

Supply Substitution and Market Definition: Lessons from *FTC v. RAG-Stiftung*

Randy Chugh, Andrew J. Ewalt, and Nicholas Hill

There is broad agreement—crystallized in the 2010 Horizontal Merger Guidelines—that product market definition focuses on identifying products that are substitutes from the perspective of customers. That is, product market definition focuses on demand substitution.¹ The FTC, however, relied on a supply substitution theory to define the relevant market in *FTC v. RAG-Stiftung*,² its recent challenge to the merger of Evonik and PeroxyChem, two North American manufacturers of hydrogen peroxide. Although the court concluded that the evidence presented at trial did not support the FTC’s approach and allowed the merger to close, it accepted the general proposition—also reflected in the Guidelines—that supply substitution can play a role in market definition in narrowly defined circumstances.

In this article, we explore the economic and legal underpinnings of the FTC’s use of supply substitution as part of its market definition analysis and discuss the implications of *RAG-Stiftung* for market definition in future cases. We conclude that while supply substitution is often relevant to identifying market participants and calculating market shares, there are only rare cases where it may be used in market definition. As illustrated in *RAG-Stiftung*, aggregating markets on the basis of supply substitution is allowable only as a matter of convenience and only when doing so does not alter the conclusion that would be reached if market definition was based on demand substitution alone.

Market Definition’s Demand-Side Rule and Supply-Side Exception

Market definition is the iterative process of identifying a set of products that is broad enough that customer substitution would not prevent a hypothetical monopolist from profitably raising prices by a small amount (often 5 percent). This is known as the “hypothetical monopolist test.” In other words, the crux of market definition is customer behavior, not producer behavior. Producer responses are taken into account in the process of identifying market participants (including potential entrants) and measuring market shares, but not during market definition. In this section, we discuss situations in which this crisp division blurs.

The 2010 Horizontal Merger Guidelines (the Guidelines) make clear that market definition focuses on demand substitution—that is, customer responses to price increases.³ The hypothetical

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¹ In this article, we focus on product market definition, but many of the same points raised here also apply to geographic market definition.

² *FTC v. RAG-Stiftung*, 436 F. Supp. 3d 278 (D.D.C. 2020).

³ See U.S. Dep’t of Justice & Fed. Trade Comm’n, Horizontal Merger Guidelines § 4 (2010) [hereinafter Guidelines] (“Market definition focuses solely on demand substitution factors, i.e., on customers’ ability and willingness to substitute away from one product to another in response to a price increase or a corresponding non-price change such as a reduction in product quality or service.”), <https://www.justice.gov/sites/default/files/atr/legacy/2010/08/19/hmg-2010.pdf>.

monopolist test asks if a monopolist of the products in a candidate market would profitably raise the price on at least one of those products by at least a small but significant and non-transitory amount. If the answer is “yes” (because few customers would switch to products outside of the candidate market in response to the price increase), then the products in the candidate market constitute a properly defined market. If the answer is “no” (because many customers would substitute to products outside of the candidate market), then the candidate market is defined too narrowly. The hypothetical monopolist test does not incorporate supplier responses.

The Guidelines also recognize that supply responses can influence market outcomes. In particular, market participants need not be limited to the set of firms that currently supply the market. If a price increase attempted post-merger would provide sufficient incentive for firms that do not currently produce the relevant product to rapidly enter the market without incurring significant sunk costs, then the Guidelines treat those firms as “rapid entrants” and count them as market participants.⁴ Rapid entrants are assigned market shares that reflect the extent of their future competitive significance, even if they do not currently make sales in the relevant market.⁵

To illustrate these demand and supply considerations, consider a stylized example in which consumers who eat gluten-free bread do not think that regular bread is a good alternative. In such a case, it would be profitable for a hypothetical monopolist of gluten-free bread to raise its price, and gluten-free bread would be a relevant antitrust product market. Now suppose there is a bakery that currently uses all of its ovens to produce regular bread but can easily and profitably satisfy the requirements of producing gluten-free bread in two of its ovens. Despite not currently producing gluten-free bread, this regular-bread bakery would be a participant in the market for gluten-free bread, and its market share would be calculated to reflect the output capacity of the two ovens that it could easily and profitably use to produce gluten-free bread.⁶

The Guidelines treat producers like the regular-bread bakery as rapid entrants only if they meet simple—but stringent—requirements. Specifically:

In markets for relatively homogeneous goods where a supplier's ability to compete depends predominantly on its costs and its capacity, and not on other factors such as experience or reputation in the relevant market, a supplier with efficient idle capacity, or readily available “swing” capacity currently used in adjacent markets that can *easily* and *profitably* be shifted to serve the relevant market, may be a rapid entrant.⁷

These criteria are grounded in sound economics. Shifting production capacity back and forth between products (i.e., “swinging”) must be easy because only then would an entrant be able to respond quickly enough to discipline potential price increases. If the regular-bread bakery needed to invest significant time and capital to meet the requirements for producing gluten-free bread

⁴ See Guidelines, *supra* note 3, § 5.1 (“Firms that are not current producers in a relevant market, but that would very likely provide rapid supply responses with direct competitive impact in the event of a SSNIP, without incurring significant sunk costs, are also considered market participants. These firms are termed ‘rapid entrants.’”).

⁵ See *id.* § 5.2 (explaining that the agencies “calculate market shares for other market participants if this can be done to reliably reflect their competitive significance”).

⁶ For example, suppose all bakeries’ output is limited by the number of ovens they have and all ovens have identical output capacity. If there are 4 gluten-free bakeries with 2 ovens each, there would be 5 market participants: the 4 gluten-free bakeries and the regular bakery. Market shares would be 20 percent for each of the 5 bakeries because each would compete in the gluten-free bread market with 2 ovens’ worth of capacity.

⁷ Guidelines, *supra* note 3, § 5.1 (emphasis added).

(e.g., meeting regulatory requirements and developing a tasty recipe that includes no gluten), then it would be unlikely to discipline attempts to raise the price of gluten-free bread.

Swinging must also be profitable, or an entrant would have no incentive to shift capacity into the production of the relevant product. For example, if the profit margins on gluten-free bread were lower than those for regular bread (even after a post-merger price increase), then the regular-bread bakery would not swing its production capacity into gluten-free bread and thus would not be a participant in the market for gluten-free bread.

While easy and profitable swinging are enough to count rapid entrants as market participants, supply substitution still cannot play a role in market definition unless a third criterion is also met. The Guidelines state that the agencies consider using “an aggregate description of markets for those products as a matter of convenience” only if such swinging is also “*nearly universal* among the firms selling one or more of a group of products.”⁸

Another bakery example illustrates the concept. Suppose that there are only two bakeries in the relevant geographic market. Suppose further that both have equal production capacity and that they propose to merge. One bakery currently produces only regular bread and the other produces only gluten-free bread, but each could easily and profitably repurpose all of its capacity to produce the other kind of bread if the price of that other kind of bread increased. In this case, because each bakery’s share is the same in both markets, describing a single market for all bread would be more convenient than analyzing separate markets for regular and gluten-free bread. Crucially, the aggregation of the two separate markets is permissible only because competitive conditions are the same in both markets and so aggregating them is convenient and sacrifices no analytical precision.

On the other hand, aggregating two markets would not be appropriate if swinging is not nearly universal, as we can see by changing just one feature of the previous example. Instead of both bakeries being capable of easily and profitably swinging capacity to make either kind of bread, suppose that the gluten-free bakery can easily and profitably swing all of its capacity into making regular bread, but the regular-bread bakery cannot swing any of its capacity into making gluten-free bread. In this case, each bakery would have a 50 percent share of the regular-bread market, but the gluten-free bakery would have a 100 percent share of the gluten-free market. Collapsing the separate markets for regular and gluten-free bread into a single, aggregated all-bread market would, in these circumstances, give a distorted picture of market concentration and competition.

To summarize, market definition is focused on demand substitution. In rare cases—i.e., when nearly all suppliers can easily and profitably swing production capacity between different products—it is permissible to describe a single market encompassing all of those products. But such aggregation is appropriate only when competitive conditions are substantively the same for each product (e.g., similar concentration levels, market shares, competitive dynamics, and entry conditions). Further, one can always analyze the products separately if so desired—using an aggregate market is purely for convenience.

Supply-Side Precedents

While occasionally recognizing that supply substitution can be part of the market definition process, courts almost always emphasize demand considerations when articulating standards for

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⁸ *Id.* § 5.1 n.8 (emphasis added).

market definition. In the frequently cited formulation from *Du Pont*,⁹ the Supreme Court focused exclusively on demand substitution and ignored supply substitution altogether, explaining that, “[i]n considering what is the relevant market for determining the control of price and competition, no more definite rule can be declared than that commodities reasonably interchangeable by consumers for the same purposes make up that part of the trade or commerce.”¹⁰ Reiterating that standard in *Brown Shoe*,¹¹ the Court stated that “[t]he 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.”¹²

But the Court has also indicated that supply substitution can be relevant in defining markets. Indeed, in the footnote immediately following *Brown Shoe*’s articulation of the “reasonable interchangeability” standard, the Court recognized that the “cross-elasticity of production facilities may also be an important factor in defining a product market.”¹³ More recently, the Court noted that “the relevant market is defined as the area of effective competition” and then went on to explain that “[t]ypically this is the arena within which significant substitution in consumption or production occurs.”¹⁴

Despite these stray references to supply substitution, we are aware of only one Supreme Court decision in which analysis of supply substitution influenced the result. In *Columbia Steel*,¹⁵ the government argued for a relevant market limited to steel “plates and shapes,” while the defendant asserted that it ought to include all “rolled steel products.” To resolve that dispute, the Court questioned “[i]f rolled steel producers can make other products as easily as plates and shapes” because, if they could, then the relevant market could not be one for “plates and shapes alone, but for all comparable rolled products.”¹⁶ With the record suggesting that “rolled steel producers can make other products interchangeably with shapes and plates,” the Court concluded that the relevant market should include all rolled steel products.¹⁷ The Supreme Court has not again relied on supply substitution in defining a market in the 70 years since *Columbia Steel*.

Lower courts have occasionally considered supply substitution in defining markets, but the handful of examples of which we are aware were all decided at least 25 years ago. For example, *FTC v. Illinois Cereal Mills, Inc.*¹⁸ involved a merger of industrial dry corn mills that produced a range of “prime” products (including grits, cornmeal, and corn flour) that customers did not consider to be substitutes for each other.¹⁹ Despite the lack of demand substitution, the district court defined a single relevant product market of “all prime products for food use produced by industrial dry corn mills” because “[e]vidence presented by the Commission show[ed] that industrial dry corn mills possess the ability to configure their operations to produce all prime products used by

⁹ *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377 (1956).

¹⁰ *Id.* at 395 (internal quotation marks omitted).

¹¹ *Brown Shoe Co. v. United States*, 370 U.S. 294 (1962).

¹² *Id.* at 325.

¹³ *Id.* at 325 n.42.

¹⁴ *Ohio v. Am. Express Co.*, 138 S. Ct. 2274, 2285 (2018) (internal quotation marks and citation omitted).

¹⁵ *United States v. Columbia Steel Co.*, 334 U.S. 495, 508–09 (1948).

¹⁶ *Id.* at 510.

¹⁷ *Id.* at 510–11.

¹⁸ *FTC v. Illinois Cereal Mills, Inc.*, 691 F. Supp. 1131 (N.D. Ill. 1988), *aff’d sub nom. FTC v. Elders Grain, Inc.*, 868 F.2d 901 (7th Cir. 1989).

¹⁹ *Id.* at 1135–36.

food processors.”²⁰ Similarly, in *Rebel Oil Co. v. Atlantic Richfield Co.*,²¹ the Ninth Circuit defined a relevant product market including both full-serve and self-serve sales of gasoline because “sellers of full-serve gasoline can easily convert their full-serve pumps, at virtually no cost, into self-serve, cash-only pumps.”²² Finally, in *Virtual Maintenance, Inc. v. Prime Computer, Inc.*,²³ the Sixth Circuit once stated that “[d]efining a market . . . on the basis of demand considerations alone is erroneous because such an approach fails to consider the supply side of the market,”²⁴ but that opinion was subsequently vacated by the Supreme Court on other grounds.²⁵

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*FTC v. RAG-Stiftung*²⁶ was the first time in 25 years that a court evaluated whether it was appropriate to use supply substitution to define a relevant product market and the first time that the Guidelines’ supply substitution requirements had ever been applied in litigation.

The Hydrogen Peroxide Industry. In *RAG-Stiftung*, the FTC challenged the proposed merger of Evonik and PeroxyChem, two North American manufacturers of hydrogen peroxide and other chemicals. Hydrogen peroxide is a multi-purpose, environmentally friendly chemical that breaks down into water and oxygen. Historically, its main use was as a bleaching agent for the pulp and paper and textile industries, but the number of uses for—and consequently varieties of—hydrogen peroxide has grown significantly in recent years. Today, its uses include chemical manufacturing, mining, oil and gas extraction, food packaging, and semiconductor fabrication. Prior to the merger, there were five producers of hydrogen peroxide in North America: Evonik, PeroxyChem, Arkema, Nouryon, and Solvay.²⁷

Hydrogen peroxide products made by different producers but formulated for the same *end use* typically are interchangeable, but products formulated for different end uses typically are not. For example, Evonik’s pulp bleaching product could be easily substituted for PeroxyChem’s, but hydrogen peroxide formulated for pulp bleaching cannot be used in place of hydrogen peroxide formulated for food packaging. Not all firms make products suitable for all end uses. For example, prior to the merger, PeroxyChem sold a product for use in aseptic packaging, but Evonik lacked the necessary regulatory approvals to sell an aseptic packaging product in the United States.

In addition to being sorted by end use, hydrogen peroxide products can also be classified into *grades* according to purity. *Standard grade* products are the least purified, the cheapest, and the least technologically challenging to produce. All firms in the industry make standard grade hydrogen peroxide, which is most commonly used for bleaching pulp and paper.

Specialty grade products are purified using filtration or distillation techniques to remove contaminants and may also have various regulatory certifications. All firms make some specialty

²⁰ *Id.* at 1141.

²¹ *Rebel Oil Co. v. Atlantic Richfield Co.*, 51 F.3d 1421 (9th Cir. 1995).

²² *Id.* at 1436.

²³ *Virtual Maintenance, Inc. v. Prime Computer, Inc.*, 957 F.2d 1318 (6th Cir. 1992).

²⁴ *Id.* at 1327.

²⁵ *Virtual Maint., Inc. v. Prime Computer, Inc.*, 506 U.S. 910 (1992). On remand, the Sixth Circuit quoted the statement from its earlier (later vacated) opinion about the importance of supply-side considerations, but it did so only to provide context and did not employ a supply-side approach to market definition in deciding the case. *See Virtual Maint., Inc. v. Prime Computer, Inc.*, 11 F.3d 660, 664–66 (6th Cir. 1993).

²⁶ 436 F. Supp. 3d 278 (D.D.C. 2020).

²⁷ Following the merger, there are still 5 producers, because the parties agreed to divest one of PeroxyChem’s plants to United Initiators, another chemical company that was not manufacturing hydrogen peroxide in North America at the time of the merger.

hydrogen peroxide products, but the mix of application-specific formulations varies substantially across firms. *Pre-electronics grade* hydrogen peroxide is more highly purified than specialty grade (with impurities measured in parts per billion). Only Evonik and Arkema sell pre-electronics grade, and they sell almost exclusively to MGC, which refines it further still. Finally, *electronics grade* is the purest hydrogen peroxide product (with impurities measured in parts per trillion). MGC, PeroxyChem, and Solvay sell electronics grade to semiconductor manufacturers for use in cleaning silicon wafers.

The FTC's Market Definition Theory. In November 2018, Evonik agreed to acquire PeroxyChem for \$625 million. Following a nine-month investigation, the FTC initiated administrative proceedings to block the merger and filed a complaint in the U.S. District Court for the District of Columbia seeking a preliminary injunction to prevent the parties from closing the transaction before the conclusion of the administrative proceedings.²⁸

In the complaint, the FTC alleged that non-electronics hydrogen peroxide was a relevant product market. That alleged market included standard, specialty, and pre-electronics grades of hydrogen peroxide, but it excluded electronics grade. According to the complaint, non-electronics hydrogen peroxide products constituted a relevant market because hydrogen peroxide purchasers “could not realistically switch to other chemicals in the face of a” SSNIP.²⁹ The complaint did not, however, address whether consumers of particular grades or end uses considered other grades or end uses to be reasonable substitutes. The complaint was also silent about how other hydrogen peroxide producers would respond if the merged firm attempted to raise prices.

The Court Rejects the FTC's Supply-Side Approach to Market Definition. At the evidentiary hearing on its motion for a preliminary injunction, the FTC tried to rely on the Guidelines' approach to incorporating supply considerations into market definition. Over the course of the two-week hearing, the FTC and the merging parties presented hundreds of exhibits and testimony from company executives, customers, competitors, and economic experts. The parties contested many issues—including product market definition, geographic market definition, and competitive effects (both coordinated and unilateral)—but Judge Timothy J. Kelly “agree[d] with Defendants that the FTC ha[d] not met its burden of establishing its prima facie case because it ha[d] not identified a relevant market within which to analyze the merger's possible anticompetitive effects” and emphasized that “[t]hat failure begins and ends with the FTC's theory of supply-side substitution.”³⁰

While appreciating that the FTC's theory was “a substantial departure from the typical way in which a product market is defined”³¹ and “an exception to th[e] general rule” that market definition focuses on demand substitution factors,³² Judge Kelly did not hold that a relevant market could never be defined based on supply substitution. On the contrary, he accepted the Guidelines' three-part inquiry into whether supply substitution is (1) nearly universal, (2) easy, and (3) profitable.³³ He then concluded that “the FTC has failed to meet its burden of showing that supply-side

²⁸ See Complaint for Temporary Restraining Order and Preliminary Injunction Pursuant to Section 13(b) of the Federal Trade Commission Act, *FTC v. RAG-Stiftung*, No. 1:19-cv-02337 (D.D.C. Aug. 2, 2019) [hereinafter *Complaint*].

²⁹ *Id.* ¶ 26.

³⁰ *RAG-Stiftung*, 436 F. Supp. 3d at 292.

³¹ *Id.*

³² *Id.* at 293.

³³ *Id.* at 293–94.

substitution across [standard grade, specialty grade, and pre-electronics grade] meets any of the three requirements.”³⁴

NEARLY UNIVERSAL. Judge Kelly gave three reasons for concluding that supply substitution was not nearly universal. First, he found that “three of the five North American suppliers of hydrogen peroxide do not, at present, swing to the production of *pre-electronics grade* hydrogen peroxide” and that “[s]winging is not nearly universal between grades of hydrogen peroxide where a majority of suppliers do not swing into one of the three grades.”³⁵ Second, Judge Kelly observed that many specialty-grade hydrogen products (including those used for aseptic packaging, some chemical synthesis, biocides, medical sterilization, contact lens solution, and rocket propulsion) are not sold by many suppliers, and faulted the FTC for not providing evidence “that shows the portion of the specialty grade market to which suppliers actually do swing.”³⁶ Finally, Judge Kelly noted that the long-run trend of firms moving away from low-margin standard grade products toward high-margin specialty products was not evidence of the kind of supply-side substitution relevant for market definition. According to Judge Kelly, defendants’ economic expert, “persuasively testified that a supplier’s . . . ‘strategic decision to sell more of one of its products and less of another . . . in one direction’—is not swinging under the Guidelines.” and that the Guidelines intend for “swinging” to refer to firms that “‘move back and forth producing those products’—like a swing.”³⁷

EASY. The evidence presented at trial revealed that, while swinging from specialty grade to standard grade may be easy for some manufacturers, swinging in the other direction is significantly constrained. Technological constraints limit how much standard-grade capacity could swing into the production of specialty-grade or pre-electronics-grade products and make it difficult for suppliers to swing all of their capacity across grades, though it does “not necessarily stop suppliers from constraining prices across grades” entirely.³⁸ Swinging into pre-electronics grade is especially difficult because it requires additional equipment, training, and technological know-how. Judge Kelly found that it would not be easy for even PeroxyChem and Solvay to start selling pre-electronics grade, even though they already sell more highly purified electronics grade.³⁹

PROFITABLE. On average, suppliers’ margins are highest for pre-electronics grade, followed by specialty grade, and then by standard grade. Based on that evidence, Judge Kelly found that “suppliers’ average profits increase so much up-grade that even if the price of standard grade or specialty grade increased by five or even ten percent, suppliers are unlikely to switch production down-grade from specialty or pre-electronics grade hydrogen peroxide.”⁴⁰ He also rejected the FTC’s reliance on data showing that margins on *some* standard-grade and specialty-grade products are higher than margins on higher-grade products because “if suppliers wanted to produce more higher-margin standard or specialty grade products, they would not do so by swinging down-grade from their profitable stock of specialty and pre-electronics grade hydrogen peroxide,” but instead by trying “to convert their existing stock of lower-margin standard and specialty grade

³⁴ *Id.* at 294.

³⁵ *Id.* (emphasis added).

³⁶ *Id.* at 295.

³⁷ *Id.* Nicholas Hill, one of the authors of this article, was the defendants’ economic expert.

³⁸ *Id.* at 296.

³⁹ *Id.* at 297.

⁴⁰ *Id.* at 298.

hydrogen peroxide to higher-margin products.”⁴¹ Although swinging up-grade would have been profitable, Judge Kelly found that doing so would not be easy and that “all three swinging requirements must be met to aggregate grades of hydrogen peroxide in a relevant product market.”⁴²

Conclusion

After a 25-year absence from merger litigation, supply substitution played a prominent role in *RAG-Stiftung*. Despite rejecting the FTC’s use of supply substitution to define the relevant product market in that case, Judge Kelly’s opinion embraced the Guidelines’ framework for determining when it is appropriate for supply substitution to play a role in market definition.

The court’s opinion makes clear that it is appropriate to include products that are not demand substitutes in the same relevant market only if nearly all suppliers can easily and profitably swing production capacity among those products. When that kind of swinging is nearly universal, an aggregate description of the relevant market can be appropriate and convenient because competitive conditions are the same in the aggregated market as they would be if each product was analyzed as a separate market. On the other hand, when suppliers have differing abilities or incentives to swing capacity among products—as was the case in the hydrogen peroxide industry—then an aggregate description of the market will result in misleading market shares and incorrect conclusions about competitive effects. By discussing these issues in great detail, and in a complete and rigorous framework, *RAG-Stiftung* fills an important gap in antitrust jurisprudence and will surely become a key precedent on the role of supply substitution in market definition. ●

⁴¹ *Id.* at 299.

⁴² *Id.*