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ABSTRACT

The increasing importance of innovation competition requires adjusting the definition of an antitrust market. The article considers how technological change affects the economic definition of a market. The article examines both the 2023 Department of Justice and Federal Trade Commission Merger Guidelines and the 2024 European Commission Notice on the definition of a relevant market. The article explains that the 2023 Guidelines' proposed market definition using worsening of innovation is misguided. The article presents a comprehensive approach to the economic definition of a market and examines some of the effects of innovation. The article argues that antitrust market definition should address innovation and technological change.

L'importance croissante de la concurrence par l'innovation nécessite d'adapter la définition d'un marché en droit de la concurrence. Cet article s'intéresse à la manière dont les évolutions technologiques influencent la définition économique d'un marché. Il examine à la fois les lignes directrices sur les concentrations publiées en 2023 par le Département de la Justice et la Commission fédérale du commerce des États-Unis, ainsi que l'avis de la Commission européenne de 2024 sur la définition du marché pertinent. L'article explique que la définition de marché proposée par les lignes directrices de 2023, basée sur une détérioration de l'innovation, est erronée. Il propose une approche plus complète de la définition économique d'un marché et analyse certains des effets de l'innovation. L'article soutient que la définition des marchés en droit de la concurrence doit prendre en compte l'innovation et les évolutions technologiques.

I. Introduction

1. The definition of an antitrust market informs public policy toward competition, monopolization, market power, and mergers. Antitrust market definition is helpful for understanding competition in the market and competition for the market. Antitrust market definitions fall short, however, when they assume stationary technology and price competition. This is likely to bias the definition of an antitrust market and adversely affect antitrust policy. In this article, I argue that the definition of an antitrust market should address innovation and technological change.

2. Antitrust market definition should recognize the interplay between innovation and the extent of the market. Innovation tends to increase the extent of a market, as the present discussion explains. In turn, an increase in the extent of a market can provide incentives to innovate.[1] Innovation and the extent of the market are jointly determined because they result from strategic decisions by firms. This suggests that antitrust policy should not presume that market structure determines innovation.

3. Antitrust policy often requires a market definition, also referred to as the "relevant market." Ideally, the definition of an antitrust market is founded on the economic definition of a market. The definition of an antitrust market highlights those aspects of the economic definition of a market that are relevant to antitrust policy. An antitrust market definition helps policymakers determine whether firms have engaged in anticompetitive conduct and evaluate how firm conduct affects consumer welfare and economic efficiency.

4. I begin by considering how innovation affects the definition of an antitrust market in the U.S. Department of Justice (DOJ) and the Federal Trade Commission (FTC) 2023 Merger Guidelines (Guidelines).[2] The Guidelines propose that an antitrust market can be defined by a worsening of contract terms due to reduced innovation. I find that the Guidelines' proposed market definition based on reduction of innovation is misguided.

1 *See* Schmookler (1959), Schmookler (1962), Spulber (2008a), Spulber (2010a), and Vives (2008).

2 U.S. Department of Justice (DOJ) and the Federal Trade Commission (FTC), Merger Guidelines, December 18, 2023, at 40, https://www.justice.gov/d9/2023-12/2023%20Merger%20Guidelines.pdf.

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5. I also consider how the European Commission's (EC) 2024 Commission Notice on the definition of the relevant market (EC Notice) considers innovation.[3] I point out that the EC Notice emphasizes the effects of market concentration on incentives to innovate.

6. I then present a comprehensive approach to the economic definition of a market. I show that the economic definition of a market has five main features.[4] First, an economic market consists of products, locations, and time frames. Second, an economic market has sides, including participants on the demand side and the supply side, as well as suppliers and distributors. Third, an economic market has intermediaries and market mechanisms that bring buyers and sellers together. Fourth, an economic market has technologies that handle transactions. Fifth, an economic market has coordination mechanisms that provide incentives for participation of buyers and sellers.

7. I examine next how innovation and technological change affect the economic definition of a market. Consideration of innovation is critical because a market definition with static technology will generate policy errors. Ignoring innovation can result in misclassification of competitive conduct. This can lead policymakers to classify vigorous innovation competition as anticompetitive conduct and to classify harmful anticompetitive activities as competitive conduct. Antitrust market definition without consideration of technological change may lead to policies that discourage innovation.

II. U.S. antitrust policy toward market definition and innovation

8. The 2023 DOJ-FTC Merger Guidelines address antitrust market definition at some length. The purpose of market definition in the Guidelines is to evaluate the effects of a merger on competition.[5] In this section, I examine how the Guidelines consider the role of innovation in market definition.

9. The Guidelines define markets in terms of location in geographic and product space: "*A relevant antitrust market is an area of effective competition, comprising both product (or service) and geographic elements*."[6] The Guidelines emphasize elasticity of demand: "*The outer boundaries of a relevant product market are determined by the 'reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it.'*"[7]

10. The Guidelines recognize the importance of innovation competition: "*Firms can compete for customers by offering varied and innovative products and features, which could range from minor improvements to the introduction of a new product category. Features can include new or different product attributes, services offered along with a product, or higher-quality services standing alone.*"[8]

11. The Guidelines consider product innovation: "*Customers value the variety of products or services that competition generates, including having a variety of locations at which they can shop.*"[9] The Guidelines also take note of innovation in production processes and distribution: "*Innovation may be directed at outcomes beyond product features; for example, innovation may be directed at reducing costs or adopting new technology for the distribution of products.*"[10]

12. The Guidelines maintain that concentration in market structure affects incentives to innovate: "*The merged firm may have a reduced incentive to continue or initiate development of new products that would have competed with the other merging party, but post-merger would 'cannibalize' what would be its own sales*."[11] The Guidelines extend this concern to small firms: "*Where firms are two of a small number of companies with specialized employees, development facilities, intellectual property, or research projects in a particular area, competition between them will have a greater impact on their incentives to innovate*."[12]

13. The Guidelines include innovation competition in the definition of an antitrust market. The Guidelines state: "*When considering harm to competition in innovation, market definition may follow the same approaches that are used to analyze other dimensions of competition. In the case where a merger may substantially lessen competition by decreasing incentives to innovate, the Agencies may define relevant antitrust markets around the products that would result from that innovation if successful, even if those products do not yet exist*."[13] The Guidelines further observe: "*In some cases, the Agencies may analyze different relevant markets when considering innovation than when considering other dimensions of competition*."[14]

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3 Communication from the Commission, Commission Notice on the definition of the relevant market for the purposes of Union competition law, C/2024/1645, February 22, 2024, para. 6, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202401645.

4 I draw on my definition of a market in the context of digital platforms, Spulber (2019).

5 Guidelines, *supra* note 2, at 39 ("*The Agencies engage in a market definition inquiry in order to identify whether there is any line of commerce or section of the country in which the merger may substantially lessen competition or tend to create a monopoly*").

6 Ibid. at 40.

7 Ibid., quoting *Brown Shoe Co. v. U.S.*, 370 U.S. 294, 325 (1962).

8 Ibid. at 39.

9 Ibid.

10 Ibid.

11 Ibid.

12 Ibid.

13 Ibid. at 48.

14 Ibid.

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14. The Guidelines apply incentives to innovate in the definition of an antitrust market. The Guidelines consider the hypothetical monopolist test (HMT) based on "*a small but significant and non-transitory increase in price ('SSNIP') or other worsening of terms ('SSNIPT') for at least one product in the group*."[15] According to the 2023 Merger Guidelines, the "worsening of terms" could include "*quality, service, capacity investment, choice of product variety or features, or innovative effort*."[16] I will argue subsequently that the "worsening of terms" approach is not helpful for determining the effect of innovation on the definition of an antitrust market.

III. EU antitrust policy toward market definition and innovation

15. In this section, I examine the role of innovation in the EU antitrust market definition. According to the EC, "[t]*he main purpose of market definition is to identify in a systematic way the effective and immediate competitive constraints faced by the* [firms] *involved when they offer particular products in a particular area*."[17] The EC states that "[m]*arket definition leads to the identification of the relevant competitors of the* [firm]*(s) involved when they offer those products, as well as the relevant customers*."[18] The EC adds that "[o]*nly products that exert effective and immediate competitive constraints within the relevant timeframe form part of the same relevant market as those of the* [firm]*(s) involved, while other less effective, or merely potential, constraints are considered as part of the competitive assessment*."[19]

16. The EC's market definition policy addresses technological change: "*In rapidly evolving industries, especially those characterised by fast technological progress (e.g. in the digital sector), the introduction of new or newly developed products or processes, as well as technological or regulatory changes may lead to structural market transitions, which affect existing competitive dynamics and the general reactions to relative supply conditions. In such cases, the Commission may take into account the expected changes in substitution possibilities resulting from the change in competitive dynamics* (. . .)." [20]

17. The EC observes: "*Innovation is often a key parameter of competition. The Commission takes into account the specificities of highly innovative industries characterised by frequent and significant research and development ('R&D'). These specificities, which may be present in any industry sector, are usually taken into account at the stage of the competitive assessment but may also be relevant for market definition*." [21]

18. The EC considers the relationship between innovative effort and outcomes: "*Given that the outcome of innovation efforts in terms of final products can be uncertain, the Commission may factor in various potential outcomes of R&D processes in its assessment*."[22] The EC suggests the need to predict product substitution: "*The intended use of the pipeline product and its projected substitutability with other products play a particular role in defining the relevant market*."[23]

19. The EC considers early stages of R&D as part of market definition but concedes that "*the fact that such early innovation efforts do not immediately translate into tradeable products may render it difficult to identify a relevant product market in the strict sense*."[24] In evaluating potential innovation competition, the EC suggests considering "*factors such as the nature and scope of the innovation efforts, the objectives of the different lines of research, the specialisation of the different teams involved or the results of the undertaking's past innovation efforts*."[25]

IV. The effects of innovation on economic market definition

20. To better understand the relationship between antitrust market definition and innovation, it is helpful to examine the economic definition of a market. In this section, I present a comprehensive analysis of the economic definition of a market. I consider how innovation and technological change affect the economic definition of a market. I observe that technological change tends to increase the extent of markets.

15 Ibid. at 41–42. *See FTC v. Penn State Hershey Med. Center*, 838 F.3d 327, 338 (3d Cir. 2016).

16 Guidelines, *supra* note 2, at 42.

17 For clarity, I have replaced the term "undertaking" with "firm" here and elsewhere. EC Notice, *supra* note 3, at 4.

18 Ibid.

19 Ibid. The EC "*generally uses market definition where there is a need to assess the relative competitive strength of* [firms] *as part of the competitive assessment and, most notably, to assess whether* [a firm] *holds market power*."

20 Ibid. at 19.

21 Ibid. at 28.

22 Ibid.

23 Ibid. at 29.

24 Ibid.

25 Ibid.

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1. Products, locations, and time frames

21. Advances in transportation increased the extent of markets for many types of products. Technological change in transportation lowered the costs of delivering products, allowing sellers to reach buyers in wider geographic areas. The development of rail, trucks, container ships, aircraft, intermodal shipping, and logistics expanded transactions to regional, national, and global markets. David Hummels observes: "*One prominent possible explanation for the rise in international trade is a decline in international transportation costs*."[26]

22. Advances in transportation made possible the commercial revolution in the mid-19th century with the emergence of mass distribution, department stores, and retail chains.[27] Technological change in both transportation and manufacturing made feasible mass production, managerial enterprises, and mass marketing.[28] Technological advances in travel allowed buyers and sellers to transact at greater distances. These developments allowed companies to serve wider geographic areas.

23. Technological advances in communications such as the telegraph, telephone, radio, television, the Internet, and mobile communications lowered transaction costs. Advances in digital technology lowered the cost of search, replication, transportation, tracking, and verification.[29] Improvements in communication and decreases in transaction costs expanded the geographic extent of markets. The development of e-commerce allowed consumers and firms to do business online, further reducing transaction costs and expanding the extent of markets.

24. The economics of monopolistic competition defined markets in terms of firms that supply differentiated products. Edward Chamberlin considered firms that derive market power from differentiated products but compete by entering the market.[30] Harold Hotelling identified differentiated products as locations in the space of products, so that markets can be defined as areas in the space of products.[31] Kelvin Lancaster described differentiated products as combinations of attributes such as quality, durability, form, design, and many other quantitative and qualitative characteristics.[32] These developments influenced antitrust market definition.[33]

26 Hummels (2007) at 131.

27 Chandler (1977).

28 Ibid.; Chandler (1990).

29 Goldfarb and Tucker (2019).

30 Chamberlin (1933), Chamberlin (1951), Chamberlin (1961), and Robinson (1933).

31 Hotelling (1929).

32 Lancaster (1979).

33 Werden (1992) at 123.

25. Building on the economics of monopolistic competition, the study of industrial organization further extended the analysis of competition to product differentiation.[34] Differentiated products can be in the same market when they are substitutes for buyers. The definition of an economic market then refers to a collection of substitute products.

26. Product innovation affects the economic definition of a market by adding to a collection of substitute products. Incumbent firms and new entrants increase the extent of the market by introducing new products. Product innovation increases the extent of the market by expanding product variety and adding combinations of features.[35] Innovative competition involves both the introduction and removal of products. As Joseph Schumpeter observed: "*This process of Creative Destruction is the essential fact about capitalism*."[36]

27. Alfred Marshall includes time in the market definition of a market: "[M]*arkets vary with regard to the period of time which is allowed to the forces of demand and supply to bring themselves into equilibrium with one another, as well as with regard to the area over which they extend*."[37] Marshall identifies short, intermediate, and long time periods in which a market attains equilibrium, corresponding respectively to variation in inventories, production, and investment. The time frame associated with adjustment to specific innovations can depend on the rate at which the innovations are provided and adopted.

28. Innovation in transaction methods affects the time frame of a market. Advances in information and communications technology (ICT) increase the speed of market clearing. For example, organized exchanges for securities and other financial assets have nearly instantaneous price adjustment. E-commerce increases the speed of transactions and leads to faster price adjustment in product markets.[38]

2. The sides of a market

29. The sides of a market are groups of consumers on the demand side and groups of firms on the supply side. The sides of a market can include various groups of distributors, input suppliers, and service providers that form part of the market's value chains.[39] Innovation can expand the demand and supply sides of a market by lowering the costs of transactions, communication, travel, and transportation. Lowering these costs allows greater numbers of consumers and firms to participate in a market.

34 Carlton and Perloff (2005).

35 Lancaster (1966).

36 Schumpeter (1942) at 83.

37 Marshall (1920) at 192.

38 Jo et al. (2022).

39 Antràs and Chor (2022).

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30. The economic definition of a market includes the demand decisions of individual consumers. In characterizing markets, economic analysis may examine the total of individual demands in a particular market. There has been considerable empirical analysis of market demand. Economists have studied the market demand for differentiated products.[40] Economists have examined the demand for new products.[41]

31. The economic definition of a market also includes the supply decisions of individual firms. In a perfectly competitive market, the supply decisions of price-taking firms can be combined to obtain a market supply function. Economists have estimated the supply of differentiated products.[42] Innovative products and production processes increase the extent of the market by allowing the expansion of incumbent firms or the entry of new firms.

32. Antitrust policy often considers a market from the perspective of an individual firm. Generally, this approach should be distinguished from the overall economic definition of a market. The definition of an individual firm's market consists of its customers' demand for its product. The firm's demand is affected by substitute products offered by its competitors. The firm's residual demand accounts for the supply reactions of its competitors.[43] The firm's own-price and cross-price elasticities of demand provide a measure of the degree of substitution for its product.[44] Elasticity of the firm's demand can serve as an indicator of the firm's market power.

3. Intermediaries and market mechanisms

33. The economic definition of a market should include intermediaries. This is because specialized intermediaries establish and operate practically all markets.[45] Intermediaries include retailers, wholesalers, and financial institutions. Intermediaries bring buyers and sellers together by acting as dealers that buy and sell products and as brokers that match buyers and sellers. Intermediaries adjust prices and engage in competition with other intermediaries.

34. Advances in e-commerce and the automation of business decisions and transactions have generated what I have termed "The Business Revolution."[46] E-commerce has generated a vast number of intermediaries that operate digital platforms.[47] Intermediaries with digital platforms benefit from significant economies of scale and network effects. Innovations including the Internet, mobile communications, and e-commerce software have greatly increased the extent of markets by improving the efficiency of intermediaries.

35. Intermediary firms make strategic decisions regarding what types of markets to establish and how to operate those markets.[48] For this reason, public policymakers should not treat markets as external phenomena. The economic definition of a market should recognize that the characteristics of markets are endogenous—that is, they result from economic decisions and competition. This means that the structure-conduct-performance approach should not be applied to markets.

4. Transaction technologies

36. Transaction technologies are a critical feature of the economic definition of markets. Transaction technologies refer to the transaction methods that match buyers and sellers, determine the terms of exchange, and adjust prices. Transaction technologies include bilateral bargaining, auctions, and pricing mechanisms in organized exchanges. Intermediaries provide transaction technologies and apply them to operate marketplaces.

37. The Business Revolution that I describe elsewhere involves automation in retail, wholesale, and financial transactions.[49] This automation improves the productivity of labor in creating transactions and increases the efficiency of transactions. By lowering transaction costs, the Business Revolution increases the extent of markets, involving more buyers and sellers. The Business Revolution includes digital platforms that have allowed the establishment of new types of digital markets, such as ridesharing, travel rentals, manufacturing services, used products, and craft goods. The Business Revolution has created new forms of communication, such as the various types of social media that reach vast numbers of participants.

5. Coordination mechanisms

38. Coordination mechanisms are part of the economic definition of a market. This is because the existence of a market depends on the participation decisions of buyers and sellers. The extent of participation affects the efficiency of the market. Markets with extensive participation are said to be thick, and markets with less participation are thin. In financial markets, greater participation improves market liquidity because having more market participants increases the likelihood of finding trading partners.[50]

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40 Rosen (1974), Berry et al. (1995), Bajari and Benkard (2005).

41 Petrin (2002).

42 Feenstra (1994), Broda and Weinstein (2006), Soderbery (2015).

43 Baker and Bresnahan (1988).

44 *See* Lerner's (1934) discussion of "*the principle of substitutability at the margin*" at 167. *See also* Mason (1939) at 69 (a seller's "*market includes all buyers and sellers, of whatever product, whose action he considers to influence his volume of sales*.")

45 Spulber (1996), Spulber (1999). Lucking-Reiley and Spulber (2001).

46 Spulber (2011).

47 Spulber (2019).

48 Spulber (2009).

49 Spulber (2011).

50 Lippman and J. McCall (1986).

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39. A market exhibits network effects when individuals benefit from the participation of others.[51] In two-sided markets, buyers can benefit from seller participation and sellers can benefit from buyer participation. This creates a coordination problem in markets with network effects. This problem can be solved by communication among market participants and industry organizations.[52] Intermediaries can address the coordination problem by marketing and by offering incentives such as first-party content.[53] Advances in communication and e-commerce help intermediaries address the coordination problem, thus increasing the extent of markets.

V. Interaction between innovation competition and the extent of the market

40. The previous section showed how technological change can increase the extent of markets. In this section, I consider briefly how market definition interacts with innovation competition.

41. The economics of industrial organization shows that competitive conduct is the result of firms' strategic decisions. Firms affect the characteristics of a market through their choices of competitive strategies, including pricing, investment, and entry decisions. This means that there is interaction between the characteristics of a market and the competitive strategies of firms. The causation implied by the structure-conduct-performance approach does not hold in most markets.

42. Just as market structure need not predict pricing decisions, so market structure need not predict innovation decisions. There is little empirical evidence that market structure can be used to predict innovation.[54] Innovation differs from pricing decisions so that using market structure to predict innovation is even more problematic that predicting prices. Innovation involves uncertainty in R&D and difficulties in introducing new products, production processes, or transaction methods. When there are markets for technology, competition among adopters can provide incentives to invest in R&D.[55] When vertically integrated firms invest in cost-reducing innovation, competition that decreases output can reduce incentives to innovate.[56]

51 Doganoglu and Grzybowski (2007).

52 Spulber (2008b).

53 Spulber (2010b), Hagiu and Spulber (2013).

54 Cohen (2010).

55 Spulber (2013a), Spulber (2013b).

56 Vives (2008).

43. Antitrust market definition should recognize that incumbent firms frequently compete through innovation. Firms also compete for the market through innovation, with innovative entrepreneurs challenging incumbents.[57] Antitrust market definition should account for entrepreneurship and the entry and exit of new types of firms.[58]

44. The 2023 Merger Guidelines take the view that concentration diminishes incentives to innovate. I observe elsewhere that "*antitrust merger policy should not simply consider the effects of mergers on market shares or investment in R&D. Antitrust policy should apply economic models that consider how mergers affect innovation competition and technological change*."[59]

45. Antitrust policy should allow innovation to be a part of a merger's efficiency defense. A merged firm may innovate more than the separate firms because it combines complementary capabilities or realizes economies of scale in R&D.[60] The merged firm may have incentives to expand its product variety, improve production efficiencies, or reduce transaction costs because the merger generated production cost efficiencies or increased sales.

46. This discussion suggests that innovative decisions are not sufficient to characterize an antitrust market. The 2023 Merger Guidelines, however, state that variation in innovation can define an antitrust market. The Guidelines extend the hypothetical monopoly SSNIP test, which involves an increase in price for a given quantity or quality of a product.

47. The SSNIPT test's "worsening of terms" refers to a change in the terms of exchange, such as a reduction in quantity or quality of a product for a given price. A measurable reduction of the quantity or quality of a product for a given price corresponds to the increase in the price of a product for a given quantity or quality. Because there is a relationship between the price of a product and its quantity or quality, the "worsening of terms" is meant to be the reverse of the price test.

48. The 2023 Merger Guidelines attempt to extend this reasoning to innovation. The SSNIPT concept suggests that a reduction in innovation for a given price defines an antitrust market. Unfortunately, there are several problems with the SSNIPT concept.

49. First, a reduction in innovative effort is not the mirror image of a price increase. Yet, the Guidelines include innovation in the terms of transactions with buyers. Identifying innovation as an attribute of the firm's output is inconsistent with innovation as "innovative effort," which is an input to innovation. It is unclear how a firm would worsen contract terms by decreasing

57 Spulber (2014).

58 OECD (2023) at 20–21.

59 Spulber (2023) at 10.

60 Abbott and Spulber (2024).

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innovative effort. Innovative effort need not correspond to some property of a product, production process, or transaction method.

50. Second, the creation of innovations by firms should not be viewed as a variation in the terms of a transaction. Innovation in products, production processes, or transaction methods generally differs from the number of units of output supplied for a given price. Innovations cannot be flexibly increased or decreased like a price. Although a percentage change in price is well understood, it is unclear what would be a proportional worsening of innovation.

51. Third, innovation does not affect a market in the same way as price competition. The Guidelines propose an analogy with the original price-based hypothetical monopolist test.[61] The Guidelines appear to suggest that a group of products are in the same market if a hypothetical monopolist could reduce its innovative effort profitably. Yet, unlike price variations, it is unclear how a reduction in innovative effort by a hypothetical monopolist would translate into lost sales and product substitution by consumers.

VI. Conclusion

52. Antitrust market definition provides the context for understanding how firms compete. Antitrust market definition is also useful for considering the potential entry of firms. Competition in the market and competition for the market increasingly involve technological change. Antitrust market definition should consider technological change as an important aspect of competition.

53. The present discussion showed how technological change can affect the five main aspects of the economic definition of markets. I found that technological change tends to increase the extent of the market.

54. The extent of the market provides incentives to innovate, potentially leading to more intensive competition in the market and competition for the market. This does not imply that hypothetical reductions in innovation define a market. Innovation competition need not mirror traditional price competition with static technology.

55. Innovation competition involves different strategies, including the introduction of new products, production processes, and transaction methods. Firms engaged in innovation competition choose from multiple scientific or technological approaches to a particular problem. Innovative firms combine in-house R&D, outsourcing R&D, and acquisition of technology from others. Antitrust market definition should recognize some of the complexities of innovation competition. ■

61 U.S. Department of Justice, 1982 Merger Guidelines, https://www.justice.gov/archives/atr/1982-merger-guidelines.

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