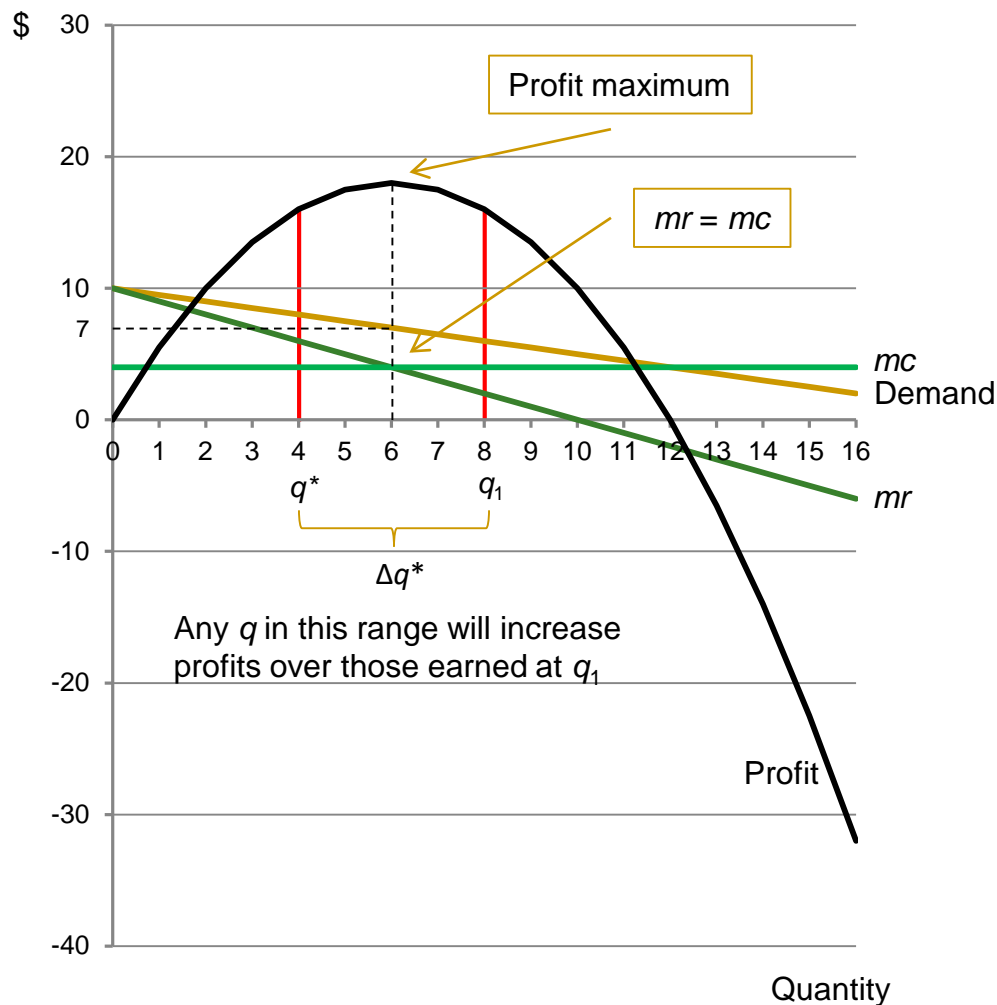
Critical loss

■ The basic idea

- Consider a price increase Δp in the product of a single-product hypothetical monopolist and an accompanying loss of sales Δq when the demand curve is downward sloping
 - When loss of sales is sufficiently small, then the gross gain in profits from higher prices on retained sales will be greater than gross loss in profits from lost sales and the price increase will be profitable
 - When the loss of sales is sufficiently large, the gross gain in profits from higher prices on retained sales will be smaller than gross loss in profits from lost sales and the price increase will be unprofitable
 - This is *precisely* the same question we asked in the competition economics discussion of monopoly pricing: When is it in the interest of the monopolist to raise price?
- *Definition:* The loss of sales Δq^* at the tipping point when the gross gain in profits just equals the gross loss is called the critical loss
 - Critical loss is often express in percentage terms as $\Delta q^*/q$, where q is the premerger level of sales
 - NB: A decrease in sales greater than Δq^* will mean a *loss* in profits compared to the starting point
- Dependencies
 - Critical loss (CL) is a function of the starting quantity q , the price p , and the price change Δp

Critical loss

■ The basic idea



Recall this diagram from Unit 4. The curves result from the inverse demand function $q = 20 - 2p$. While we originally saw this demand function in the context of a monopolist, we can reinterpret here as the aggregate demand function for the industry (where all firms produce identical products and have identical, constant marginal costs). The profit curve then shows aggregate profits for the firms in the market.

Suppose competition among the firms in the market yields an aggregate output q_1 , a quantity above the profit-maximizing level. The hypothetical monopolist tests asks whether a hypothetical monopolist can profitably raise profits by some SSNIP. An increase in price will decrease the quantity demanded, so q will move to the left. The critical loss is the Δq^* so that the profits at $q^* = q_1 - \Delta q^*$ are equal to the profits at q_1 . Note that the profits at q^* are not the profit maximum.

Critical loss

■ Formulas for critical loss

- We can express the critical loss Δq^* algebraically in two equivalent ways:¹

- As an equality of total profits after and before the price increase:

$$(p + \Delta p - c)(q - \Delta q^*) = (p - c)q$$

Breakeven condition

- As an equality of the gross gain in profits on retained sales and the gross loss in profits from lost sales:

Gain on retained sales

$$\Delta p (q - \Delta q^*) = (p - c) \Delta q^*$$

Loss of margin on lost sales

- Note: Critical loss is a function of q , that is, the magnitude of q^* depends on the starting point q as well as on p and c

- Solving for Δq^* provides a formula for the critical loss in absolute units:

$$\Delta q^* = \frac{q \Delta p}{(p + \Delta p) - c}$$

or in percentage terms:

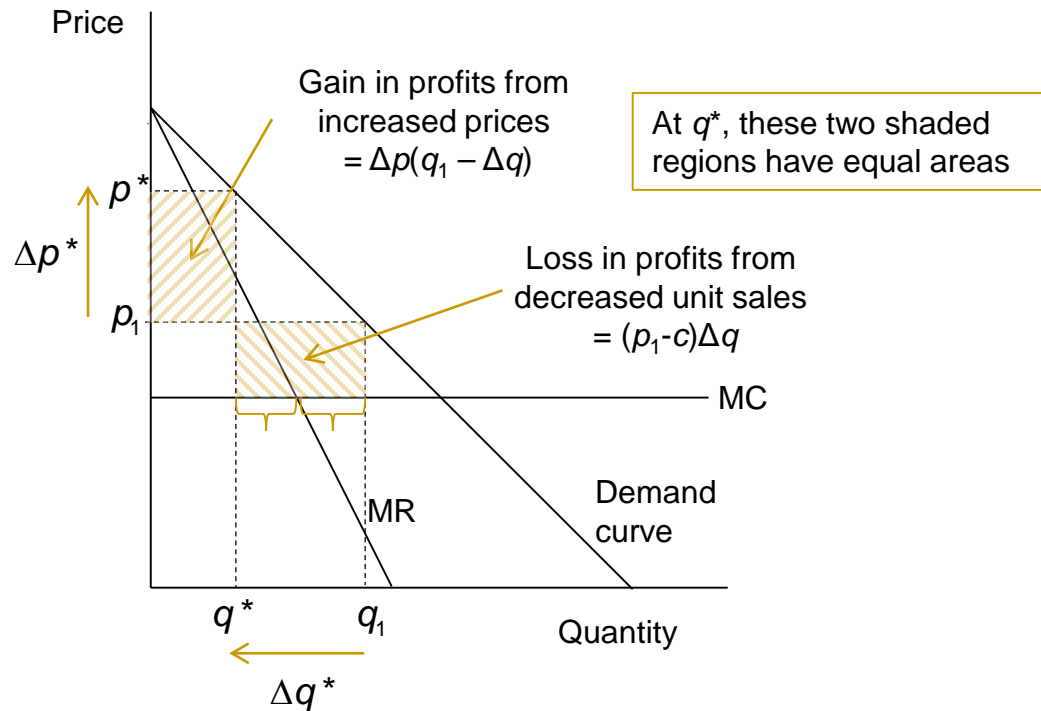
$$\frac{\Delta q^*}{q} = \frac{\Delta p}{(p + \Delta p) - c} = \frac{\frac{\Delta p}{p}}{\frac{\Delta p}{p} + \frac{p - c}{p}} = \frac{\delta}{\delta + m}$$

Where δ is the percentage price increase and m is the percentage gross margin

¹ This assumes zero fixed costs and constant marginal costs.

Critical loss

- Formulas for critical loss



NB: The profit-maximizing quantity lies equidistant between q^* and q_1

Critical loss and market definition

■ The basic idea

- Recall that under the hypothetical monopolist test, a candidate market is a relevant market if a hypothetical monopolist could profitably raise prices in the candidate market by a SSNIP.
 - So for any candidate market with prevailing aggregate output q and price p and a SSNIP Δp , then if the change in output Δq is less than the critical loss Δq^* a hypothetical monopolist could profitably raise price by the SSNIP and the candidate market is a relevant market
- Algorithm
 1. Start with a product of the merging firm
 - Or a product of the merging firm together with other closely related products (as in H&R Block/TaxACT)
 2. Assume a hypothetical monopolist over the group of products—the “candidate market”—and raise price by a SSNIP
 3. Compare actual loss Δq to critical loss Δq^* ,
 - If the actual loss $\Delta q < \Delta q^*$, then a hypothetical monopolist could profitably raise prices by the SSNIP and the product grouping is a relevant market
 - Whether the SSNIP is profitable will be determined by the candidate market’s *own-elasticity of demand*
 - If the actual loss $\Delta q \geq \Delta q^*$, then a hypothetical monopolist could not profitably raise prices the product grouping is not a relevant market → add to the product group another product with a high cross-elasticity of demand/diversion ratio and repeat Steps 2 and 3.
 - If the SSNIP is not profitable, the additional product to include the candidate market is determined by the *cross-elasticity of demand* between the products in the candidate market and the products outside the candidate market

Critical loss and market definition

■ Example 1

- Products A and B are being tested as a candidate market. Each sells for \$100, has an incremental cost of \$60, and sells 1200 units. When the price for both products is increased by \$5, each firm loses 100 units to outside the market. Do A and B constitute a relevant market under the 2010 Guidelines?

Parameters			Critical loss calculations			Critical loss		
Price	p	100	Gain = (Q+ΔQ)Δp			$\Delta q^* = \frac{q\Delta p}{(p + \Delta p) - c}$		
Cost	c	60	Q + ΔQ	2200				
Gross margin	m	40	Δp	5				
Market output	Q	2400	Gain	11000				
SSNIP	Δp	5	Loss = mΔQ			qΔp	12000	
Customer loss	ΔQ	-200	ΔQ	-200	m	40	(p+Δp)-c	45
			Loss	<u>-8000</u>			CL	266.6667
			Net	3000				

From the breakeven condition (see earlier slide)

Conclusion: Since the gain exceeds the loss, a hypothetical monopolist of A and B could profitably raise price by 5% and so A and B are a relevant market

Critical loss and market definition

■ Example 1A

- We can also analyze Example 1 in terms of the percentage critical loss:

Summary:

$$P = \$100$$

$$C = \$60$$

$$\text{Margin} = \$40$$

$$\text{Total market } Q = q_1 + q_2 = 2400$$

$$\text{Percentage margin } m = \frac{p - c}{p} = \frac{100 - 60}{100} = 40.0\%$$

$$\text{SSNIP } \delta = 5\%$$

$$\text{Percentage critical loss } CL = \frac{\delta}{\delta + m} = \frac{5\%}{5\% + 40\%} = 11.1\%$$

$$\text{Percentage actual loss } L = \frac{100 + 100}{2000} = 10.0\%$$

Conclusion: Since the percentage actual loss L does not exceed the percentage critical loss CL , a hypothetical monopolist of A and B could profitably raise price by 5% and so A and B are a relevant market

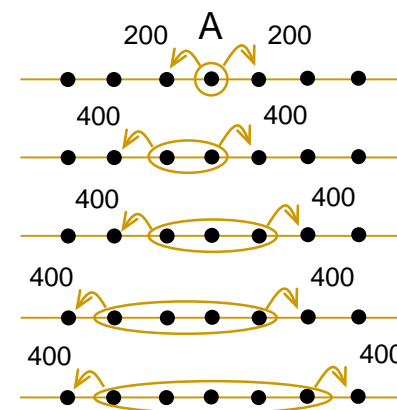
Critical loss and market definition

■ Example 2: Gas stations on a road

- Assume that there is an identical gas station every mile on a straight road. Each gas station charges \$3.25 per gallon, has an incremental costs of \$2.50, and sells 1000 gallons. When the price at a station is increased by 5% (holding the price at all other gas stations constant), the station loses 400 customers. No customer will travel more than one mile, however, to avoid a 5% price increase. For a given station A, what is the relevant market?

Price	p	3.25
Cost	c	2.50
Gross margin	m	0.75
Percentage SSNIP		5.0%
Actual SSNIP		0.1625
Customers/station		1000
Customer loss		400

Stations in the market	Q	ΔQ	Gain	Loss	Net
1	1000	400	97.50	300.00	-202.50
2	2000	800	195.00	600.00	-405.00
3	3000	800	357.50	600.00	-242.50
4	4000	800	520.00	600.00	-80.00
5	5000	800	682.50	600.00	82.50



Critical loss and market definition

■ Estimating actual loss

- We can estimate the percentage critical loss if we know the aggregate own-elasticity of demand for the candidate market when:
 - Premerger pricing satisfies the Lerner Condition ($\varepsilon = 1/m$), and
 - All demand functions are linear in price in the vicinity of the premerger equilibrium point
- First-order approximation of the percentage actual loss:

$$\frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}} \equiv \varepsilon \Rightarrow \frac{\Delta q}{q} \cong \frac{\Delta p}{p} \varepsilon = \delta \varepsilon,$$

where ε is the residual own-elasticity of demand for the candidate market (i.e., of the hypothetical monopolist)

that is, the percentage actual loss is approximately equal to the percentage price change times the own-elasticity of demand

- First-order approximation of the actual loss:

$$\frac{\Delta q}{q} \cong \delta \varepsilon \Rightarrow \Delta q = q \delta \varepsilon.$$

Critical loss and market definition

■ Critical elasticities

- We can also define the critical elasticity ε^* as the maximum elasticity that will profitably support a price increase of δ :

$$\underbrace{\frac{\Delta q^*}{q} = \frac{\delta}{\delta + m}}_{\text{}} \Rightarrow \delta |\varepsilon^*| \cong \frac{\delta}{\delta + m},$$

NB: This is the conventional way to write the critical loss equation, but it means that the Δq is a *positive* number. To make the signs work, we have to use the absolute value of the elasticity. *Always watch for the sign of Δq in any equation.*

or:

$$|\varepsilon^*| \cong \frac{1}{\delta + m}$$

- Accordingly, when the own-elasticity of demand ε is less than the critical elasticity ε^* (i.e., ε is more inelastic than ε^* or equivalently $|\varepsilon| < |\varepsilon^*|$), then for a small enough SSNIP the price increase will be profitable

- We can express this as:

$$|\varepsilon| < \frac{1}{\delta + m}.$$

Critical loss and market definition

OPTIONAL

■ Profit-maximization

- As noted earlier, the guidelines ask whether the hypothetical monopolist for the candidate market profit-maximizing price increase would be above a SSNIP
- The monopolist's profit-maximizing critical elasticity ε^{pm} —that is, the elasticity at which the hypothetical monopolist's profit-maximizing price increase will be at least as great as the SSNIP δ —is given by:

$$|\varepsilon^{pm}| = \frac{1}{2\delta + m}$$

- With a little algebra, we can rearrange the above equation to solve for δ :

$$\delta^{pm} = \frac{-m|\varepsilon| + 1}{2|\varepsilon|}$$

- This equation gives the profit-maximizing percentage price change δ^{pm} for a given group of product with an elasticity ε
- It is helpful to remember what is going on here. A profit-maximizing monopolist prices so that the Lerner equation is satisfied ($\varepsilon = 1/m$). Competition within the product grouping, however, may decrease the margin m , so that the Lerner equation is no longer satisfied. The profit-maximizing δ^{pm} gives the percentage price change that the monopolist would implement if it gained control of the product grouping. (Note that when $\varepsilon = 1/m$, $\delta^{pm} = 0$, as it should be.)

“Aggregate diversion ratio”

■ Basic idea

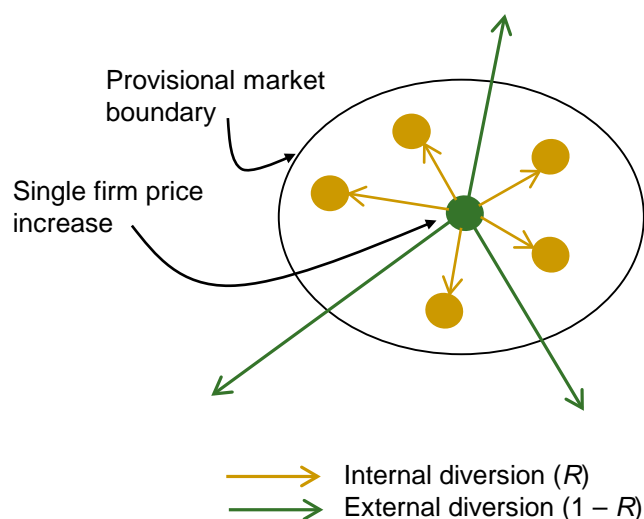
- 1982 Merger Guidelines
 - Required that all products in the provisional market be increased by the same percentage SSNIP
- 1992 Merger Guidelines
 - Allowed price discrimination in the SSNIP, at least where the premerger market exhibited some price discrimination (and sometimes when the postmerger market arguably would exhibit price discrimination even if the premerger market did not)
- 2010 Merger Guidelines
 - After the 2010 Merger Guidelines, some economists—including agency economists in court proceeding—used price discriminating SSNIPs in any differentiated products markets
 - A *one-product SSNIP* creates the most narrow relevant markets, since internalizes the maximum amount of diversion
 - The “aggregate diversion ratio” method can whether a candidate market satisfies the hypothetical monopolist test under a one-product SSNIP
 - Some economists have used the aggregate diversion ratio method when imposing a uniform price increase across all products in the candidate market, but this requires some restrictive conditions
 - Examples: DOJ’s economist in H&R Block/TaxACT
FTC’s economist in Sysco/US Foods
DOJ’s economist in Aetna/Cigna

“Aggregate diversion ratio”

■ Aggregate diversion ratio

□ Definition

- The percentage of total sales lost by a product in the wake of a uniform SSNIP that is captured by all of the other products inside the provisional market.



1. Raise the product of one merging firm by a SSNIP, leaving the prices of all other products in the provisional market at premerger levels
2. That product loses sales Δq , of which Δq_{inside} are diverted to products *inside* the provisional market (“recaptured”) and $\Delta q_{outside}$ are diverted to products *outside* the provisional market
3. $R \equiv \Delta q_{inside} / \Delta q$ is called the aggregate diversion ratio (it is more descriptively called the “recapture ratio”)

- **Key result.** If the aggregate diversion ratio is greater than or equal to the critical loss, the provision market satisfies the hypothetical monopolist test:

$$R \equiv \frac{\Delta q_{inside}}{\Delta q} \geq \frac{\Delta q^*}{q} \Rightarrow \text{Hypothetical monopolist test is satisfied}$$

“Aggregate diversion ratio”

■ Proof:

Assume that the candidate market has an own-elasticity of ε . Then:

$$\frac{\Delta q}{q} \cong \frac{\Delta p}{p} \varepsilon = \delta \varepsilon$$

Remember $\delta = \Delta p/p$ by our prior definition

Now assume that the hypothetical monopolist imposes a uniform SSNIP on all products in the candidate market. Some percentage R of the $\Delta q/q$ loss will be “recaptured” by other products in the candidate market and the remaining fraction $1 - R$ will exit the market. The actual percentage loss to the market is then $(1 - R)\varepsilon\delta$. The hypothetical monopolist will find the price increase profitable if and only if the actual percentage loss is less than the critical loss, that is:

$$(1 - R)\varepsilon\delta < \frac{\delta}{\delta + m} = \frac{\Delta q^*}{q}$$

Rearranging, this simplifies to:

$$R \geq \frac{\delta}{\delta + m}$$

That is, the price increase is profitable if the percentage recapture rate is greater than the percentage critical loss. Q.E.D.

“Aggregate diversion ratio”

■ Extension to single product recapture rates

- Some economists apply the aggregate diversion ratio test to individual products in the candidate market.
 - Say the hypothetical monopolist imposes a uniform SSNIP on all products in the candidate market and that some percentage R_i of the $\Delta q_i/q_i$ loss of each product i will be “recaptured” by other products in the candidate market and the remaining fraction $1 - R_i$ will exit the market.
 - Further assume that the percentage gross margin m is the same for each product.
 - Let R be the recapture rate for the candidate market as a whole
 - Define R^* to be the critical recapture rate for the candidate market as a whole, that is:

$$R^* = \frac{\delta}{\delta + m}$$

- Rule:

If $\min_i R_i \geq R^*$, then $R \geq R^*$ and so $L < CL$.

- I call this a conjecture because I have not seen a formal proof.
- Warren-Bolton advanced, and the court accepted, this test in H&R Block/TaxACT

“Aggregate diversion ratio”

- Extension to single product recapture rates

- Rule:

If $\min_i R_i \geq R^*$, then $R \geq R^*$ and so $L < CL$.

- Proof:

Recall that

$$R_i \equiv \frac{\Delta q_i^{inside}}{\Delta q_i}.$$

Without loss of generality, let R_1 be the smallest individual product recapture rate.

Now

$$R = \frac{\Delta Q^{inside}}{\Delta Q} = \frac{\sum_{i=1}^n \Delta q_i^{inside}}{\sum_{i=1}^n \Delta q_i} = \sum_{i=1}^n \frac{\Delta q_i^{inside}}{\Delta q_i} \frac{\Delta q_i}{\Delta Q}$$

If R_1 is the smallest recapture rate, then:

$$R = \sum_{i=1}^n \frac{\Delta q_i^{inside}}{\Delta q_i} \frac{\Delta q_i}{\Delta Q} \geq \sum_{i=1}^n \frac{\Delta q_1^{inside}}{\Delta q_1} \frac{\Delta q_i}{\Delta Q}$$

But
$$\sum_{i=1}^n \frac{\Delta q_1^{inside}}{\Delta q_1} \frac{\Delta q_i}{\Delta Q} = \frac{\Delta q_1^{inside}}{\Delta q_1} \sum_{i=1}^n \frac{\Delta q_i}{\Delta Q} = \frac{\Delta q_1^{inside}}{\Delta q_1} \frac{\Delta Q}{\Delta Q} = \frac{\Delta q_1^{inside}}{\Delta q_1} = R_1.$$

So

$$R \geq R_1 > R^*.$$

Q.E.D.

“Aggregate diversion ratio”

- Extension to single product recapture rates

- Define the critical recapture rate R^* as:

$$R^* = \frac{\delta}{\delta + m}.$$

- Conjecture:

If $\min_i R_i \geq R^*$, then $R \geq R^*$ and so $L < CL$.

- Example

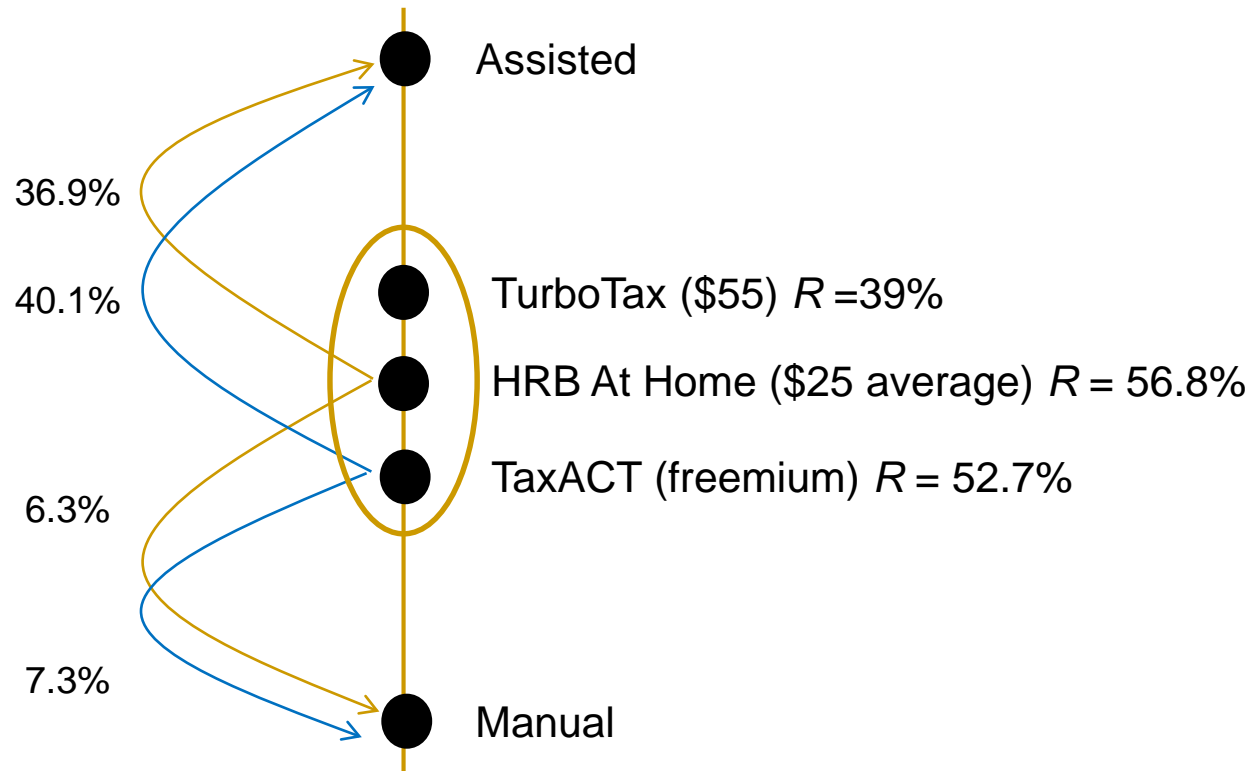
- Assume a three-product candidate market. Each product has a margin of 35%. Assume a uniform SSNIP of 5% across all products. Then $R^* = 12.5\%$. Suppose that the SSNIP generates the following recapture rates:

Product	q	Δq	Recapture	
			Units	Rate (R)
A	300	90	20	22.22%
B	400	125	40	32.00%
C	500	200	35	17.50%
Total	1200	415	95	22.89%

- Applying extension, since the smallest R_i (17.5%) is greater than R^* (12.5%), a hypothetical monopolist can profitably sustain a 5% uniform price and so the three products are a relevant market

“Aggregate diversion ratio”

- Warren-Bolton analysis in H&R Block/TaxACT



“Aggregate diversion ratio”

■ Warren-Bolton analysis in H&R Block/TaxACT

- Question: Is DDIY a market?
- Critical loss (CL): Use percentage critical loss formula
 - Starting point: Start with DDIY products (HRB, TaxACT, and TurboTax)
 - SSNIP (δ): 10%
 - Gross margin (m): 50% on each product

$$CL = \frac{\delta}{\delta + m} = \frac{10\%}{10\% + 50\%} = 16.7\%$$

- Actual loss: Use Aggregate diversion ratio method (recapture rate R)
 - Test: If $R \geq CL$, then product grouping is a market
 - Using IRS switching data as a proxy for R , Warrant-Bolton found:
 - HRB: $R = 57\%$
 - TaxACT: $R = 53\%$
 - TurboTax: $R = 39\%$
 - Warren-Bolton concluded that, since each $R > CL$, a hypothetical monopolist of the DDIY product could profitably raise price by a SSNIP and therefore DDIY was a relevant product market