MONOPOLIZING KNOWLEDGE: ENHANCING ANTITRUST IN THE AGE OF DIGITAL CREDENCE GOODS

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ABSTRACT

We exist in the age of digital platforms. Yet, while this development has received significant attention, it is crucial that antitrust scholars and practitioners not overlook the nature of the goods sold on those platforms. This Article expands the ongoing debate surrounding digital platforms by exploring how the digitization of goods generates unique market failures, which, when exploited by firms with market power, create distinct antitrust concerns. In particular, digitization can imbue goods with credence characteristics—qualities that make their value difficult to assess even post-consumption. As a result, these markets not only implicate oft-analyzed market failures such as network effects and overcharging, but also can produce unique challenges like supplier-induced demand and quality degradation via "reputation mining."

Given this trend, as markets continue to digitize—and as illustrated by the dominance of platforms like Amazon and Google—the power of gatekeeping intermediaries may eclipse the characteristics of the goods they intermediate.

The $19 billion scientific journal publishing industry exemplifies these risks. Therein, dominant publishers act as certifiers of scientific articles, whose quality remains difficult for purchasers to evaluate even after purchase. By focusing on the nature of the goods in question, and their ensuing market failures, this Article reveals how digitization and the "Open Access Revolution" have reshaped scientific publishers' incentives, driving apparent supracompetitive prices and profits. Given these transformations, scrutiny of the industry is due. For, consistent with the economic theory of certification markets, publishers' conduct may not merely entrench their dominance, but also degrade the quality of science itself.

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INTRODUCTION

The excesses of the nineteen-billion-dollar scientific publishing industry regularly plaster headlines.[1] Dominant scientific journal publishers have faced boycotts by libraries,[2] scientists,[3] and even their own editorial boards.[4] These firms wield immense leverage over universities when negotiating access to their journal portfolios, resulting in bundled agreements with secret terms and prices. Further, publishers may manipulate the reputational metrics on which scientists and universities rely to assess the quality of journals, disadvantaging rivals. Beneath this conduct lurks the specter of rising concentration, supracompetitive prices, and exorbitant profits. Further, although initially hailed as a panacea, digitization and the Open Access Revolution likely helped cement publishers' dominance, presenting new opportunities for anticompetitive conduct.

However, despite the importance of scientific innovation to the U.S. economy,[5] antitrust legal scholars have not thoroughly analyzed the industry for at least twenty years.[6] This Article fills the gap, exploring the upstream market to acquire copyrighted scientific works, the downstream market for the sale of those works through subscriptions to bundles of academic journals, and the role of dominant publishing intermediaries in distorting competition in both.

To do so, this Article presents a novel framework for analyzing digital goods—one that centralizes the nature of the goods themselves and the market failures that may ensue. Applying this framework to the scientific journal industry reveals that scientific journal articles are most properly understood as credence goods—goods whose quality remains difficult to assess even after consumption. Thus understood, dominant publishers function as gatekeeping intermediaries that certify scientific quality. However, the economic theory of certification markets for credence goods suggests these markets are particularly vulnerable to failures, including network effects, overcharging, and supplier-induced demand. Even more concerning, in the absence of meaningful competition, certification intermediaries can "mine" their reputations for profit by degrading the quality of the very goods they exist to validate.

Section I describes the economics of markets for credence goods—goods whose quality is difficult for their purchasers to assess even after purchase and use—and for certification markets, where certifying intermediaries assess and assure the quality of credence goods. It argues for

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[1] *See* Stephen Buranyi, *Is the Staggeringly Profitable Business of Scientific Publishing Bad for Science?*, GUARDIAN (June 27, 2017), https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science ("[G]lobal revenues [are] more than £19 billion.").

[2] *See* Jefferey Brainard, *California Universities and Elsevier Make Up, Ink Big Open-Access Deal*, SCIENCEINSIDER (Mar. 16, 2021), https://www.science.org/content/article/california-universities-and-elsevier-make-ink-big-open-access-deal.

[3] Jop de Vrieze, *Thousands of Scientists Vow to Boycott Elsevier to Protest Journal Prices*, SCIENCEINSIDER (Feb. 1, 2012), https://www.science.org/content/article/thousands-scientists-vow-boycott-elsevier-protest-journal-prices.

[4] *See, e.g.*, Katherine Sanderson, *Journal Editors Are Resigning En Masse: What Do These Group Exits Achieve?,* 628 NATURE 244, 244 (2024); Katherine Sanderson, *Editors Quit Top Neuroscience Journal to Protest Against Open-Access Charges*, 616 NATURE 64, 64 (2023).

[5] *Research & Innovation: Ensuring America's Economic and Strategic Leadership*, *Before the S. Comm. on Com., Sci., Transp. & H. Subcomm. on Sci., Oceans, Fisheries, and Weather*, 116th Cong. 1 (2019) (Testimony of Diane Souvaine, Chair Nat. Sci Bd.) ("[A]dvancements in science and technology have driven 85% of [American] economic growth . . . .").

[6] The last such antitrust law article was written in 2004. *See* Aaron Edlin & Daniel L. Rubinfeld, *Exclusion or Efficient Pricing: The "Big Deal" Bundling of Academic Journals*, 72(1) ANTITRUST L.J. 119 (2004).

antitrust attention in such markets, explaining that they are most properly understood through their market failures. Section II describes the basics of the scientific journal publishing market, arguing that scientific journal articles are credence goods and that the publishing market for those goods is a certification market in which demand produces, and is produced by, symbolic reputational metrics. As a result, the scientific publishing market exhibits high barriers to entry, largely due to network and lock-in effects, as well as market failures archetypal of credence goods or certification markets, including supplier-induced demand, and reputation-mining. Section III argues that direct evidence of supracompetitive prices and profits or of quality degradation may be especially useful and available when defining certification markets. It then defines likely product markets in the scientific publishing industry and outlines how direct and indirect evidence could show dominant publishers have market or monopoly power. This Section also criticizes the Supreme Court's market definition analysis in *American Express*[7] as misguided when applied to digital platforms, especially where, as here, the goods in question exhibit credence characteristics. Section IV describes how monopolization claims against an intermediary in a credence good market, especially a digital certification market, should be envisioned, using dominant publishers' conduct as an example. Part V concludes.

I. MARKET FAILURES OF CREDENCE GOODS AND CERTIFICATION MARKETS

A. Defining Credence Goods Markets

Goods can be characterized by reference to consumers' ability to evaluate their quality.[8] Search goods (e.g., clothes) are evaluable before purchase; experience goods (e.g., a dining experience) are evaluable after purchase; and credence goods are difficult to evaluate even after purchase.[9] Typical credence goods include newspapers, taxi rides, medical treatment, and patents.[10] Because credence goods characteristics deprive consumers of quality information, suppliers in these markets often can take advantage of information asymmetries. Further, in a credence good market, suppliers can wield these informational advantages to increase demand for credence goods beyond what a buyer may need, a phenomenon called supplier-induced demand.[11]

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[7] Ohio v. Am. Express Co., 585 U.S. 529 (2018) [hereinafter *AmEx*].

[8] A characterization first drawn in 1973. *See* Michael Darby & Edi Karni, *Free Competition and the Optimal Amount of Fraud*, 16(10) J.L. & ECON. 67 (1973).

[9] *Id.* ("Credence qualities are those which, although worthwhile, cannot be evaluated in normal use. Instead, the assessment of their value requires additional costly information."); Eric Schniter, J. Dustin Tracyc & Vojtěch Zíkad, *Uncertainty and Reputation Effects in Credence Goods Markets* 4–5 (ESI Working Paper 21–15, 2021); Felix Gottschalk, *What Characterizes Credence Goods? A Critical Look at the Literature* (Center Econ. Rsch. ETH Zurich, Working Paper January 2018),

[10] Robert Lande & Neil Avaritt, *Using the "Consumer Choice" Approach to Antitrust Law*, 74 ANTITRUST L.J. 175 (2007) ("Newspapers' . . . actual quality is difficult to determine even after they have been bought and consumed, and it must to some degree be taken on faith."); Felix Gottschalk, Wanda Mimra & Christian Waibel, *Health Services as Credence Goods: A Field Experiment*, 130(629) ECON. J. 1346, 1347 (2020) ("Often, even after receiving treatment, patients cannot judge whether the treatment was appropriate or whether, for instance, a less invasive or less expensive treatment might as well have solved their health problem."); Loukas Balafoutas et al., *What Drives Taxi Drivers? A Field Experiment on Fraud in a Market for Credence Goods*, 80 REV. ECON. STUDIES 876 (2013) (describing taxi rides as credence goods); Sivaramjani Thambisetty, *Patents as Credence Goods*, 27 OXFORD J.L. STUD. 707 (2007) (arguing patents are credence goods).

[11] For instance, because consumers may lack the expertise to evaluate whether the supplier's recommendation aligns with their actual

While credence goods are thoroughly analyzed in economic literature, a robust discussion of credence goods in antitrust case law is largely lacking, even where the good in question obviously exhibits credence characteristics.[12] In scholarship, credence goods are rarely examined outside of the consumer protection context, usually regarding the advertisement of non-digital goods.[13] In the antitrust context, credence characteristics have been noted as a condition that makes a market ripe for deceptive conduct,[14] or have been merely mentioned with limited analysis.[15] In the digital goods context, there has been little mention. For instance, Google search has been characterized as likely being an experience or credence good, although this characterization has not yet been adopted by courts.[16]

However, the market failures caused by a good's nature as a credence good should be addressed. First, credence goods can lead to particular failures that make their markets ripe for antitrust issues. For instance, typical credence goods market failures include oversupply,[17] overcharging,[18] undertreatment,[19] and second-degree moral hazard.[20] Conduct that creates or exacerbates these market failures is ripe for antitrust scrutiny insofar as it artificially manipulates price, output, or quality.[21]

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needs, creating a dependency on the supplier's judgment. *See* Manela Karunadasa, Katri K. Sieberg & Toni Tapani Kristian Jantunen, *Payment Systems, Supplier-Induced Demand, and Service Quality in Credence Goods: Results from a Laboratory Experiment*, 14 GAMES MDPI 1, 14 (2023). In the scientific journal market, it is likely that supplier-induced demand occurs because librarians cannot determine whether high subscription fees are justified by the actual value of a journal's content. *See infra* note 101and accompanying text.

[12] I found only one case mentioning "credence goods," which did so only in passing. *See* Lee v. Carter-Reed Co., L.L.C., 203 N.J. 496, 526–27 (N.J. Sup. C. 2010) (citing Ariel Katz, *Pharmaceutical Lemons: Innovation and Regulation in the Drug Industry*, 14 MICH. TELECOMM. & TECH. L. REV. 1 (2007)).

[13] *See, e.g.*, Warren Grimes, *Spiff Polish and Consumer Demand Quality, Vertical Price Restraints Revisited*, 80(4) CALIF. L. REV. 817, 825 (1992) (discussing credence goods in the context of promotion); Ariel Katz, *supra* note 12, at 23–24 (discussing regulation of pharmaceuticals).

[14] *See, e.g.*, Maurice E. Stucke, *How Do (and Should) Competition Authorities Treat a Dominant Firm's Deception?*, 63 SMU L. REV. 1069, 1073–74 (2010); Maurice E. Stucke, *When a Monopolist Deceives*, 76 ANTITRUST L.J. 823, 825 (2010).

[15] *See, e.g.*, Margherita Colangeol & Mariateresa Maggiolino, *Manipulation of Information as Antitrust Infringement*, 26 COLUM. J. EUR. L. 53, 59 n.21 (2020) (mentioning credence goods in the information manipulation context); Maurice E. Stucke & Allen Grunes, *Towards a Better Competition Policy for the Media*, 42 CT. L. REV. 101, 116–117 (2009) (mentioning media as a credence good); Brad Greenberg, *The News Deal: How Price-Fixing and Collusion Can Save the Newspaper Industry-and Why Congress Should Promote It*, 59 UCLA L. REV. 414, 463–64 (2011) (same).

[16] *See, e.g.*, Mark R. Patterson, *Google and Search-Engine Market Power*, 11 (HARV. J. L. & TECH. OCCASIONAL PAPER SERIES, 2013) (identifying some search results as having credence goods characteristics); Frank Pasquale, *Beyond Innovation and Competition*, NW. U.L. REV 105, 154–60 (discussing regulation of search results); *but see generally* United States v. Google LLC, 747 F. Supp. 3d 1 (D.D.C. 2024) (finding Google depreciated the quality of its text ads "by reducing the information available to advertisers").

[17] For instance, when suppliers induce consumers to buy too much of a good, the consumer can notice that their potential problem is now absent but cannot evaluate whether the good they received was necessary. Gottschalk, Mimra & Waibel, *supra* note 10, at 150 (discussing overtreatment).

[18] For instance, consumers may be charged more than their willingness-to-pay if they had known which service or product they have actually purchased. Gottschalk, *What Characterizes Credence Goods?*, *supra* note 9, at 11.

[19] For instance, when a consumer obtains a good insufficient to satisfy their need. *Id.* at 11–12.

[20] Second-degree moral hazard occurs when a seller who knows that a consumer who is insulated from price increases raises prices because of that knowledge. Loukas Balafoutas, Rudolf Kerschbamer & Matthias Sutter, *Second Degree Moral Hazard in a Real-World Credence Goods Market*, 127 ECON. J. 1, 2 (2017) (finding taxi drivers charged more to passengers when they knew passengers would be reimbursed by their employers).

[21] *See* Phillip E. Areeda & Herbert Hovenkamp, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION, CCH 100 (4th ed. 2017) ("[O]ptimal competition occurs when the firms in a market price their output at marginal cost . . . [T]he best measure of competition is equilibrium output."); Nat'l Soc'y of Prof'l Eng'rs v. United States, 435 U.S. 679, 695 (1978) ("The Sherman Act reflects a legislative judgment that ultimately competition will produce not only lower prices, but also better goods and services.").

Second, as markets transition online, goods will take on credence characteristics, rendering more markets susceptible to such market failures. Unlike physical goods that can be examined, poked, and prodded before purchase, digitized goods and platforms are intangible and invisible. Even physical goods sold online may take on credence characteristics because digital selling makes it more difficult for consumers to know the quality of what they are buying, even after purchase. For instance, the characteristics of such goods that may inform customers about the quality of a product may only be observable in person.[22] Additionally, as goods become digital, they often become licensed or subscribed to instead of owned, adding ephemerality as a quality that customers often either do not know about or that is difficult for them to assess.[23] And consumers' inability to directly observe digital goods' attributes before purchase renders them more reliant on suppliers' claims.

In particular, digitization facilitates and incentivizes bundled subscription models, which in turn amplify the credence aspects of the goods offered. Subscriptions are increasingly viable because digital goods can be delivered instantly, billing is seamless, and access can be toggled automatically.[24] Reduced transaction costs further support bundling: global delivery across devices eliminates geographic and inventory constraints, enabling the scaling of subscribers and content without needing to scale logistics. Further, the near-zero marginal cost for delivering an additional unit—such as an article or a stream—renders both bundling and recurring access economically attractive. Each user interaction also generates data, which firms can collect, store, and analyze to tailor offerings, predict churn, and optimize retention.[25] Together, these dynamics make recurring, access-based models more profitable than one-time sales—low marginal costs make monthly access economical, while constant feedback enables firms to maximize long-term subscriber value.[26] The result is the widespread shift from ownership to access.[27] At the same time, digital subscriptions and bundles also accentuate the credence nature of goods. Users, even after accessing

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[22] Even if some consumers do observe breakdowns, their individual experience may be insufficient to conclude that a product has a tendency to break down. *See* Noga B. Shchory, *Information Asymmetries in E-Commerce*, 20 J. HIGH TECH. 1, 20 (2015) ("[A]n individual experience cannot reasonably lead to an unequivocal conclusion about the credence quality of a product").

[23] *See* Kevin Carr, *Digital Assets & License Protections in an Age that Denies Class Actions and Mandates Arbitration Actions and Mandates Arbitration*, 2 J. DISP. RESOL. 1, 7 (2021) ("Digitally licensed goods are different than physical goods in the sense that they can be taken away from the consumer by the digital platform that they bought it from, even after the consumer has paid full price.").

[24] *See* Ben Thompson, *Aggregation Theory*, STRATECHERY (July 21, 2015) (describing reduction of transaction costs via digitization). Digitization therefore makes customer retention, the core of subscription-based businesses, easier. Christoffer Lindström, Behzad Vishkaei & Pietro De Giovanni, *Subscription-based Business Models in the Context of Tech Firms: Theory and Applications*, 6(3) INT'L J. INDUS. ENG'G & OPERATIONS MGMT. 256, 262–64 (2023). However, the reduction of transaction costs in a credence good market is not necessarily beneficial. *See* David Driesen & Shubha Ghosh, *The Functions of Transaction Costs: Rethinking Transaction Cost Minimization in a World of Friction*, 47 ARIZ. L. REV. 61, 87, 89 ("Transaction costs slow down the process of transacting and provide a means for parties and the market system to sort out the good transactions from the bad, " which can help resolve "information asymmetry" and avoid "regret, bad deals, and the possibility of misfeasance or malfeasance.").

[25] Lindström, Vishkaei & De Giovanni, *supra* note 24, at 263 (Describing "data generation and analysis" as essential for subscription models to create value).

[26] *See* DAVID ARDITI, DIGITAL FEUDALISM: CREATORS, CREDIT, CONSUMPTION, AND CAPITALISM, 23–38 (2023) (describing business incentives behind subscription models). As the Internet of Things has grown, digitization has even expanded the possibility of subscription models for seemingly physical goods. *See, e.g.*, Guilherme Smania, *Car Subscription Services: Automakers' Shift Towards Servitized and Sustainable Business Models*, 36 SUSTAINABLE PROD. & CONSUMPTION 184 (2023) (describing subscriptions for cars); Dara Dunne, *Understanding the Importance of Subscriptions for Modern Retailing*, FORBES (Apr. 25, 2023) (same for retail).

[27] AARON PERZANOWSKI & JASON SCHULTZ, THE END OF OWNERSHIP: PERSONAL PROPERTY IN THE DIGITAL AGE (MIT Press, 2016).

today's subscription or bundle, cannot know the future quality of software updates[28] or the composition of tomorrow's catalogs.[29] Thus, digitization's facilitation of the shift from owned, stable goods to licensed, evolving access intensifies the credence dimensions of digital consumption.

Additionally, the production of digital goods and their characteristics is increasingly driven by specialized knowledge, exacerbating credence goods information asymmetries. For instance, judging whether an algorithm is producing the "best" search results requires the technology or expertise to understand the algorithm ordering those results.[30] Further complicating assessments of quality is digital platforms transition from using "objective" criteria for search or marketplace recommendation to using "subjective" assessments of consumers' preferences.[31] Even worse, digitization can transmogrify price, which is ordinarily a search characteristic of a good, into a credence characteristic.[32] For instance, the price discrimination made possible by big data undermines consumers' assumption that the price of a good is a universal characteristic.[33] The price characteristics of digitized goods take on additional credence characteristics as consumers increasingly must forfeit their data and privacy, the value of which they are unable to assess, when shopping online for physical goods.[34] Moreover, developments in behavioral economics have shown that, when a platform offers a service at zero-price, consumers' ability to assess that good's quality is warped.[35]

The digitization of what was previously a physical good may exacerbate credence goods problems. In addition to its potential to obscure critical information, the transition to digital itself may pose an issue for consumers who were once accustomed to purchasing a tangible good with either no credence qualities or limited credence qualities. Digital intermediaries likely have

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[28] Patrick Lum, *My Petty Gripe: Forced Software Updates Just Make Everything Worse*, GUARDIAN (Aug. 19, 2025).

[29] While subscriptions reduce consumers' upfront costs, they also redefine consumers' relationship to the product: access becomes conditional, revocable, and dependent on opaque licensing or other business decisions. A particularly ironic example occurred when Amazon removed George Orwell's 1984 from user's Kindles without notice. *See* Cade Metz, *Amazon Vanishes 1984 From Citizen Kindles*, REGISTER (July 18, 2009) ("At any given moment, your books - the books you've paid for - may disappear."); *see also* Matthew Ruiz, *Spotify Removes Hundreds of K-pop Songs,* PITCHFORK (Mar. 1, 2021), https://pitchfork.com/news/spotify-removes-hundreds-of-k-pop-songs [https://perma.cc/YW95-9BJQ]; Netflix Help Center, *Why Do TV Shows and Movies Leave Netflix?*, https://help.netflix.com/en/node/60541 [https://perma.cc/SH5W-QM5H] (last visited Sep. 16, 2025); PlayStation, *Update on Discovery Entitlements Affected Titles* (Dec. 21, 2021), www.playstation.com/en-us/legal/psvideocontent [https://perma.cc/362X-3W4S].

[30] For instance, in United States v. Google LLC, quality used was measured by "IS points," a metric relative to the amount of information contained by Wikipedia, which has a "nonlinear" relationship with traffic. *See Google*, 747 F. Supp. 3d at 25. This is similar to other credence good industries. *See* Gilles Grolleau & Sandoss BenAbid, 36(4) INTERECONOMICS 208, 212–13 (explaining in the food quality context that most consumers cannot access technology or expertise necessary to assess credence qualities); Ariel Katz, *supra* note 12, at 20–21 (same in pharmaceuticals).

[31] For a fantastic discussion of this trend, *see* Shchory, *Information Asymmetries in E-Commerce*, *supra* note 22, at Part IV.

[32] *See* Shchory, *supra* note 22.

[33] *Id.* at 41–42 ("By uncovering the consumer's utility function, sellers can improve their negotiation positions, isolating the consumer from the market and offering isolated ("just for you") transaction terms . . . As a result, the consumer cannot tell if he or she is receiving preferential or discriminatory pricing.").

[34] *See* Katherine J. Strandburg, *Free Fall: The Online Market's Consumer Preference Disconnect*, 2013(5) U. CHI. L.F. 95, 106 ("The fact that users continue to subject themselves to online tracking despite expressing discomfort about it is one basis for the argument that users accept online data collection as a price paid for access to online products and services.").

[35] *See* Michal Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 528–30 (2016) (describing how the "zero price effect" causes consumers to overestimate quality); John M. Newman, *Antitrust in Zero-Price Markets: Foundations*, 164 U. PA. L. REV. 149, 184–85 (2015).

reduced incentive to rectify credence goods market failures if they stand to benefit from consumers' lack of knowledge. For instance, as brick-and-mortar retail marketplaces move online, reputation may pose less of a constraint on intermediaries' ability to reduce quality.[36]

Moreover, digitization can facilitate certain types of conduct that also enhance goods' credence characteristics. For instance, as further analyzed below,[37] the transformation of intermediaries into digital intermediaries allows them to pursue new forms of bundling and subscription models, and can incentivize self-preferencing, especially if the quality of the physical good was already problematic for the consumer to assess due to credence characteristics.[38]

B. Defining Certification Markets

Reputational constraints can play a pivotal role in addressing market failures that arise from information asymmetries, particularly in credence goods markets.[39] For instance, in credence goods markets where customers are repeat purchasers, providers who establish a track record of fair dealings and high-quality service have an incentive to build trust and brand equity. This is a much-studied effect in the economic literature, which confirms that in some credence goods markets, reputation can substitute for direct consumer knowledge by ensuring that only those providers who offer genuine value retain market standing.[40] In such markets, reputation can even replace regulation.[41]

Reputation can arise through multiple avenues with varying effectiveness.[42] In certain credence goods markets, intermediaries between buyers and sellers take on the role of addressing market failures by certifying the quality of the goods in question.[43] In these "certification markets," certifying firms serve as gatekeepers, adjudicating the quality of goods, services, or information.[44]

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[36] Neil Dryden, Sergey Khodjamirian & Jorge Padilla, *The Simple Economics of Hybrid Marketplaces*, COMPETITION: J. ANTITRUST, UCL & PRIV. SEC. CAL. L. ASSOC. 85, 89–92 (2020) (finding for hybrid marketplaces, the existence of brick-and-mortar stores alongside online marketplaces helps align intermediaries' preferences with sellers and consumers).

[37] *See infra* Section III.E.

[38] This problem is especially pronounced when a digital intermediary also sells goods that it owns or produces. *See* Ariel Ezrachi & Maurice E. Stucke, *The Curious Case of Competition and Quality*, 3(2) J. ANTITRUST ENF'T 227, 249 (noting that "search engine[s] can have the incentive to promote—and rank higher—its sponsored results and provide fewer—and rank lower—the organic results").

[39] *See, e.g.*, Schniter, Tracyc & Zíkad., *supra* note 9, at 24 (finding in healthcare services that "concern for a positive self-image might discipline credence-goods experts even when uncertainty obfuscates deception"); Yonathan A. Arbel, *Reputation Failure: The Limits of Market Discipline in Consumer Markets*, 54 WAKE FOREST L. REV. 1239, 1248 (2019) (describing reputation as "arguably the most central" disciplinary mechanism).

[40] *See* Loukas Balafoutas & Rudolf Kerschbamer, *Credence Goods in the Literature: What the Past Fifteen Years Have Taught Us About Fraud, Incentives, and the Role of Institutions*, 26 J. BEHAV. & EXPERIMENTAL FIN. 1, 11 (2020) (summarizing the literature on reputation).

[41] *Id.* at 14 (examining under what conditions "price regulation might be a cheap and effective means to increase efficiency" or "may actually reduce efficiency").

[42] For instance, word of mouth or reviews may adequately discipline certain markets but may be inadequate in others. *See* Schniter, Tracyc & Zíkad., *supra* note 9, at 15–18 (finding a difference in the effectiveness of ratings for "high-need" versus "low-need" services).

[43] The prototypical certification market is credit rating agencies. *See* Nima Fazeli, *Competition in Certification Markets* 23 (Working Paper 2020) (finding certifying intermediaries compete on quality); *see also generally* Marco Pagano & Paolo Volpin, *Credit Ratings Failures and Policy Options*, 25 ECON. POL'Y 401 (2012). Other examples include markets for attorneys, auditors, underwriters, and stock exchanges. *See* Jonathan M. Barnett, *Intermediaries Revisited: Is Efficient Certification Consistent with Profit Maximization?*, 37 J. CORP. LAW 476, 481 n.26–29 (2012) (collecting examples).

[44] To my knowledge, only one article has characterized the scientific journal market as a certification market. *See* Catherine Bobtcheff, Bernard Caillaud & Raphaël Lévy, *Academic Publishing and Open Access: What Does Economics Teach Us?*, ANNALS OF ECON. AND

The typical dogma in law-and-economics is that reputational pressures drive certifiers, as repeat players, to provide efficient solutions to market failures caused by credence goods characteristics.[45] However, more recent scholarship has begun to recognize that such pressures may not maximize quality, mainly due to a type of market failure—reputation-mining.[46] Reputation-mining occurs when barriers to entry and lock-in effects protect certification firms that have achieved dominance from the negative reputational impact of relaxing quality.[47] When consumers cannot credibly threaten termination due to lock-in effects, dominant certifiers are incentivized to reduce quality until consumers' diminished utility from the degraded good is weakly preferable to the risks and costs associated with switching.[48] This market failure is exacerbated in the face of lock-in because consumers' tolerance of quality degradation is not just endogenous to the quality of the next-best certification, but also to the cost to switch to that certification.[49] Economic modeling of certification goods markets also bears out that lock-in via high switching costs also serves as a barrier to entry.[50] It is no surprise that certification is an imperfect solution to market failures in credence good markets as the quality of a particular certification in assuring the quality of a particular good may be difficult for consumers to evaluate even after use of that good. In other words, the act of certification often may itself be a credence good.

Legal scholars examining certification markets have largely focused solely on certifying firms' conduct as certifiers, often comparing the issues in certification markets to the issues that arise in the standard-setting contexts.[51] Although antitrust scholars have debated heavily quality effects,[52] adding discussion of certification markets will benefit the dialogue because some scholars assert such markets are poor candidates for competition. For instance, some scholars argue that competition can cause certification firms to shift "focus from maintaining long-term

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STATS. 150, 160 (2023). However, that paper does not discuss the credence goods characteristics of scientific journal articles nor resulting market failures. Its analysis also lags behind the digitized state of the market. *Id.* at 156 (for instance, by describing submission fees as "insignificant").

[45] *See, e.g.*, Reinier H. Kraakman, *Corporate Liability Strategies and the Costs of Legal Controls*, 93 YALE L.J. 857, 891 (1984) (characterizing intermediaries as "incorruptible"); Barnett, *supra* note 43, at 482 n.31 (collecting literature); Barnett *supra* note 43 at 482 n.32 (collecting cases).

[46] Barnett, *supra* note 43, at 478 ("Intermediary failure is a regular feature of certification markets"); George A. Akerlof & Robert J. Shiller, *Phishing for Phools; The Economics of Manipulation and Deception*, 23–37 (Princeton U. Press, 2015) (coining the term "reputation-mining").

[47] For example, as in *Google*, 2024 WL 3647498, at *47.

[48] Barnett, *supra* note 43, at 493–94.

[49] *Id.*

[50] Switching costs may include the costs used to evaluate alternative certifier firms, as well as typical transition costs. *See id.* at 495 (arguing that switching costs are compounded by "the limited observability of certifier effort and the ambiguous signal transmitted by even observed cases of apparent certifier shirking.").

[51] Standard setting is the act of setting norms for a particular good, often to ensure interoperability, while certification is the act of assessing whether that good meets minimum quality standards. *See, e.g.*, Jeanne C. Fromer, *The Unregulated Certification Mark(et)*, 69 STAN. L. REV. 121, 171 (2017) (comparing market failures in market for certification marks to in standard-setting); Victoria Daskalova & Michiel Heldeweg, *Challenges for Responsible Certification in Institutional Context: The Case of Competition Law Enforcement in Markets with Certification*, *in* STUD. IN EUR. ECON. L. & REG. 16, 50 (Patrick Rott ed., 2019) (discussing differences between standard-setting and certification).

[52] *See generally*, Ezrachi & Stucke, *supra* note 38.

reputational integrity to maximizing short-term profits."[53] However, the argument that prices should converge to marginal cost should not be inherently problematic for certifiers' evaluation quality. To claim otherwise elides that competitive pressures often lead to increased efficiency and innovation, reducing costs and improving service quality.[54] Additionally, given natural barriers to entry and switching costs, certifiers who differentiate based on quality may achieve sustainable above-marginal-cost pricing without needing monopolistic control over the market. Further, the high market concentration that leads to higher prices can also result in complacency, reducing certifiers' incentive to innovate and improve their evaluation quality and leading to the risks of reputation mining.[55] Regardless, the claim that supracompetitive profits are necessary to provide some other value to consumers in a specific industry must always be carefully examined,[56] especially in cases where the value offered may run contrary to the basic policies of federal antitrust law.[57] Further, if any additional value to consumers is cognizable, then it can be appropriately accounted for by courts through typical rule of reason analysis.[58]

A more likely model of certification markets shows that competition lowers incentives for certifiers to reduce quality to attract low-quality submissions.[59] The threat that consumers may respond to low-quality goods or services by switching to competitors is what incentivizes providers to uphold high standards, as each provider must earn and maintain positive reputation to attract and retain customers.[60] Without adequate competition, the cost of poor reputation is minimized as dissatisfied consumers find themselves with limited alternatives. For similar reasons, price transparency can also rectify the credence good market failure of overcharging, as such

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[53] Barnett, *supra* note 43, at 503. Without supracompetitive profits, Barnett argues, "the cushion provided by supracompetitive rents must be preserved to some extent in order to induce intermediaries to maintain costly investments in evaluation quality."). *Id.* at 501.

[54] *See* Richard Gilbert & Douglas Melamed, *Innovation Under Section 2 of the Sherman Act*, 84 ANTITRUST L.J. 1, 5–9 (2021) (identifying innovation effects as proper for antitrust analysis).

[55] Barnett's argument also relies partially on historical contingency, specifically that "the most well-developed certification markets converge on a stable and small number of providers." Barnett, *supra* note 43, at 491. This argument not only similarly confuses the effect of barriers to entry on certification, but also overlooks confounding historical factors. *See* Mark Glick, *Antitrust and Economic History: The Historic Failure of the Chicago School of Antitrust*, 64 ANTITRUST BULL. 295, 302–09 (describing how financialization and shifts in corporate structures since the 1970s have caused firms to increasingly focus on short-term profits).

[56] *See* Yanev Heled, Ana Santos Rutschman & Liza Vertinsky, *The Problem with Relying on Profit-Driven Models to Produce Pandemic Drugs*, 7 J.L. BIOSCIENCE 1, 16–17 (arguing that contrary to what many commentators suggest, increasing profit is unlikely to spur increased innovation); Katz, *supra* note 12, at 9–11 (arguing pharmaceuticals' credence good qualities necessitate regulation in addition to monopoly profits from patents to spur innovation); Richard R. Nelson, *The Role of Knowledge in R&D Efficiency*, 97 Q.J. ECON. 453, 453–54 (1953) (arguing substantial profits are necessary to encourage long-term R&D in aerospace and defense). This assertion certainly should not exempt industries from antitrust scrutiny, especially in credence goods markets. For instance, healthcare quality generally increases with competition, not profit margins. *See* Johann Han, Nadja Kairies-Schwarz & Markus Vomhof, *Quality Competition and Hospital Mergers- An Experiment*, 26 HEALTH ECON. 36, 48–49 (2017); Martin Gaynor, *Competition and Quality in Health Care Markets*, *in* 2(6) FOUNDATIONS & TRENDS MICROECON. 1, 53 (2007) ("There seems to be no impact of doing better financially above a threshold (bottom quartile of operating margin).").

[57] *See Ind. Fed'n of Dentists*, 476 U.S. at 462–63 (holding argument that increasing competition would reduce quality of care a noncognizable procompetitive benefit); *Nat'l Soc'y of Prof'l Eng'rs*, 435 U.S. at 692–94 (ruling argued benefits from ban on competitive bidding were noncognizable).

[58] *See, e.g.*, United States v. Microsoft Corp., 253 F.3d 34, 59 (D.C. Cir. 2001) (en banc) (per curiam); Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 575 (1986) (discussing how to treat exclusionary conduct that may be procompetitive).

[59] Matthieu Bouvard & Raphael Levy, *Two-Sided Reputation in Certification Markets*, 64 MGMT. SCI. 4755, 4764 (2018) (finding under single-homing, in which a seller who buys certification solicits one certifier only, competition "lowers incentives for the certifier to pander to low-quality sellers").

[60] *See* Steffen Huck, Gabriele K. Lünser & Jean-Robert Tyran, *Competition Fosters Trust*, 71 GAMES & ECON. BEHAV. 195, 205 (2012).

transparency can provide consumers with additional data points from which they can determine fair prices.[61] In sum, it is transparency accompanied by choice that enables reputation to constrain providers from exploiting information asymmetries because it is only with these factors that consumers can garner sufficient information over repeated interactions to incentivize sellers to provide high quality in the present to attract consumers in the future. This model also better accords with the experimental economics literature on credence goods, which largely finds that reputation can only discipline credence goods markets in the presence of sufficient competition.[62] In other words, the commonsense truism underlying antitrust law holds: when markets fail, antitrust practitioners and courts may step in as it is a rare market that is poorly suited to competition.[63]

Antitrust attention to certification markets is increasingly essential for another reason: in the digital age, certifiers may increasingly own the goods they certify.[64] As a result, certifiers increasingly operate as platforms with cross-group externalities. The conflict of interest occurring when a firm that owns a good is also the certifier of that good's quality should further evoke skepticism of the law-and-economics dogma that certifiers are trustworthy gatekeepers of quality.[65]

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[61] *Id.* ("Only if some minimal feedback information – enabling the mechanics of reputation building – is coupled with competition we observe that the market-crippling moral hazard problem is fully overcome.").

[62] *See id.*; Alexander Rasch & Christian Waibel, *What Drives Fraud in a Credence Goods Market? Evidence from a Field Study*, 80 OXFORD BULL. ECON. STAT. 605, 615 (2018) (finding in car repair services that "a high level of competition decreases the level of fraud"); Silvia Angerer et al., *The Value of Rating Systems in Healthcare Credence Goods Market* B-1-2 (2022) (finding ratings reduced overprovision and overcharging in markets for healthcare credence goods only when combined with competition); Kurt R. Brekke et al., *Price and Quality in Spatial Competition*, 40 REGIONAL SCI & URBAN ECON. 471, 472 (2010) (finding most studies find a positive relationship between competition and quality in health care); Roman Inderst & Marco Ottaviani, *How (Not) to Pay for Advice: A Framework for Consumer Financial Protection*, 105 J. FIN. ECON. 393, 406–07 (2012) (finding competition increases consumer surplus and reduces exploitation by financial advisers); *but see* Wanda Mimra et al., *Price Competition and Reputation in Credence Goods Markets: Experimental Evidence*, 100 GAMES & ECON. BEHAV. 337, 346 fig. 1, 347 fig. 3 (finding competition reduced prices and increased undertreatment, but only in early stages while reputation was still being built); Balafoutas & Kerschbamer, *supra* note 40, at 10 (finding the effects of competition on credence goods markets "ambiguous" based solely on Mimra et al.).

[63] *See* Avishalom Tor, *Justifying Competition Law in the Face of Consumers' Bounded Rationality*, 3 NEW DEVS. L. & ECON. 1, 5 (2019) (Despite "challenges that the reality of consumers' bounded rationality poses for the standard economic account [in antitrust law]," competition law "still plays an important role in advancing efficiency and welfare even recognizing the bounded rationality of consumers.").

[64] In addition to the scientific journal industry, as this paper argues, app distribution platforms like Apple and Google appear to both certify and distribute apps. *See* Epic Games, Inc. v. Apple Inc., 559 F. Supp. 3d 898, 1002–06 (N.D. Cal. 2021), *aff'd in part, rev'd in part and remanded*, 67 F.4th 946 (9th Cir. 2023) (discussing security and privacy requirements for an app to be in Apple App Store). Some vendors can be seen as certifiers in the digital payment space, vetting merchant accounts and guaranteeing secure transactions while also owning and operating financial products that compete with the third-party services they certify. *See CFPB Proposes New Federal Oversight of Big Tech Companies and Other Providers of Digital Wallets and Payment Apps,* CONSUMER FIN. PROT. BUREAU (Nov. 7, 2023), https://www.consumerfinance.gov/about-us/newsroom/cfpb-proposes-new-federal-oversight-of-big-tech-companies-and-other-providers-of-digital-wallets-and-payment-apps [https://perma.cc/45JT-T6VN] ("Big Tech and other companies operating in consumer finance markets blur the traditional lines that have separated banking and payments from commercial activities."). Similarly, while search engines and other online marketplaces do not directly certify the goods they provide consumers, they control the core reputational markers consumers may use as proxies for quality. For example, for search engines and marketplaces, the best or most relevant search answers and goods should be located at or close to the top of the first page of results. *See Google*, 2024 WL 3647498, at *9–11 (describing how search results are generated); Lina M. Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 710, 754–55 (2017) (describing potential harms from Amazon prioritizing its own products).

[65] *See* Barnett, *supra* note 43, at 481 (collecting literature describing that "legal scholars that use economically-informed approaches have generally depicted the reputational intermediary as a trustworthy player").

II. BASICS OF THE RELEVANT SCIENTIFIC JOURNAL PUBLISHING MARKETS

Like many intellectual property markets, the market for scientific publications transforms knowledge into a commodity.[66] Therein, academic research findings, theories, and insights are packaged into written manuscripts, copyrighted, and offered for publication and exchange. The certifying nexus between the production and the dissemination of this knowledge is scientific publishers. Scientists pay fees to transfer the copyrights for their manuscripts to publishers, who then sell those manuscripts as journal articles to universities and other research institutions.[67] As has been suspected or discovered of two-sided markets, dominant intermediaries can often exacerbate market failures to maximally extract rents from both buyers and suppliers.[68]

Much of the only previous antitrust analysis of this market was performed when the transition of the market to the digital was still nascent, and subscribing to a journal included the delivery of physical books.[69] This section updates that market analysis for the digital era, including increased network effects and lock-in, as well as new or newly-discovered conduct like charging scientists fees to publish in journals, new types of journals, vertical acquisitions, and non-disclosure agreements governing bundling practices.

A. The Market Upstream: Scientist to Publisher

The publication process begins when a scientist memorializes her idea in a written manuscript, which entitles the scientist to copyright protection.[70] However, while the copyright in a scientific work creates intellectual property belonging to the scientist, neither the idea nor the manuscript tends to have commercial or scientific value until it is peer-reviewed and published.[71] Thus, the scientist next chooses the journal to which she will submit her written manuscript for acceptance. Generally, scientists may only submit their manuscripts to a single journal at a time.[72] When deciding, the scientist typically walks a fine line between maximizing reputational metrics

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[66] *See* Neal Young et al., *Why Current Publication Practices May Distort Science*, 5 PUB. LIBR. SCI. MED. 201, 201 (2008) (describing scientific knowledge as a commodity); ELIZABETH BERMAN, CREATING THE MARKET UNIVERSITY. HOW ACADEMIC SCIENCE BECAME AN ECONOMIC ENGINE 4–8 (Princeton University Press 2012) (describing the commercialization of the production of science).

[67] BO-CHRISTER BJÖRK & DAVID SOLOMON, DEVELOPING AN EFFECTIVE MARKET FOR OPEN ACCESS ARTICLE PROCESSING CHARGES (Wellcome Trust, 2014). This differs significantly from other publishing industries, where authors commonly retain their copyrights. *See infra* notes 83, 88.

[68] *See, e.g.*, Lina Khan, *The Separation of Platforms and Commerce*, 119(4) COLUM. L. REV. 973, 985–1006 (describing issues presented by digital platforms who serve as intermediaries); Victoria Daskalova & Michiel Heldeweg, *Challenges for Responsible Certification in Institutional Context: The Case of Competition Law Enforcement in Markets with Certification*, 16 STUDS. EUR. ECON. L. & REG. 16, 50 (2019) (describing how intermediaries may use information asymmetries to "extract rents from buyers, sellers, or both").

[69] *See generally*, Edlin & Rubinfeld, *supra* note 6.

[70] *See* Copyright Act of 1976, 17 U.S.C. § 102(a)(1) (1976).

[71] *See* Jonathan Tennant & Tony Ross-Hellaur, *The Limitations to our Understanding of Peer Review*, 5(1) RSCH. INTEGRITY PEER REV. 1, 8 (Peer review "assigns an imprimatur, via 'stamp of approval' or endorsement over which knowledge enters the scholarly record and can thus be built upon."). Exceptions may exist. For instance, if a scientist had written the first paper describing the theory of relativity and still owned the copyright, that paper would likely have value even if it were not reviewed and published. However, such extreme exceptions only reify the general principle that peer review not merely enhances value, but actually creates it.

[72] This practice is ostensibly necessary for peer review, especially in smaller fields with fewer reviewers who serve multiple journals. *See* Elizabeth Wager, *Why You Should Not Submit Your Work to More than One Journal at a Time*, 7(2) AFR. J. TRAD. COMPLEMENTARY & ALT. MEDS. 161, 161–62 (2010). It is unclear to what extent journals enforce this practice by contract or pursuant to informal, longstanding "professional ethics" codes. On the other hand, a recent lawsuit alleges this practice occurs due to collusion. Complaint at 1, Dr. Lucina Uddin v. Elsevier et al., No. 1:24-cv-06409-HG (E.D.N.Y. Sep. 12, 2024).

like "impact factor" or "citation count" and minimizing the high risk associated with any delay in publication. Impact factor is the most widely-used reputational metric.[73] Reputational metrics provide critical value to scientists because they directly affect their academic reputation, job prospects, and funding.[74] The high risks associated with a publication delay are also of paramount concern. A scientist's manuscript, and even her career, may be jeopardized if another scientist publishes a similar article while their submission remains under review.[75] Journals often take over a year to decide whether to accept a submission, drastically raising the stakes associated with rejection.[76] This timeframe, combined with the rule that scientists may only submit to a single journal at a time, exacerbates the high risks associated with delay and prevents scientists from shopping for a higher impact factor.[77] If the scientist is too ambitious in her journal selection and gets rejected after a prolonged review, she will have to restart the entire process with a different journal, dramatically increasing the odds that she will get "scooped" by another scientist in the meantime. Consequently, scientists face strong incentives to target a journal that maximizes their impact factor while also minimizing any uncertainty about acceptance.[78] These pressures result in what is often described as a "publish or perish" culture in academia.[79]

The submission process varies from journal to journal, beginning when a scientist selects the appropriate journal and submits her manuscript.[80] If the manuscript meets the journal's basic editorial criteria, the journal's editors will initiate peer review.[81] Upon completing peer review, those editors will decide to accept, decline, or require revisions of the manuscript.[82] Traditionally, if the article is accepted, the scientist must both transfer copyright to the journal and *pay the*

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[73] Michael Kavic & Richard Satava, *Scientific Literature and Evaluation Metrics: Impact Factor, Usage Metrics, and Altmetrics*, 25 J. SOC. LAPAROSCOPIC & ROBOTIC SURGEONS 1, 3 (2021).

[74] *See* David Moher et al., *Assessing Scientists for Hiring, Promotion, and Tenure*, PUB. LIBR. SCI. BIOLOGY 1, 1–2, 9–10 (2018) (discussing importance of impact metrics); Seema Rawat & Sanjay Meena, *Publish or Perish: Where Are We Heading*, 19(2) J. RES. MED. SCI. 87, 87 (2014) ("Many universities do not focus on teaching ability when they hire new faculty and simply look at the publications list"); Dag W. Aksnes, *Citations, Citation Indicators, and Research Quality: An Overview of Basic Concepts and Theories*, 9(1) SAGE OPEN, 1, 12 (2019) (describing practice of using impact factor in hiring, promotion, or funding decisions).

[75] Called "scooping." *See* Heidi Laine, *Afraid of Scooping – Case Study on Researcher Strategies against Fear of Scooping in the Context of Open Science*, 16 DATA SCI. J. 1, 1 (2017).

[76] *See* Kendell Powell, *The Waiting Game*, 530 NATURE 149, 149–50 (2015).

[77] Compare the marketplace for article publishing to the market for college admissions. Typically, high schoolers will apply to reach schools and safety schools. Only once accepted do they decide which university to attend. As a result, universities compete by offering scholarships, quality assurances, and targeted programs to ensure the best students will attend once accepted. Universities' ability to increase tuition costs, as well as high schoolers' abilities to seek the best education, drastically change if all colleges agreed to only accept early decision applications (where high schoolers must attend a college by contract if their application was accepted).

[78] Ronald D. Vale, *Accelerating Scientific Publication in Biology*, 112 PROC. NAT'L ACAD. SCIS. 13439, 13441 (2015) (identifying these as main "opposing factors").

[79] Hendrik P Van Dalen & Kene Henkens, *Intended and Unintended Consequences of a Publish-or-Perish Culture: A Worldwide Survey*, 63 J. AM. SOC'Y INFO. SCI. & TECH. 1, 1–2 ("Over time the productivity of scientists and universities in terms of publications and citations has become more important as a determinant of individual and organizational rewards.").

[80] Some journals may charge submission fees at this stage. *See* Stephan Puehringer, *The Political Economy of Academic Publishing: On the Commodification of a Public Good*, 16 PUB. LIBR. SCI. ONE 1, 13, 14 tbl. 5 (describing both APCs and submission fees).

[81] Frank E. Likis & Brittany Swett, *Demystifying the Journal Submission, Peer Review, and Publication Process*, 64 J. MIDWIFERY & WOMEN'S HEALTH 139, 145 (2019).

[82] *Id.* at 146.

journal, ostensibly to offset publication costs such as editing and peer review services.[83] If the scientist decides to publish open access, the scientist's payment to the journal publisher takes the form of an even higher Article Processing Charge (APC).[84] APCs are typically justified as a necessary cost to publish open access because publishers ostensibly do not then profit from charging consumers in the downstream market for access. As discussed further below, this justification lacks ground.[85] And even if the scientist chooses not to publish open access, they sometimes must pay per-page, per-article, or per-figure fees.[86] APCs and other fees are usually paid by the scientist's academic institution or by grants received from government institutions like the National Institute of Health.[87]

The APC model is distinct from similar industries. In book publishing, for instance, publishers compensate authors in exchange for their copyrights, including by paying considerable upfront advances, flat fees, or royalties.[88] And, in many non-scientific fields, editing and peer review services are offered for free or for minimal fees.[89]

APCs are increasing.[90] However, despite rising APCs, there is no evidence that scientists are less willing or able to pay scientific journal publishers to subsume their copyrights, likely because demand for publishing is highly price-inelastic.[91] Inelastic demand likely exists because scientists pay journals more to acquire the academic credit that comes from publishing in a high-impact journal than for any of the publisher's distribution or other services.[92] Further, scientists are insulated from high prices because they are funded by third parties and are thus nonresponsive to price increases, much as many hospital patients are nonresponsive to price increases for medical

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[83] Valentina Moscon, *Academic Freedom, Copyright, and Access to Scholarly Works: A Comparative Perspective*, *in* BALANCING COPYRIGHT L. IN THE DIG. AGE 99, 102–03 (Roberto Caso & Federica Giovanella ed., 2015) ("[S]cientific authors are willing to freely hand over to publishers their exclusive rights in a work under copyright law. This leads to the 'propertization' of scientific findings."). Recently, for some open access journals, scientists may now keep their copyright, transferring instead an exclusive or non-exclusive license. *See, e.g.*, ELSEVIER COPYRIGHT (2024), https://www.elsevier.com/about/policies-and-standards/copyright (last visited Nov. 1, 2024).

[84] *See* Sang-Jun Kim & Kay Sook Park, *Market Share of the Largest Publishers in Journal Citation*, 7 SCI. EDITING 149, 151 tbl. 3 (2020) (finding average APCs nearly $3,000 for submissions to the top three publishers).

[85] *See infra* note 152 (discussing double-dipping).

[86] *See, e.g.*, SAGE PAGE AND PUBLICATION CHARGES (2024), https://us.sagepub.com/en-us/nam/page-and-publication-charges (last visited Nov. 1, 2024).

[87] *See* Jessica Monaghan et al., *'APCs in the Wild': Could Increased Monitoring and Consolidation of Funding Accelerate the Transition to Open Access?*, 13 fig. 5 (Springer Nature Whitepaper, 2020) (61% paid from funders, 57% paid from universities, only 16% from personal funds); AM. ASSOC. ADVANCEMENT SCI., EXPLORING THE HIDDEN IMPACTS OF OPEN ACCESS FINANCING MECHANISMS: AAAS SURVEY ON SCHOLARLY PUBLICATION EXPERIENCES & PERSPECTIVES 6 (Oct. 2022), https://www.aaas.org/sites/default/files/2022-10/OpenAccessSurveyReport_Oct2022_FINAL.pdf [https://perma.cc/V3EN-E5M7] (69.4% paid from grants, 55% from universities and only 15% used personal funds).

[88] *See* United States v. Bertelsmann SE & Co. KGaA, 646 F. Supp. 3d 1, 13–15 (D.D.C. 2022).

[89] For example, prospective law review article authors pay submission fees of $7.35, no publishing fees, and may submit their articles to multiple journals at a time. *See* SCHOLASTICA PRICING AND SET UP FAQS, https://scholasticahq.com/law-reviews [https://perma.cc/X973-XMXU] (last visited Jan. 29, 2026); *but see* Darren Bush, *Law Reviews, Citation Counts, and Twitter (Oh My!): Behind the Curtains of the Law Professor's Search for Meaning*, 50 LOYOLA U. CHICAGO L.J. 327, 345–46 (2018) (describing issues in law review publication processes).

[90] *See* Shaun Yon-Seng Khoo, *Article Processing Charge Hyperinflation and Price Insensitivity: An Open Access Sequel to the Serials Crisis*, 29 J. ASSOC. EUR. RSCH. LIBRS. Q. 1, 3 (2019) (APC prices are increasing at a rate three times inflation).

[91] Demand in the marketplace for article publishing can thus be compared to demand for necessities. *See id.* at 1.

[92] *See infra* notes 65–69 and accompanying text.

services charged to insurers.[93]

B. The Market Downstream: Publisher-to-University

Across all disciplines, most scientific journals are owned by one of the "Big Five" publishing giants: Elsevier, Wiley & Blackwell, SAGE, Springer, and Taylor & Francis.[94] Each publisher owns large portfolios of journals that span a variety of academic disciplines. Elsevier, the largest, controls a portfolio of over 2,900 journals.[95] Consolidation in the market persists as scientific journal publishers continually acquire small or independent journals.[96]

Currently, the majority of journal publishers' profits come from selling subscriptions to bundled portfolios of their journals, called "Big Deals," to the academic and government institutions that fund the research behind those articles in the first place.[97] Under the Big Deal subscription model, university libraries subscribe to journals on behalf of their scientists, paying fees to publishers for access to a subscription to a bundle of journals.[98] Big Deal bundles are usually negotiated from base packages offering "discounts" on artificially inflated retail list prices.[99] Often, Big Deal contracts may be offered all-or-nothing.[100] Big Deals also typically lock universities into multi-year business-to-business contracts with steady annual price escalation for content, irrespective of whether universities actually want, need, or use individual titles within the bundle.[101] A single subscription contract with a single publisher may cost an academic or

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[93] *See* In the Matter of Evanston Nw. Healthcare Corp., No. 9315, 2007 WL 2286195, at *65 (F.T.C. Aug. 6, 2007).

[94] Leigh-Ann Butler et al., *The Oligopoly's Shift to Open Access: How the Big Five Academic Publishers Profit from Article Processing Charges*, 4(4) QUANTITATIVE SCI. STUDIES 778, 778 (2023) (nomenclating major publishers as the Big Five); Vincent Larivière, Stefanie Haustein & Philippe Mongeon, *The Oligopoly of Academic Publishers in the Digital Era*, 10(6) PUB. LIBR. SCI. ONE 1, 5, 6–7 (2015) (finding these publishers publish over 53% of natural science articles and 70% of social sciences articles). Interestingly, even this nomenclature is suggestive of a certification market. *See* Barnett, *supra* note 43, at 490 (noting the tendency for mature certification markets to converge on a "Big [number of competitors].").

[95] OPEN ACCESS AT ELSEVIER, https://www.elsevier.com/open-access (last visited Nov. 1, 2024).

[96] Simon van Bellen et al., *The Oligopoly of Academic Publishers Persists in Exclusive Database* 8–9 (June 25, 2024), https://arxiv.org/abs/2406.17893; Alejandro Posada & George Chen, *Vertical Integration in Academic Publishing: Implications for Knowledge Inequality, in* CONNECTING THE KNOWLEDGE COMMONS — FROM PROJECTS TO SUSTAINABLE INFRASTRUCTURE 15, 20–22 (Leslie Chan & Pierre Mounier ed., 2019).

[97] STM GLOBAL, STM GLOBAL BRIEF 2021 – ECONOMICS AND MARKET SIZE 12 (2022) (industry report finding that although "30% of all scholarly articles are published as paid-for Open Access," this accounts for "just over 7% of the total journal publishing market value").

[98] Edlin & Rubinfeld, *supra* note 6, at 121.

[99] Theodore C. Bergstrom et al., *Evaluating Big Deal Journal Bundles*, 111 PNAS ECON. SCI. 9425, 9425 (2015). The most recent data I found shows that to access a single article ran individual scientists from $20 to over $100 in 2013. Ted Bergstrom & Preston McAfee, Summary Statistics Spreadsheet (calculated Sep. 29, 2013), *available at* https://mc4f.ee/Papers/Journal/2013_FinalSummaryForWeb.xlsx; *see also* Julian Fisher, *Read This Academic Journal Article, But Prepare to Pay*, ATLANTIC (Feb 2, 2011) (stating typical cost per article is $20–50).

[100] Fei Shu et al., *Is it Such a Big Deal? On the Cost of Journal Use in the Digital Era*, 79 COLL. & RSCH. LIBRS., 785, 796 (2018) (describing how Big Deals comprise a relatively small number of highly valued journals and a large number of "secondary journals, which currently often serve as—and are subsidized for—filler for these bundled big deals"); Kenneth Frazier, *The Librarian's Dilemma: Contemplating the Costs of the Big Deal*, 7 D-LIB MAGAZINE (2001) (describing negotiations as "all-or-nothing"); Stéphanie Gagnon, *Journal Publishers' Big Deals: Are They Worth It?*, 29 AGAINST THE GRAIN 22, 22–23, 28 (2017) (describing a university's failed attempt at unbundling its Big Deal subscriptions); *but see* Bergstrom et al., *supra* note 99, at 9428 (finding for a limited set of universities whose Big Deals were not covered by NDAs that some Big Deals were for "subsets of publisher['s] full collection[s]").

[101] Fei Shu et al., *supra* note 100, at 796 (describing how Big Deals comprise a relatively small number of highly valued journals and many "secondary journals, which currently often serve as—and are subsidized for—filler for these bundled big deals").

government institution up to $1.8 million per year,[102] as well as lock the institution into yearly price increases of 6% on average.[103]

University demand for Big Deal subscriptions is also highly price inelastic. One explanation is that universities compete with each other to improve their academic rankings and reputation, which in turn attract students and faculty.[104] Universities that do not provide access to critical research infrastructure, including "flagship" must-have journals, may struggle to attract top scientists.[105] A university's rankings may then further suffer as their scientists become less likely to be able to attract research and funding[106] or publish in reputable journals if they can't access and cite the top journals in their field.[107] Further, as a result of vertical integration by dominant publishers, Big Deal bundles may now include academic infrastructure as well as access to journals.[108] Given this integration, the decision not to subscribe to a large publisher's bundle of journals is also a decision to be outside that infrastructure, through which the production of science flows. Further complicating the issue is the fact that the pricing and exact content of bundles, as well as other terms, are rendered invisible by non-disclosure agreements.[109]

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[102] Ruth Serven Smith, *UVa Eyes New Way to Purchase Scholarly Journals*, DAILY PROGRESS (May 12, 2019), https://dailyprogress.com/news/local/uva/uva-eyes-new-way-to-purchase-scholarly-journals/article_50b692b2-7517-11e9-8499-1f86f89a0d11.html [] (reporting University of Virginia pays 1.8 million annually for a single Big Deal); *see also* Gretchen Kell, *Why UC Split with Publishing Giant Elsevier Daily*, BERKELEY NEWS (Feb. 28, 2019), https://news.berkeley.edu/2019/02/28/why-uc-split-with-publishing-giant-elsevier [https://perma.cc/3FV7-WN23] (reporting UC System paid 11 million a year for one publisher's Big Deal).

[103] Bergstrom et al., *supra* note 99, at 9426 (finding 6% annual increases).

[104] Vincente Safón, *Inter-ranking Reputational Effects: An Analysis of the Academic Ranking of World Universities (ARWU) and the Times Higher Education World University Rankings (THE) Reputational Relationship*, 121 SCIENTOMETRICS 897, 900–01 (2019) (describing university competition through rankings).

[105] The capacity to offer access to top-tier journals is part of the competitive landscape, as it enhances the academic experience and supports a university's reputation as a leading research institution. *See id.* (describing how university reputation drives and is driven by citation count metrics); *see also* Fei Shu et al., *supra* note 100, at 787 (describing difference in demand for high-impact, core journals versus low-impact, secondary journals). Publishers themselves have acknowledged the "must-have" nature of flagship journals. *Wiley to Acquire Blackwell Publishing (Holdings) Ltd.*, JOHN WILEY & SONS, INC. 1 (Nov. 17, 2006), http://www.blackwellpublishing.com/pdf/wiley.pdf [https://perma.cc/6GNY-N2JX]. In this way, must-have journals can be compared to must-have hospitals for insurance networks. Just as an insurance network may not be marketable in a certain geographic market if a certain hospital were not in-network, a university may not attract scientists of a certain discipline if it cannot provide them access to a must-have journal in that field. *See* Complaint at 15–16, California ex. Rel Becerra v. Sutter Health Inc., No. CGC-18-565398 (Cal. Sup. Ct. Mar. 29, 2018).

[106] Funding agencies tend to allocate a significant portion of funds to a smaller segment of highly productive investigators and institutions, indicating a preference for strong research outputs and access to the latest research developments. *See* Kaare Aagaard, *Concentration or Dispersal of Research Funding?*, 1 QUANTITATIVE SCI. STUD. 117, 138 (2019) (meta-study discussing "[t]he accelerating concentration of funding"). This has only grown with the rise of competitive or "excellence" funding. *See* Wout Scholten et al., *Funding for Few, Anticipation Among All: Effects of Excellence Funding on Academic Research Groups*, 48(2) SCI. & PUBLIC POL'Y 265, 266 (finding literature shows "Excellence [funding] has increased the concentration of resources to a limited number of researchers").

[107] *See* Chhaya Divecha et al., *The Art of Referencing: Well Begun is Half Done!*, 69 J. POSTGRADUATE MED. 1, 1 (discussing importance of references for getting published); Martin R. Huecker & Jaboc Shreffler, *How to Write and Publish a Scientific Manuscript,* STATPEARLS (Oct. 31, 2022), https://www.ncbi.nlm.nih.gov/books/NBK564394 [https://perma.cc/N7CZ-KMRT] (instructing scientists to "[e]nsure citation of keystone papers on this topic" in order to publish their manuscripts). For instance, editors in Elsevier's Cell may be less likely to publish a paper by an immunologist who does not cite any articles previously published in Cell. *See* Borrego, Anglada & Abadal , *Use and Availability of Scholarly Journals in Catalan Academic Libraries*, 38 SERIALS REV. 243, 244 (describing the importance of accessing reputable journals to scientists).

[108] *See* Posada & Chen, *supra* note 96, at 29–31 (describing university dependence on academic infrastructures owned by dominant publishers).

[109] Bergstrom et al., *supra* note 99, at 1. These NDAs are rigorously enforced. *See generally*, Complaint, Elsevier Inc. v. Wash. St. Univ., No. 09-2-00137 (Wash. Super. Ct. Whitman County, June 6, 2011) (requesting injunction to keep Big Deal contract terms out of the public record).

C. Scientific Journal Articles as Credence Goods

The ability to access scientific journals is best characterized as a credence good. It is typically unknown to university librarians, the primary purchasers of journal subscriptions, which journals will prove useful to their institutions' scientists.[110] The content of journals requires technical expertise to understand and evaluate, expertise that librarians simply do not possess.[111] As a result, librarians often rely on reputational metrics to evaluate article or journal quality.[112]

Articles are likely credence goods even from the perspectives of scientists, as scientists themselves also may find it difficult to assess whether any particular article or journal issue will prove useful to their research.[113] The process of developing a scientific innovation worthy of publication is a process of rigorous and repetitive experimentation that often draws on both a wide-ranging hodgepodge of prior literature as well as the particular expertise of the scientists' laboratory. Further, without performing a replication study on every article that a scientist reads, it becomes difficult to know whether its results would hold.[114] And, the value of much scientific research only becomes apparent after years, often not until further research builds upon it.[115] In this way, publishers may often have more information about the quality of those articles than librarians prior to, and even after, purchase.[116] Thus, the market for scientific journal articles likely exhibit the core market failure of credence good markets: information asymmetry between consumers and suppliers.

D. Reputational Mechanisms in the Scientific Publishing Certification Market

The market for academic journal articles consists of three central players (universities, publishers, and scientists), resulting in a three-sided coordination equilibrium.[117] Because scientific journal publishers are intermediaries who confer marks of quality via peer review on

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[110] Theodore Bergstrom, *Librarians and the Terrible Fix: Economics of the Big Deal*, 23(2) Serials 77, 77 (describing principal-agent problem occurring when librarians purchase subscriptions on behalf of universities); *see also* Fei Shu et al., *supra note* 100, at 786 ("While librarians are rarely the end-users of journals, they serve as subscription agents—and thus as information providers and curators—to support research and teaching efforts at their institutions").

[111] For instance, to evaluate the quality of the articles in a biophysics journal would require expertise in biophysics methodology.

[112] ROBIN CHIN ROEMER & RACHEL BORCHARDT, MEANINGFUL METRICS 5 (Assoc. Coll. & Rsch. Libr. ed., 2015) (characterizing impact as "a question that must be answered" although it is "totally impossible").

[113] Neal Young et al., *supra* note 66, at 1421 ("When scientific information itself is the commodity, there is uncertainty as to its value, both immediately and in the long term. Usually, we do not know what information will be most useful (valuable) eventually.").

[114] *See* Max Korbmacher et al., *The Replication Crisis Has Led to Positive Structural, Procedural, and Community Changes*, 1(3) COMMC'NS PSYCH. 1, 2 (2023) (discussing the fallout of the finding that, for psychology papers, only 39% were successful and, of those, effects were roughly half the original size).

[115] COMM. ON ASSESSING BEHAV. AND SOC. SCI. RSCH. ON AGING, A STRATEGY FOR ASSESSING SCIENCE 74 (Irwin Feller & Paul C. Stern eds.) (2006) ("Whether or not new scientific ideas or methods become productive research traditions depends on an uncertain process that may extend over considerable time."); Inna Vishik, *Why Scientific 'Breakthroughs' Are Often Decades in The Making*, FORBES (Feb. 8, 2016), https://www.forbes.com/sites/quora/2016/02/08/why-scientific-breakthroughs-are-often-decades-in-the-making/ [https://perma.cc/HN4T-MH2J] (giving examples about how scientific breakthroughs are often "esoteric" with an "application to technology and/or basic science [that] is unpredictable").

[116] For instance, publishers will always have more information about the quality of their own peer review process than purchasers because they are the managerial entities whose act of publishing an article is what gives it the quality stamp of peer review. Thus viewed, especially given that publishers now control the means by which reputational metrics are produced, the quality of articles appears at least partially manufactured by publishers. As further discussed below, the peer review process may be less trustworthy than some suggest. *See infra* notes 320–321 (including accompanying text).

[117] Edlin & Rubinfeld, *supra* note 6, at 129–30.

scientific articles, the market is properly characterizable as a certification market. As a result, scrutiny of publishers' gatekeeping mechanisms is essential because those mechanisms are central to the market's functionality.[118]

Like in all certification markets, reputation is the central mechanism facilitating the equilibrium between scientists, publishers, and universities.[119] Reputation here is likely more than mere branding, where a logo is a stand-in marker of quality or distinctive production technology, characteristics which can be verified before or after purchase.[120] Rather, reputation as quantified becomes an aspect of the quality of journals and their articles, a currency that scientists need for career progression and that universities use to compete for faculty and students.[121] In other words, reputation in this market is not just a marker of the value of the good in question, but rather itself intertwined with that value.[122] Publishers are well aware of the price-setting power granted by a good reputation.[123]

Reputation renders the scientific publishing market the product of and subject to direct and indirect network effects.[124] Direct network effects occur when the value of a product or service increases as more people use it, whereas indirect network effects arise when the value of a product or service increases due to the growth of complementary products or services.[125] Direct network effects exist in this market because authors want to publish in journals with the highest citation counts, i.e., where other high-impact authors are publishing.[126] Indirect network effects exist because, without readers, articles published in the journal will be less cited, and the journal's reputation will suffer. And, on the other side of the market, an increase in a journal's quantified

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[118] *See* Barnett, *supra* note 43, at 479 (describing the role of reputation in disciplining the market).

[119] *Id.* (certifiers incentives are "reputation-driven); Edlin & Rubinfeld, *supra* note 6, at 129–30 (discussing reputation's role in scientific journal market).

[120] Although branding clearly plays a role. *See* Deven Desai & Spencer Waller, *Brands, Competition, and the Law*, 5(1) BYU L. REV. 1425, 1447 (2010) (describing purposes of branding).

[121] *See supra* notes 74–79 & accompanying text; *see also* Inder M. Verma, *Impact, Not Impact Factor*, 112(26) PNAS 7875, 7875 (2015) (noting that scientists performance assessments, job applications, tenure, and funding "hinge greatly" on impact factor); May R. Berenbaum, *Impact Factor Impacts on Early Career Scientist Careers*, 116(34) PNAS 16659, 16660 (2019) ("In an increasingly competitive job market, hiring, promotions, grant funding, and bonuses are inextricably linked to [Journal Impact Factor].").

[122] As such, the value reputation accords is not merely perceived, but functions directly as a measurable form of symbolic capital. Symbolic capital, first identified by Pierre Bourdieu, is an abstract measure of prestige or authority, which helps construct and define the "exchange rates" between other types of capital. Frédéric Lebaron, *Symbolic Capital*, *in* ENCYCLOPEDIA QUALITY OF LIFE AND WELL-BEING RSCH. 6537, 6538 (Alex C. Michalos ed., 2014). Symbolic capital, like the concept of soft power in international political theory, is rarely measurable, making reputational metrics an interesting potential object of examination for economists.

[123] For instance, Springer stated that it uses and intends to continue leveraging the prestige of its journals to raise prices. Bianca Kramer & Jeroen Bosman, *Linking Impact Factor to 'Open Access' Charges Creates More Inequality in Academic Publishing*, TIMES HIGHER EDU (May 16, 2018), https://www.timeshighereducation.com/blog/linking-impact-factor-open-access-charges-creates-more-inequality-academic-publishing [https://perma.cc/YVQ3-926N] (discussing SpringerNature's Prospectus for a delayed IPO).

[124] *See* Rawat & Meena, *supra* note 74, at 87 (explaining how researching and publishing for one's career rather than furthering science degrades the integrity of research).

[125] Herbert Hovenkamp, *Antitrust and Platform Monopoly*, 130(8) YALE L.J. 1952 (2021). The classic example of direct network effects is on a social network like Facebook: the more users on the platform, the more valuable it becomes to each individual user. *See* Dina Srinivasan, *The Antitrust Case Against Facebook: A Monopolist's Journey Towards Pervasive Surveillance in Spite of Consumers' Preference for Privacy*, 16 BERKELEY BUS. L.J. 39, 89 (2019). For indirect network effects, the classic legal example is the credit card market. *See AmEx*, 585 U.S. at 529. When more consumers use a particular credit card, more merchants become inclined to accept that card and the wider merchants' acceptance of the card, the more value owning that card has for consumers. *Id.*

[126] Michael R. Dougherty & Zachary Horne, *Citation Counts And Journal Impact Factors Do Not Capture Some Indicators of Research Quality in the Behavioural and Brain Sciences*, 9(8) ROYAL SOC. OPEN SCI. (2022), https://doi.org/10.1098/rsos.220334.

reputational metrics makes it more likely that a university will subscribe to, and its scientists will read, its articles.

Reputational network effects can worsen the classic market failures of certification markets for credence goods. For instance, such effects can raise barriers to entry because the more articles in a prestigious journal are cited, the more likely that established journals will continuously attract more authors, readers, and citations—enhancing their market position. Further, to successfully enter, a new entrant must solve the market's three-sided coordination problem by simultaneously convincing both scientists and universities that it will be worth both publishing in and purchasing subscriptions to. Thus, first-mover firms can likely take advantage of path dependence to lock in consumers.[127] The higher the collective switching costs, arising from the difficulty of coordinating a mass migration among scientists and librarians from one network to another, the worse the lock-in. Here, without any way to assess the true value of the product, libraries find themselves forced to do whatever it takes to access the most reputable journals because not being able to access the most cited journals or articles is costly to their scientists' ability to publish.[128] As a result, as in most network effects markets, "[o]ne product or standard tends toward dominance," because "[o]nce a product or standard achieves wide acceptance, it becomes more or less entrenched."[129]

Because of path dependence, coordination equilibria may likely be local maxima,[130] here represented by crude impressions of a journal's reputation. The most intransigent of local maxima are the most reputable, "flagship" journals, which are must-haves for university libraries and the most desirable for scientists seeking publication.[131] These are the few leading journals that concentrate the top-cited works, thus making them the most desired journals for publication by scientists and for access by universities.[132] Due to high barriers to entry and switching costs for moving away from reputable journals, the likelihood that the universities can transition to preferable maxima due to quality or price competition is negligible.

While the severity of lock-in due to network effects in digital markets has been much

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[127] "Network effects are among the strongest lock-in mechanisms, often resulting in de facto monopolies." HARALD OVERBY & JAN ARILD AUDESTAD, INTRODUCTION TO DIGITAL ECONOMICS 166–167 (2nd ed., 2021); *see also* John M. Yun, *Does Antitrust Have Digital Blind Spots?*, 72(2) S.C.L. REV. 305, 316–17 (2020) (distinguishing between network effects and network externalities). In markets that exhibit network effects and path dependence, first is often more important than being best for this reason.

[128] Such reputational lock-in, as a type of information-based lock-in, may be especially durable, tending to increase over time. *See* Gabriel Nicholas, *Taking It with You: Platform Barriers to Entry and the Limits of Data Portability*, 27 MICH. TECH. L. REV. 263, 277 (2021) (describing the "chicken-and-egg problem" that occurs when a consumer wants to move away from an incumbent benefiting from informational economies of scale); CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 103–134, 184–86 (1999).

[129] *Microsoft*, 253 F.3d at 49 (citing Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424, 424 (1985)).

[130] *Id.* at 167 (when a market exhibits path dependence, the equilibrium it ends up is often "arbitrary and may not be the best choice."

[131] *Wiley to Acquire Blackwell Publishing (Holdings) Ltd*., *supra* note 105 and accompanying text. Studies finding that even the most reputable journals do not have superior reliability suggest that these maxima are in fact local. *See* Bjorn Brembs, *Prestigious Science Journals Struggle to Reach Even Average Reliability,* 12(37) FRONT. HUM. NEUROSCI. 1, 2 ("[T]here is no evidence that articles published in higher ranking journals are methodologically stronger").

[132] John Ioannidis, *Concentration of the Most-Cited Papers in the Scientific Literature: Analysis of Journal Ecosystems,* 1(1) PUB. LIBR. SCI. ONE 1, 4–6 (2006) (finding highly-cited research is highly concentrated).

debated,[133] scholars have primarily focused on network effects as an independent type of market failure. However, in the scientific journal publishing market, network effects are not the core market failure themselves, but rather are the flawed solution to the issues caused by goods' credence characteristics. Further, whereas physical goods wear out, reducing switching costs, scientific research accessible through digital subscriptions lives and grows.[134] Any enhancement of switching costs due to digitization is particularly dangerous in certification markets. Resulting lock-in effects disallow consumers from credibly threatening termination, allowing dominant certifiers to reduce quality until consumers' diminished utility from the degraded good is weakly preferable to the risks and costs associated with switching. In other words, by rendering lock-in effects particularly resilient, digitization may also increase firms' incentives to reputation-mine. If that firm also has market power, conduct that exacerbates or entrenches such market failures should be scrutinized by antitrust scholars and practitioners.

E. Digitization Worsens Credence Good Market Failures in the Scientific Publishing Industry

Although antitrust scholars recognized many issues in the industry,[135] most believed that digitization would be a panacea—plummeting costs and ushering an "Open Access revolution" that would undermine scientific publishers' dominance.[136] However, while digitization occurred, its promised curative effects never materialized. Instead, digitization did little to address —and in many cases likely exacerbated—credence goods market failures.

Today, most articles are accessed online.[137] As in most digital industries, the primary effect of digitization in scientific publishing was the reduction of certain transaction costs.[138] For instance, digitization reduced costs related to peer review, editing, and distribution.[139] More importantly, it enabled the bundling of numerous journals into a single digital package, leveraging universities' existing electronic infrastructure to eliminate the logistical and financial burdens of printing and physical distribution. [140] In this way, digitization was essential to the emergence of

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[133] *See* Catherine Tucker, *Network Effects and Market Power: What Have We Learned in the Last Decade?*, 32(2) ANTITRUST 73, 73 (2018) (arguing network effects do not lead to insurmountable dominance); Geoffery Parker et al., *Digital Platforms and Antitrust* 1, 17 (Stanford Digital Economy Lab Working Paper, 2021); Herbert Hovenkamp, *supra* note 125, at 1996–98 (discussing network effects the context of the dominance of digital platforms).

[134] While some articles may fade in importance in time as new science comes out, a discipline's seminal articles may often be necessary to cite for a scientist to publish in that field. *See* Bobtcheff, Caillaud & Lévy, *supra* note 44, at 8 (noting older science in pre-existing catalogs remains paywalled).

[135] *See, e.g.*, Lee C. Van Orsde, *Antitrust Issues in Scholarly and Legal Publishing: Report on an Invitational Symposium in Washington, D.C.*, COLL & RSCH. LIBRS. NEWS, May 2005, at 374, 374.

[136] *Id.* at 1 (predicting the author-pays business model would force publishers to keep prices competitive); Joseph Scott Miller, *Symposium Foreword: Why Open Access to Scholarship Matters*, 10 LEWIS & CLARK L. REV. 733 (2006) (lauding the Open Access Movement).

[137] Borrego, Anglada & Abadal, *supra* note 107, at 244 (finding "[m]ost [scientists] use electronic journals either exclusively or in any case more than print journals").

[138] *See* Ben Thompson, *supra* note 24; *but see* Tim Wu, *Ben Thompson's "Stratechery"*, MEDIUM (Oct. 28, 2020), https://superwuster.medium.com/ben-thompsons-stratechery-part-2-89f3591d9460 [https://perma.cc/V4TS-BGHD] (arguing that while lower, transition costs still exist in the digital age).

[139] *See* Julian H. Fisher, *Scholarly Publishing Re-invented: Real Costs and Real Freedoms*, 11(2) J. ELEC. PUBL'G (2008) (describing costs for electronic journals compared to print).

[140] *See* Edlin & Rubinfeld, *supra* note 6, at 121 (describing the rise of the Big Deal); *see also* Frazier, *supra* note 100 (coining the term Big Deal).

Big Deal Bundling. Combined with consolidation, which allowed publishers to offer increasingly wide-ranging digital databases, Big Deal Bundling became the operative method of journal access in the Digital Age.[141]

At the same time, digitization spurred another market transition: the Open Access Revolution. Currently, roughly fifty percent of articles are now published in some form of "open access."[142] This shift was only possible because of digitization, which, by lowering transaction costs, also lowered cost barriers to free dissemination of scientific knowledge.[143] However, the rise of open access also gave rise to APCs, which were introduced as the cost to publish open access because publishers ostensibly do not then profit from charging consumers in the downstream market for access.[144] In effect, open access expanded dominant publishers' ability to extract rents, allowing them to monetize both the publisher-to-university and the scientist-to-publisher sides of the market.

Furthering this market transition, the Obama administration issued a policy memorandum in 2013 that directed federal agencies with more than $100 million in research and development expenditures to develop plans to make the results of federally funded research freely available to the public within one year of publication, a form of open access known as "green" open access.[145] This was much derided by some critics, who argued that open access should be "gold," meaning free to access immediately after publication. Ultimately, the Obama Order lacked any meaningful enforcement mechanism and covered too few articles to effectuate the Open Access revolution.[146] Since the Obama Order, two additional major attempts have been made to stimulate a transition to gold open access. Further, an August 2022 Biden memorandum, which mandated all federal

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[141] *See* Edlin & Rubinfeld, *supra* note 6, at 137 ("All Big Deals involve the bundling of print and digital representations of journals."). Consolidation and the introduction of Big Deal business model likely had mutually reinforcing effects: Big Deals entrenched the dominance of publishers by locking institutions into bundles, while consolidation enhanced that dominance by growing publishers' portfolios and reducing competition. *See generally* Mark McCabe, *Journal Pricing and Mergers: A Portfolio Approach*, 92(1) AM. ECON. REV. 259 (2002) (tracking how consolidation in the 1990s resulted in rising journal prices). Consolidation alone is unlikely to be a sufficient explanation of the effects described by this Article unless accompanied by sufficiently high entry barriers, the discussion of which is the principal concern of this Article. As illustration, McCabe isolated only 12% of 50% price increases as being due to mergers. *See id.* at 268; *see also* Edlin & Rubinfeld, *supra* note 6, at 156 (describing how raising of entry barriers through Big Deal bundling could raise prices and be litigated as illegal monopolization or tying).

[142] Depending on publisher. *See, e.g.*, Kathryn Sharples, *Open Research Journey in 2023: How We're Paving the Way for Research Quality and Community in 2024*, WILEY.COM (Jan. 17, 2024), https://www.wiley.com/en-us/network/publishing/societies/open-access/open-research-journey-in-2023 [https://perma.cc/JH5N-CTU5] (50% of Wiley journals were published open access in 2023); Heather Piwowar et al., *The State of OA: A Large-Scale Analysis of the Prevalence and Impact of Open Access Articles*, 6 PEER J. 1, 16 (finding 45% of articles published open access in 2015).

[143] Saima Khan et al., *Digitization and Its Impact on the Economy*, 5(2) INT'L J. DIGITAL LIBR. SERVS. 138, 142 (2015).

[144] *See* Leigh-Ann Butler et al., *supra* note 94, at 779–80 (explaining the introduction of APCs). Indeed, as the backlash against double-dipping demonstrates, scientists would have been unlikely to uptake paying APCs in conjunction with subscription fees absent the open access model. *See infra* notes 151–152 (describing evidence of double-dipping).

[145] Memorandum from John P. Holdren, Director Office of Science and Technology Policy, to the Heads of Executive Departments and Agencies (Feb. 22, 2013), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf [Obama Order]. Publishers also decried the Order, arguing that open access would dissuade universities from subscribing to non-open access journals, impeding publishers' ability to serve as intermediaries in the market. DAVID KRAMER, *Scientific Publishers Unite to Oppose Potential Open Access Executive Order*, AM. INST. PHYSICS (Dec. 20, 2019), https://ww2.aip.org/fyi/2019/scientific-publishers-unite-oppose-potential-open-access-executive-order [https://perma.cc/9D2L-LXR5].

[146] For instance, while the U.S. Department of Technology announced that all U.S.-funded research was accessible green open access in 2017, 11 of the 19 agencies studied did not actually check whether the research they funded complied. U.S. GOV'T ACCOUNTABILITY OFF., GAO-20-81, ADDITIONAL ACTIONS NEEDED TO IMPROVE PUBLIC ACCESS TO RESEARCH RESULTS 4–5 (2019).

agencies to take steps to ensure that the research they fund gets published gold open access by 2026, similarly lacks any mechanism to ensure that agencies or scientists follow its guidance.[147]

Far from heralding the promised Open Access Revolution, the digitization under the Obama Order allowed increased obfuscation in the scientific publishing market. In addition to green open access, publishers have launched an array of color-coded subscription models, including gold, platinum, bronze, white, black, blue, and yellow, with each color signifying a different timeframe, methodology, or funding method through which scientists may make their publications free to access.[148] In addition, both the Obama and Biden Order allow for "hybrid" open access journals, a form of open access in which some, but not all articles in a particular journal would be open access. In such journals, scientists may pay a higher APC to make their articles openly available, or a lower APC to not.[149] Because articles in hybrid journals are made open access on a case-by-case basis chosen by the scientist who wrote the article, hybrid open access renders library purchasers likely unaware at the time of purchase, or even after, which articles, which important articles, or what percentage of articles in the hybrid journals that are a part of Big Deals would have been accessible for free.[150]

One might expect that, because libraries are repeat purchasers, they could come to know this information. However, the nature of hybrid journals is such that libraries typically cannot know when deciding whether to subscribe to the journal what percentage of articles in that journal are open access or will be in the future, even if they subscribed to that journal previously.[151] One result of this information asymmetry may be to facilitate a practice that many scientists call "double-dipping," where publishers allegedly charge universities for content that has supposedly already been paid for by scientists' APCs.[152] Further, paradoxically, APCs for hybrid journals tend

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[147] Memorandum From Alondra Nelson, Deputy Director for Science and Society, For the Heads of Executive Departments and Agencies (Aug. 25, 2022) [Biden Order]. Furthermore, even if compliance were achieved, the memorandum pertains only to federally funded research. For example, under the Order, a journal could contain both open access articles funded by U.S. agencies and non-open access articles funded by other sources. Also relevant is Plan S, a concerted mandate from various European research funding organizations launched in 2018. *See* Mark Armstrong, *Plan S: An Economist's Perspective*, 42(8) MANAGERIAL & DECISION ECON. 2017, 2023–24 (2021). However, Plan S does not govern research funded by U.S. agencies or universities. *Id.* at 2025.

[148] *A Guide to Understanding the Colors of Open Access*, IGI GLOBAL (Aug. 27, 2021), https://www.igi-global.com/newsroom/archive/guide-understanding-colors-open-access/4925/ [https://perma.cc/Y6S3-VCQ4].

[149] *See id.*; Kim & Park, *supra* note 84, at 154 (finding total APCs tend to be more expensive than subscription fees).

[150] *See, e.g.,* Najko Jahn, Lisa Matthias & Mikael Laakso, *Toward Transparency of Hybrid Open Access Through Publisher-Provided Metadata: An Article-Level Study of Elsevier*, 73 J. INFO. SCI. TECH. 104, 115 (2022) (describing how "hybrid OA has been a challenging subject to study due to the lack of standardized ways publishers flag such content and APC funding data being limited to self-reported data, surveys, and other secondary sources"); BO-CHRISTER BJOERK & DAVID SOLOMON, DEVELOPING AN EFFECTIVE MARKET FOR OPEN ACCESS ARTICLE PROCESSING CHARGES 4 (2014), https://cms.wellcome.org/sites/default/files/developing-effective-market-for-open-access-article-processing-charges-mar14.pdf ("Several interviews conducted during the study showed the difficulties in getting agreements with publishers on these issues and the concern of librarians (faced with limited budgets and the potential of a significant rise in costs to their university) of covering APCs without a concurrent drop in subscription fees.").

[151] Sumiko Asai, *Does Double Dipping Occur? The Case of Wiley's Hybrid Journals*, 128 SCIENTOMETRICS 5159, 5159 (2023) (finding "increased proportions of open access articles did not result in lower subscription prices"); Steven Pinfiel, Jennifer Salter & Peter Bath, *The "Total Cost of Publication" in a Hybrid Open-Access Environment: Institutional Approaches to Funding Journal Article-Processing Charges in Combination with Subscriptions*, 67(7) J. ASSOC. INFO. SCI. & TECH. 1751, 1751–52 (2015) (describing how publishers have made statements about offsetting, pricing models remain obscure and actual impact is difficult to verify). It is unclear to what extent this data is tracked or if, tracked, provided to university libraries.

[152] Asai, *supra* note 151, at 5159 (concluding that "there is no denying that double dipping occurs). While publishers publicly deny double-

to be higher than in journals with gold open access.[153] In other words, digitization, and especially the existence of hybrid journals, likely exacerbates the extant credence good characteristics of Big Deal bundles.[154]

Digitization also introduced another structural barrier to entry: new entrants' addition to the "Web of Science" or other bibliometric databases from which the citation counts used to calculate reputation are produced.[155] The Web of Science, for instance, only accepts a few new journals each year.[156] As such, when faced with a potential new entrant that may compete with a journal in a dominant publishers' bundle, dominant firms may predatorially launch a journal in the same discipline as a new entrant.[157] Further exacerbating this barrier to entry is the acquisition or launch of bibliometric databases by dominant publishers, which likely increases reputational barriers to entry because the publishers that produce metrics may be able to bias them against competitors.[158] Any manipulation of the metrics used to assess reputation necessarily enhances the credence good qualities of scientific journals as such manipulation makes their quality more difficult to assess.

III. MARKET DEFINITION AND MONOPOLY POWER

The typical first step in any non-*per se* antitrust analysis is to show market or monopoly power.[159] Market power is "the ability to raise prices above those that would be charged in a competitive market," in a given product market and is generally considered a lesser threshold than

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dipping, it is an open secret among industry insiders that the practice is common. *See* Danny Kingsley, *Addressing the Double-Dipping Charge*, AUSTRALASIAN OPEN ACCESS STRATEGY GRP. (Feb. 27, 2014), https://web.archive.org/web/20210302183453/https://aoasg.org.au/news-updates/blog-summary/addressing-the-double-dipping-charge. Further, scientific journal publishers have also stated that they do not consider whether they may face losses in the subscription market when they create their pricing models for full or partial open access journals. For instance, some publishers' pricing policy statements suggest that they do not or did not factor whether the articles they provide institutions could be provided open access in their pricing model explanations. *Compare* ELSEVIER, PRICING (2022), http://web.archive.org/web/20220316152538/https://www.elsevier.com/about/policies/pricing ("Subscription prices are set independent of open access articles, and open access articles are not considered when setting subscription prices.") *with* ELSEVIER, PRICING (2024), https://www.elsevier.com/about/policies-and-standards/pricing ("Subscription prices are set excluding open access articles.").

[153] David Solomon & Bo-Christer Bjork, *Article Processing Charges for Open Access Publication—The Situation for Research Intensive Universities in the USA and Canada*, 4 PEER J. 1, 7 (2016); Butler et al., *supra* note 94, at 789 ("[H]ybrid APCs were thus 46.0% more expensive than their gold counterparts").

[154] Exemplifying the credence qualities of hybrid journals is that confusion as to what percentage of articles in each journal fall into each type of access exists even among leading scholars. *See supra* note 138.

[155] Raminta Pranckute, *Web of Science (WoS) and Scopus: The Titans of Bibliographic Information in Today's Academic World*, 9(12) PUBLICATIONS 1, 1–2 (2021); Kyle Siler & Vincent Larivière, *Varieties of Diffusion in Academic Publishing: How Status and Legitimacy Influence Growth Trajectories of New Innovations*, 75 J. ASSOC. INFO. SCI. & TECH. 132, 134 (describing how indexing in bibliometric databases legitimates nascent entrants).

[156] Inclusion in the Web of Science is particularly essential because many "universities explicitly require inclusion in that index . . . as a minimum criterion for . . . [a scientist's] performance assessment and promotions."). Bo-Christer Björk, *Scholarly Journal Publishing in Transition- From Restricted to Open Access*, 27 ELEC. MKTS. 10, 105 (2017).

[157] *See* Bobtcheff, Caillaud & Lévy, *supra* note 44, at 8 ("The emergence of these new journals arguably stems from a brand proliferation strategy designed to deter entry by potential independent entrants").

[158] This type of self-preferencing is discussed further below. *See infra* Section IV.C.

[159] Epic Games, Inc. v. Apple, Inc., 67 F.4th 946, 974–75 (9th Cir. 2023), *cert. denied*, 144 S. Ct. 681 (2024)*; AmEx*, 585 U.S. at 543 ("[C]ourts usually cannot properly apply the rule of reason without an accurate definition of the relevant market."); *but see* Louis Kaplow, *Why (Ever) Define Markets*, 124 HARV. L. REV. 437, 515 (2010) ("[T]here is no way to define relevant markets in the first instance that does not presume the conclusion. . . .").

monopoly power, which is the "power to control price or the power to exclude competition."[160] For either a plaintiff must typically prove that "the market is also protected by significant barriers to entry."[161] One key difference between market and monopoly power is that the latter requires durability, the ability of dominant firms to "persist in [sustaining prices above a competitive level] *for a significant period* without erosion by new entry or expansion."[162] For instance, while market share can be evidence of both market and monopoly power, "[i]n evaluating monopoly power, it is not market share that counts, but the ability to maintain market share."[163] As monopoly power is the higher standard, and because analysis of anticompetitive conduct under either standard can be "essentially the same," this Article will focus there, showing a likelihood of market power *a fortiori*.[164]

Market and monopoly power can be proven by direct or indirect evidence.[165] Indirect evidence is more common, and is sufficient to show monopoly power when it presents a structural analysis that includes a showing of sufficiently high market share in a well-defined market.[166] Direct evidence is evidence "of the injurious exercise of market power" such as "evidence of restricted output and supracompetitive prices."[167] This kind of evidence is "direct proof of the injury to competition which a competitor with market power may inflict, and thus, of the actual exercise of market power."[168] Thus, abnormally high profit margins or sustained supracompetitive prices can serve as direct evidence of market power as these imply that the firm can restrict output or raise prices without losing significant market share.[169]

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[160] Nat'l Collegiate Athletic Ass'n v. Bd. of Regents of Univ. of Oklahoma, 468 U.S. 85, 109 n.38 (1984) (defining market power); United States v. Grinnell Corp., 384 U.S. 563, 571 (1966) (defining monopoly power).

[161] *Microsoft*, 253 F.3d at 82; *see also* Harrison Aire, Inc. v. Aerostar Int'l, Inc., 423 F.3d 374, 381 (3d Cir. 2005) ("In a typical section 2 case, monopoly power is 'inferred from a firm's possession of a dominant share of a relevant market that is protected by entry barriers.'") (quoting *Microsoft*, 253 F.3d at 51)).

[162] *See* AD/SAT, Div. of Skylight, Inc. v. Associated Press, 181 F.3d 216, 227 (2d Cir. 1999). This is not to say that durability is not also a characteristic of market power; rather the difference between monopoly and market power is of degree, not kind. *See* Epic v. Apple, 67 F.4th 946, 998 (9th Cir. 2023) (Monopoly power differs in degree from market power, requiring "something greater.") (citing Eastman Kodak Co. v. Image Tech. Servs., Inc., 504 U.S. 451, 481 (1992) & Phillip E. Areeda & Herbert Hovenkamp, FUNDAMENTALS OF ANTITRUST LAW § 5.02 (4th ed. 2017)).

[163] *AD/SAT*, 181 F.3d at 227; United States v. Dentsply Int'l, Inc., 399 F.3d 181, 188–9 (3d Cir. 2005).

[164] In Rule of Reason cases. *See* Verizon Commc'ns Inc. v. L. Offs. of Curtis v. Trinko, LLP, 540 U.S. 398, 407 (2004) (The Section 2 anticompetitive-conduct requirement is "essentially the same" as the inquiry applicable to Section 1 claims); Fed. Trade Comm'n v. Qualcomm Inc., 969 F.3d 974, 991 (9th Cir. 2020); *see also Microsoft*, 253 F.3d at 59 ("[I]t is clear . . . that the analysis under section 2 is similar to that under section 1 regardless of whether the rule of reason label is applied." (citation omitted)).

[165] *AmEx*, 585 U.S. at 2284; *Eastman Kodak*, 504 U.S. at 465; *Ind. Fed'n of Dentists*, 476 U.S. at 460; *Bd. of Regents*, 468 U.S. at 99; Rebel Oil Co. v. Atl. Richfield Co., 51 F.3d 1421, 1434 (9th Cir. 1995); Broadcom Corp. v. Qualcomm Inc., 501 F.3d 297, 307 (3d Cir. 2007).

[166] *Microsoft*, 253 F. 3d at 51.

[167] *Rebel Oil Co*., 51 F.3d at 1434; *Eastman Kodak*, 504 U.S. at 477–78 (finding continued profitability despite consistent and high price increases suggested that Defendant could control prices without losing significant sales to competitors, thereby indicating market power).

[168] *Rebel Oil Co*., 51 F.3d at 1434 (citing FTC v. Indiana Fed'n of Dentists, 476 U.S. 447, 460–61 (1986)).

[169] Exclusionary conduct itself can also be direct evidence of market power. *See Microsoft*, 253 F.3d at 57–58 (relying on direct evidence of Microsoft's ability to control prices and exclude competitors to conclude Microsoft held monopoly power in the operating system market); *see also Rebel Oil Co.*, 51 F.3d at 1438–39, n.10 ("[T]elltale factors" include "market share, entry barriers and the capacity of existing competitors to expand output."); L.A. Land Co. v. Brunswick Corp., 6 F.3d 1422, 1427–28 (9th Cir. 1993); Epic v. Apple, 67 F.4th at 984–85.

A. Use of Direct Evidence in Credence Goods Markets

When a market power showing is by direct evidence, such as overwhelming evidence of sustained supracompetitive profits or price levels, it is black letter law that definition of product markets and accompanying market share analysis may not be necessary.[170] In such cases, full-bore market analysis need not be conducted, but only the "rough contours of a relevant market" established.[171]

Direct evidence can be a valuable tool for courts as it provides clear and unambiguous evidence of a firm's market power, eliding the theoretical complications of the deep econometric analysis that often constitute indirect evidence of market power. This may be especially true in cases involving certification markets or other markets for credence goods. In such markets, direct evidence can provide a straightforward link between a firm's behavior and its effects, strengthening the conceptual tie between the firm's conduct and the antitrust violation alleged. Direct evidence may be especially available in credence goods or certification markets because they are particularly susceptible to market failures, such as overcharging,[172] under- or over-supply,[173] or quality degradation.[174]

Evidence of quality degradation is an especially efficient method of showing market power in a certification market as it collapses market definition into anticompetitive effects analysis. In *Google*, Judge Mehta found "persuasive" direct evidence that Google has "the ability to degrade product quality without concern of losing consumers."[175] Direct evidence of this type could be

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[170] *See Indiana Fed'n of Dentists*, 476 U.S. at 460–61 (accepting direct evidence of anticompetitive effects as sufficient to prove market power without defining a relevant market); Brief for Am. Antitrust Inst. as Amici Curiae Supporting Plaintiff-Appellant, Innovative Health, LLC. v. Biosense Webster, Inc., No. 22-55413, 2022 WL 9487305, at *17–19 (9th Cir. Oct. 7, 2022) (asserting that "a plaintiff who can show unambiguous direct evidence of anticompetitive effects can prove the 'ability' to control prices and exclude competition and the 'rough contours' of a relevant market without taking any 'measurements.'"); *see also* Epic v. Apple, 67 F.4th at 974 n.6 (noting that the usual market definition requirement is also elided when plaintiffs allege a per se violation or in "quick look" cases).

[171] Republic Tobacco Co. v. N. Atl. Trading Co., 381 F.3d 717, 737 (7th Cir. 2004*); see also* United States v. Pabst Brewing Co., 384 U.S. 546, 549 (1966) (An antitrust plaintiff does not have to prove a relevant market "by metes and bounds as a surveyor would lay off a plot of ground."); *Indiana Fed'n of Dentists*, 476 U.S. at 460–61 (requiring a lesser threshold of market analysis in light of direct evidence); Bhan v. NME Hosps., Inc., 929 F.2d 1404, 1413 (9th Cir. 1991) ("If the plaintiff can make a showing of anti-competitive effects [through direct evidence], a formal market analysis becomes unnecessary."); Toys "R" Us, Inc. v. FTC., 221 F.3d 928, 937 (7th Cir. 2000) (rejecting argument that anticompetitive effects in a market cannot be shown unless the plaintiff first proves the defendant has a large market share).

[172] Supracompetitive pricing is a common form of direct evidence*. See, e.g.*, Theme Promotions, Inc. v. News Am. Mktg. FSI, 546 F.3d 991, 1001 (9th Cir. 2008); Coastal Fuels of P.R., Inc. v. Caribbean Petrol. Corp., 79 F.3d 182, 196–97 (1st Cir. 1996); *see also* Town Sound & Custom Tops, Inc. v. Chrysler Motors Corp., 959 F.2d 468, 481 n.17 (3d Cir. 1992) (finding direct evidence of "sustained supranormal profits" sufficient). Additionally, certification goods markets may be especially prone to lock-in, thereby allowing showings of supracompetitive prices and profits to be compelling direct evidence. *See* FTC. v. Staples, Inc., 970 F. Supp. 1066, 1082–83 (D.D.C. 1997) (Finding evidence of supracompetitive prices sufficient direct evidence when combined with the reluctance of consumers to substitute other products in response to those prices).

[173] Reduced output, e.g., is a common form of direct evidence. K.M.B. Warehouse Distributors, Inc. v. Walker Mfg. Co., 61 F.3d 123, 129 (2d Cir. 1995) ("If a plaintiff can show an actual adverse effect on competition, such as reduced output[,] . . . we do not require a further showing of market power.") (citation omitted); Capital Imaging Assocs. v. Mohawk Valley Med. Assocs., 996 F.2d 537, 546 (2d Cir. 1993) (explaining that plaintiff may avoid "detailed market analysis by offering proof of actual detrimental effects, such as a reduction of output") (citation omitted).

[174] *See Google LLC*, 747 F.Supp.3d at 75–76.

[175] *Id.; see also* DEP'T OF JUSTICE AND THE FED. TRADE COMM'N, HORIZONTAL MERGER GUIDELINES 2 (2010), http://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf ("Enhanced market power can also be manifested in non-price terms and conditions that adversely affect customers, including reduced product quality. . . . Such non-price effects may coexist with price effects, or can arise in their absence. When the Agencies investigate whether a merger may lead to a substantial lessening of

sufficient to show monopoly power on its own as it is something that only a monopolist in a certification market could do.[176] Any direct evidence in this vein should be given especial weight by courts given its consistency with the typical market failures of the industry given the nature of scientific articles as credence goods.[177]

Finally, because credence goods, and in particular certification markets, usually have reputational barriers to entry, exclusionary conduct aimed at raising those barriers may also constitute direct evidence of market or monopoly power.[178] As such, conduct that a plaintiff proves creates or exacerbates those failures would be particularly compelling direct evidence.[179] Additionally, certification goods markets may be especially prone to lock-in, thereby allowing showings of supracompetitive prices and profits to be compelling direct evidence. Ultimately, a focus on direct evidence in such markets would have the potential to streamline judicial proceedings by focusing on concrete actions and outcomes rather than speculative market conditions and hypothetical competition scenarios.[180]

Viewing direct evidence in credence goods markets in this way allows courts to avoid the common mistake of asserting that direct evidence other than of "restricted output" is insufficient to show market power.[181] Instead, thus recognized, "showing a reduction in output is one form of

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non-price competition, they employ an approach analogous to that used to evaluate price competition."); DEP'T OF JUSTICE & FED. TRADE COMM'N, 2023 MERGER GUIDELINES 34 (explaining the utility of evidence of parties' intent or expectation that a merger will "reduce product quality").

[176] *See Google LLC,* 747 F.Supp.3d at 75–76 (citing *Microsoft*, 253 F. 3d at 58).

[177] Dicta in *AmEx* does not disturb this conclusion as its holding that direct evidence of competitive harm was insufficient to shift a burden of production to the defendant was limited in application to vertical restraints. 585 U.S. at 543 n.7. That holding was also economically erroneous. *See id.* at 2297 (Breyer, J., dissenting) ("One critical point that the majority's argument ignores is that proof of actual adverse effects on competition is, a fortiori, proof of market power. Without such power, the restraints could not have brought about the anticompetitive effects that the plaintiff proved.").

[178] *See* United States v. Microsoft Corp., 87 F. Supp. 2d 30, 37 (D.D.C. 2000), *aff'd in part, rev'd in part on other grounds and remanded*, 253 F.3d 34 (D.C. Cir. 2001) ("Microsoft has comported itself in a way that could only be consistent with rational behavior for a profit-maximizing firm if the firm knew that it possessed monopoly power, and if it was motivated by a desire to preserve the barrier to entry protecting that power."). Additionally, viewing direct evidence of exclusionary conduct in this way solves the analytical issue raised by the maxim that antitrust law protects competitors not competition. *See* Daniel A. Crane, *Market Power Without Market Definition*, 90 NOTRE DAME L. REV. 31, 64–65 (2014) (arguing that this maxim "makes little sense" if market power can be proven directly by exclusion). Direct evidence thus presented would show exclusion not of individual competitors but would be a structural analysis showing that a firm raised barriers to entry, thereby tending to exclude competition. This understanding also better comports with rampant case law stating that direct evidence of exclusionary behavior can show monopoly power. *See, e.g.*, PepsiCo, Inc. v. Coca-Cola Co., 315 F.3d 101, 108 (2d Cir. 2002); Tops Mkts., Inc. v. Quality Mkts., Inc., 142 F.3d 90, 98 (2d Cir. 1998); *Qualcomm*, 501 F.3d at 307 n.3 (citing Conwood Co., L.P. v. U.S. Tobacco Co., 290 F.3d 768, 783 n.2 (6th Cir. 2002).

[179] This would address courts' concern that such evidence may be exceedingly rare. *See* Phillip Areeda, Herbert Hovenkamp & John Solow, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION ¶ 531a, at 187 (2d ed., 2002); Epic v. Apple, 67 F.4th at 984–85.

[180] This approach is consistent with both scholarship and case law. *See* David Glasner & Sean P. Sullivan, *The Logic of Market Definition*, 83 ANTITRUST L.J. 293, 338–39 (2020) ("[T]here is no need for courts or litigants to waste time and resources insisting on traditional market definition when other evidence is sufficient to meet the relevant standard of proof in demonstrating anticompetitive effects."); Andrew I. Gavil & Steven C. Salop*, Probability, Presumptions and Evidentiary Burdens in Antitrust Analysis: Revitalizing the Rule of Reason for Exclusionary Conduct*, 168 U. PA. L. REV. 2107, 2134 (2020) ("It makes no economic or legal sense to require inferior evidence when superior evidence already has been provided."); United States v. Baker Hughes Inc., 908 F.2d 981, 992 (D.C. Cir. 1990) ("Market share is just a way of estimating market power, which is the ultimate consideration . . . [w]hen there are better ways to estimate market power, the court should use them.") (quoting Ball Mem'l Hosp., Inc. v. Mutual Hosp., Inc., 784 F.2d 1325, 1336 (7th Cir. 1986).

[181] *See Epic Games*, 559 F. Supp. 3d at 1030–31; Safeway Inc. v. Abbott Lab'ys, 761 F. Supp. 2d 874, 887 (N.D. Cal. (2011) (citing *Rebel Oil Co.*, 51 F.3d at 1434); *see also* Harrison Aire, Inc. v. Aerostar Int'l, Inc., 423 F.3d 374, 381 (3d Cir. 2005); Geneva Pharmas. Tech. Corp. v. Barr Lab'ys Inc., 386 F.3d 485, 500 (2d Cir. 2004); Blue Cross & Blue Shield United of Wisconsin v. Marshfield Clinic, 65 F.3d

direct evidence, but it 'is not the only measure.'"[182] Simply, output and prices are not exogenous concepts in economics.[183] *Epic v. Apple* is unique among cases involving digital platforms as direct evidence of high price (Apple's supracompetitive commission), low costs (that the commission was set without "without regard" to Apple's own costs), and high profits (Apple's "extraordinarily high operating margins") may have been sufficient direct evidence of market power had plaintiffs also shown durability.[184] In sum, courts should be less reluctant to elide the screening mechanism of indirect market definition in credence goods markets, such as some digital markets, if plaintiffs present adequate direct evidence of market power.[185]

B. Direct Evidence in the Market for Scientific Journal Articles

It is likely that the scientific journal market should be divided into discipline-specific submarkets.[186] That demand for a particular journal or journal article is dependent on discipline is obvious; a biologist is as unlikely to rely on a chemistry paper as a planetary scientist is to rely on a psychology paper.[187] This approach accords with the literature, which typically estimates concentration by discipline.[188] However, academic disciplines are now so specialized that the most granular of those studies may examine too wide a field of competitor journals. For instance, although immunology is a sub-discipline of biology, an immunologist researching NK cells' reaction to COVID may not need access to all flagship biology papers to publish successfully.[189]

Further, discipline-specific submarkets must also be distinguished for flagship journals and secondary journals.[190] Because of the difference in the competitive dynamics of the journals,

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1406, 1412 (7th Cir. 1995). Although many rely on shoddy economics. For instance, the Ninth Circuit in *Safeway* rejected Plaintiffs' argument "that evidence of restricted output is not required because raising prices necessarily depresses sales." 761 F. Supp. 2d at 887 n.3 In support of that rejection, the court stated that: "Take for example a market in which demand outstrips supply. In such a hypothetical market, a firm could raise prices—up to a certain point—without necessarily causing a commensurate reduction in sales." *Id.* This argument confuses shifts of a supply curve with shifts along a supply curve, using the specter of the possibility of the former to dismiss direct evidence of the latter.

[182] Epic v. Apple*,* 67 F.4th at 966 (citing O'Bannon v. Nat'l Collegiate Athletic Ass'n, 802 F.3d 1049, 1070 (9th Cir. 2015)) (rectifying the lower court's erroneous finding that direct evidence of supracompetitive prices was insufficient in the absence of alleged simultaneous output restrictions); *see also id.* at 984 (holding that *AmEx* did not disturb this precedent). Areeda & Hovenkamp, ANTITRUST LAW, ¶ 1503b(1).

[183] Insofar as direct evidence of output constraints may be required to show monopoly power in this market, this Article cannot adjudicate whether that evidence may exist, especially given the NDAs that cover Big Deal bundles. However, a court adjudicating such a defense should be mindful in classifying output. For instance, this paper describes how the scientific publishing market should have experienced a shift to gold open access given digitization and regulation, a shift that may have been stymied by publishers' conduct. Any benchmark for competitive output therefore should be attentive not only to whether new journals are being launched, but also to what extent they are accessible.

[184] *See* 67 F.4th at 972.

[185] *See, e.g.*, *id.* at 984–85 (analyzing indirect evidence despite finding supracompetitive prices and profits); *Google*, 2024 WL 3647498, at *76–80 (heavily analyzing indirect evidence despite finding strong direct evidence of monopoly power).

[186] *See* Edlin & Rubinfeld, *supra* note 6, at 127 ("[I]t might be that macroeconomics journals would constitute a relevant market in a merger analysis because a hypothetical monopoly of macroeconomics journals could profitably raise price.").

[187] Determining the lines between disciplines would also be a fact-specific question.

[188] *See* Larivière, Haustein & Mongeon, *supra* note 94, at 7 fig. 3; Oliver Budzinski et al., *Drivers of Article Processing Charges in Open Access*, 124 SCIENTOMETRICS 2185, 2198 (2020).

[189] *See, e.g.*, Madeline J. Lee & Catherine A. Blish, *Defining the Role of Natural Killer Cells in COVID-19*, 24(10) NATURE IMMUNOLOGY 1628 (2023) (citing predominantly virology & immunology journals).

[190] Because the competitive conditions of flagship and secondary journals vary significantly, the natural market is not properly understood

specifically, the highly inelastic demand for flagship journals and the more elastic demand for secondary journals, each discipline-specific submarket is likely not a bundle market.[191] Rather, competition is more appropriately understood as occurring journal-to-journal.[192] This accords with the presumption that narrower market definitions are proper the more highly products are differentiated.[193] In fact, because of high product differentiation and because flagship journals are likely must-haves for university libraries, it may be that the flagship journals function as "mini-monopolies."[194]

Within the rough contours of the scientific journal publishing market just described, two types of direct evidence may be available. First, evidence of supracompetitive prices.[195] And second, evidence of quality degradation.

In *Epic v. Apple*, direct evidence of high price, low costs, and high profits, if combined with durability, would have been sufficient to show market power.[196] Here, all four factors may be present. In the upstream market, publishers charge high prices, with growth far surpassing inflation every year, to universities as part of their Big Deals.[197] In the downstream market, APCs

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as a cluster market, but rather perhaps as a bundle market where individual submarkets would compete absent bundling. *See* Kevin Hahm, *Clarifying Bundle Markets and Distinguishing them from Cluster Markets*, 20(4) ANTITRUST SOURCE 1, 1 (2021) (showing that cluster markets are only appropriate when aggregated product markets share "similar competitive conditions) (citing ProMedica Health Sys., Inc. v. FTC, 749 F.3d 559, 565 (6th Cir. 2014)).

[191] *Id.* at 3 ("[A] bundle market is the collection of products or services that comprise the relevant market where customers value suppliers offering a package of goods and benefit from the "one-stop shopping" experience.). However, whether the requirement that consumers benefit from the "one-stop shopping experience is met in the scientific journal market is questionable. The assumption that just because services are currently offered as bundled makes the market a bundled market would be harmful and should be proven. *See id.* at 11 ("[I]ncorrectly grouping products as a bundle may result in structural measures that overstate or understate the likely competitive effect . . . .").

[192] Although the literature is contested on this point, more recent articles tend to view competition on a journal-to-journal basis. *Compare* Bobtcheff, Caillaud & Lévy, *supra* note 44, at 7 (describing competition between journals) *with* McCabe, *supra* note 141 (describing competition between portfolios).

[193] Brown Shoe Co. v. United States, 370 U.S. 294, 325 (1962) (stating that "the boundaries of [a product market] may be determined by examining such practical indicia as . . . the product's peculiar characteristics and uses, . . . distinct prices, [and] sensitivity to price changes . . . ."); Christine S. Wilson & Keith Klovers, *Same Rule, Different Result: How the Narrowing of Product Markets has Altered Substantive Rules*, 84 ANTITRUST L.J. 55, 70–76 (describing how product differentiation historically has led to narrower antitrust markets).

[194] If the mini-monopoly concept holds empirically, the approach would definitionally show monopoly power by publishers owning flagship journals in a market for articles in that journal's discipline. Mini-monopolies are not a novel concept in antitrust law, especially in markets involving intellectual property. *See, e.g.*, Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1059 n.115 (2005) (applying "monopolistic competition models to innovation necessarily treat[s] intellectual property rights as 'mini-monopolies' conferring at least some power over price . . ."); Michelle M. Wu, *Why Print and Electronic Resources Are Essential to the Academic Law Library*, 97 LAW LIBR. J. 233, 244 (2005) (mentioning mini-monopolies in legal publishing). For instance, in the pharmaceutical industry, branded drug products that are sufficiently unique or differentiated have often been found to constitute their own market. *See* Brian Urevig, *Hatch-Waxman - Thoughtful Planning or Just Piling on: A Consideration of the Federal Trade Commission's Proposed Changes*, 4 MINN. INTELL. PROP. REV. 367, 392 (2003) ("The first generic manufacturer is essentially granted a 'mini-monopoly' from any generic competitors."). Further, to the extent that there may be substitution away from flagship journals, this may be evidence of the Cellophane Paradox. *See Eastman Kodak*, 63 F.3d at 105 (cross-elasticity of demand among those products "may . . . be the product of monopoly power rather than a belief on the part of consumers that the products are good substitutes for one another," because "[a]t a high enough price, even poor substitutes look good to the consumer.").

[195] Such evidence is not common in many markets because determining above-cost pricing requires determining a firm's gross marginal cost, which is difficult to observe or estimate. Further, it is often difficult to determine whether high prices or profits are due to market power or other factors, such as superior efficiency or innovation. Finally, courts are often wary to accept evidence of supracompetitive prices as direct evidence because these are often transitory and therefore poor indicators of monopoly power.

[196] 67 F.4th at 984–85.

[197] Sion Romaine et al., *OA, AI, and DEI—Triple Advantage or Triple Threat?: Periodicals Price Survey 2024*, LIBR. J. NEWS (Apr. 22, 2024), https://www.libraryjournal.com/story/oa-ai-and-dei-triple-advantage-or-triple-threat-periodicals-price-survey-2024 (table 5 finding

are also rising.[198] These apparently supracompetitive prices consistently translate to over thirty-five percent profit margins for many dominant publishers.[199] Costs are likely low because most peer reviewers work for free and costs associated with print publishing have largely plummeted with the transition to digital journals.[200] Although the cost of publishers' gatekeeping function in the digital age has likely increased because the internet has lowered costs of submission, this is likely insufficient to justify increased prices. Even taking that cost into account, one study that controlled for costs to reject and review non-publishable articles concluded that the high end of costs to publishers were $723 per article, less than one fourth the average APC.[201] Therefore, just as with Apple's commission in *Epic v. Apple*, it may be that APCs bear little relation to costs in the digital age.

Profits and prices also appear immensely durable. Supracompetitive profits have been extracted and yearly price increases have been levied, likely over at least twenty years.[202] And, most tellingly, these profits have been consistently extracted despite a market disruption that most analysts predicted would shake publishers' dominance: the Open Access Revolution. In other words, just as with Apple in *Epic v. Apple*, dominant publishers' market power is likely durable because, unlike Apple, it was "durable and sustaining given the current [and past] state[s] of the relevant market."[203]

In addition to direct evidence of price, there is some evidence that scientific journal publishers may be degrading quality in accordance with the economic theory of certification markets. Evidence that the quality of scientific journals has decreased is plentiful. Many scientific

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price increases of 6.2% in 2022-23; 7.8% in 2023-24; and predicting increases of over 6.5% in 2025); Theodore Bergstrom et al., *supra* note 99, at 9426 (finding Big Deal bundle contract lock universities into yearly price increases greater than inflation).

[198] Dan Pollock & Heather Staines, *News & Views: Open Access Charges – Continued Consolidation and Increases*, DELTATHINK (Mar. 19, 2024), https://www.deltathink.com/news-views-open-access-charges-continued-consolidation-and-increases-3 (finding open access APCs beating inflation, but hybrid APCs slightly less than inflation, likely only because of outsized inflation post-COVID).

[199] For instance, the profit margin of Elsevier's Scientific, Technical, and Medical Division "never decreased below 30% during 1991–2013, and steadily increased from 30.6% to 38.9% between 2006 and 2013. Larivière, Haustein & Mongeon, *supra* note 94, at 10; *see also generally* David W. Lewis, *Why Elsevier's Outrageous Profit Margins Could Turn Out to Be a Good Thing* 1 (Indiana State University Working Paper, 2017) (discussing Elsevier's nearly 40% profit margins). A look at Elsevier's Annual Reports only shows increasing adjusted operating profit margins since 2013. *Annual Reports*, RELX (last visited Nov. 9, 2024) (showing 2% growth in profit margin in 2014; 3% in 2015; 3% in 2016; 3% in 2017, 2% in 2018, 3% in 2019, 1% in 2020, 3% in 2021, 5% in 2022, 4% in 2023). A back-of-the-envelope calculation indicates that Elsevier's profit margins on scientific journals may now exceed 50%. This trend is not exclusive to Elsevier. For instance, Taylor and Francis' profit margins also appear to have remained steady since 2006. *See* Larivière, Haustein & Mongeon, *supra* note 94 at 10 (finding a profit margin of 35.7% in 2013); *see* INFORMA, ANNUAL REPORT AND ACCOUNTS 2023, https://www.informa.com/globalassets/documents/investor-relations/2024/2023-informa-annual-report.pdf [https://perma.cc/6DRF-P5LV] (last visited Nov. 9, 2024) (profit margins ~35%).

[200] Nady el-Guebaly, *The Critical Role of Peer Reviewers: Challenges and Future Steps*, 40(1) NORDIC STUDIES ALCOHOL & DRUGS 14, 14 (2022); *see also* Complaint at 10, Dr. Lucina Uddin v. Elsevier et al., No. 1:24-cv-06409-HG (E.D.N.Y. Sep. 12, 2024).

[201] Alexander Grossman & Bjorn Brembs, *Current Market Rate of Scholarly Services*, 10(20) F1000 RSCH. 1, 8 (2021); *id.* at 1 (also finding the average cost to publish an article was $400).

[202] *See supra* notes 197–198 (subscription prices and APCs); *supra* note 199 (profits).

[203] Colo. Interstate Gas Co. v. Nat. Gas Pipeline Co. of Am., 885 F.2d 683, 695–96 (10th Cir. 1989) (finding a firm lacked monopoly power because its "ability to charge monopoly prices will necessarily be temporary").

fields are experiencing crises of replicability,[204] retraction,[205] and novelty.[206] These signifiers of potentially depressed quality may be at least in part due to publishers' rising APCs.[207] APCs allow publishers to profit off scientists' submissions to their journals as well as the sale of those submissions to university libraries. As such, APCs fundamentally shift market dynamics. Whereas publishers in the pre-digital era had little incentive to publish lower quality articles for fear of reputational side effects, publishers now make more profit on the upstream side of the market the more articles they publish.[208] This profit occurs even if the publisher accepts lower quality articles, so long as universities' diminished utility from the degraded good remains weakly preferable to the risks and costs associated with switching to an alternate publisher. In other words, the shift in the market due to APCs directly incentivizes one of the key market failures associated with credence goods in a certification market: reputation-mining.

Whether scientific journal publishers may, in fact, be reputation-mining would be a fact-specific inquiry. For instance, in *Google*, Judge Mehta relied on internal studies about the effect on revenue if it were to "significantly reduce quality" as well as Google's admission that it does not "consider whether users will go to other specific search providers (general or otherwise) if it introduces a change to its Search product."[209] Other direct evidence of reputation-mining could include any documented relaxation of standards historically, particularly if associated with the certifier gaining market power or needing additional revenue. Similarly, inflation of reputational metrics without corresponding changes in process rigor or outcome quality might indicate reputation-mining, as such evidence could show certifiers might be relying on perceived rather than actual improvements.[210]

One rough indicator that quality may be decreasing since the advent of APCs is the reported

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[204] *See generally*, R. BARKER BAUSELL, THE PROBLEM WITH SCIENCE (Oxford U. Press, 2021) (discussing a reproducibility crisis affecting most scientific disciplines); Max Korbmacher et al., *supra* note 114, at 2 (describing reproducibility crisis in psychology); Rosaria Ciriminna, *Reproducibility in Chemistry Research*, 10 HELIYON 1, 2–3 (2024) (discussing reproducibility concerns in three areas of chemistry); Sayash Kapoor & Arvind Narayanan, *Leakage and the Reproducibility Crisis in Machine-Learning-Based Science*, 4 PATTERNS 1, 3 (2023) (finding irreproducibility in machine learning).

[205] In 2023, 10,000 sham papers were retracted by journals, over 80% of which were owned by a major for-profit publisher. Richard Van Noorden, *More Than 10,000 Research Papers Were Retracted in 2023 — A New Record*, 624 NATURE 479, 479–80 (2023) (describing rising retraction rates).

[206] Michael Park, Erin Leahey, & Russell J. Funk., *Papers and Patents Are Becoming Less Disruptive Over Time*, 613 NATURE 138, 142 (2023) (finding "a marked decline in disruptive science and technology over time"). Particularly worrisome is a noted decline in pharmaceutical innovation. *See* Robin Feldman, *May Your Drug Price Be Evergreen*, 5(3) J.L. & BIOSCI. 590, 597 (2018) (finding 78% of the drugs associated with new patents were not new).

[207] For instance, there is likely a tradeoff between selectivity and reputation given that to publish more, a publisher must accept a wider range of quality of articles. Mark A. Hanson et al., *The Strain on Scientific Publishing*, 5(4) QUANT. SCI. STUDS. 823, 824–25 (2024) (describing the tradeoff between publication volume and quality). Marco Seeber, Mattia Cattaneo & Sebastian Birolini, *Academic Publishing Business Models: Self-citations and the Selectivity-Reputation Trade-off* 22–23 (May 8, 2024), https://osf.io/preprints/socarxiv/5t8v7_v1.

[208] Mark A. Hanson et al., *The Strain on Scientific Publishing*, 5 QUANTITATIVE SCI. STUDS. 823, 824 (2024).

[209] Google LLC, 747 F.Supp.3d at 75–76.

[210] Hanson et al., *supra note* 207, at 823 (finding near double growth in impact factor for most dominant publishers in 2022 compared to the previous six years).

increase in fraud in[211] and retractions of published papers.[212] Although this trend may have multiple causes[213] the risk that the quality of science is decreasing in accordance with the theory of certification markets is worth scrutiny as it suggests that certification market mechanisms that ensure quality may be failing. Indeed, regardless of the root cause of the rise in fraudulent publications, the very fact that fraud is increasing signals a breakdown of certifying intermediaries —dominant publishers—performance gatekeeping function.

C. Indirect Evidence of Monopoly Power in the Market for Scientific Publishing

If direct evidence does not suffice to show monopoly power, establishing the same through indirect evidence would be challenging. First, a strict definition of the product market would be complex. Second, publishers' market share may be too low to establish either monopoly or market power. Establishing either is beyond the scope of this Article, especially given a dearth of pricing and output data that renders determining exact substitution rates and market shares impossible.[214]

Determining where the lines between disciplines lie and which journals in those disciplines are must-haves would be an incredibly fact-specific question.[215] For instance, the granularity of a discipline would likely have to be estimated by assessing scientists' willingness to forego access to a journal in a discipline for another due to its price or quality.[216] It may very well be, for instance, that a topologist must be familiar with number theory or that a cancer immunologist must be familiar with virology in order to publish in their respective fields.

The fact-intensive nature of defining the product market would also extend to the required showing of market power within those markets.[217] Courts rarely find monopoly power in a market

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[211] Jefferey Brainard, *Fake Scientific Papers are Alarmingly Common*, 380(6645) SCIENCE 568, 568 (2023) ("[U]p to 34% of neuroscience papers published in 2020 were likely made up or plagiarized; in medicine, the Figure was 24%."); Holly Else, *Biomedical Paper Retractions Have Quadrupled in 20 Years — Why?*, 630 NATURE 280, 280–281 (2024); Ferric C. Fang, R. Grant Steen, & Arturo Casadevall, *Misconduct Accounts for the Majority of Retracted Scientific Publications*, 109 PNAS 17028, 17028 (2012) (finding tenfold increase in retractions was largely due to fraud).

[212] *See* Richard Van Noorden, *supra* note 205, at 479–80.

[213] One alternative explanation is that technology allows for easier forms of fraud. *See* Martin Majovsky et al., *Artificial Intelligence Can Generate Fraudulent but Authentic-Looking Scientific Medical Articles*, 25 J. MED. INTERNET RSCH. 1, 5–6 (2023) (finding artificial intelligence can create convincing fake medical articles). Another alternative is that scientists' incentives to commit fraud increase as the pressure to publish increases. *See* Paul Maldino & Richard McElreath, *The Natural Selection of Bad Science*, 3 ROYAL SOC'Y OPEN. SCI. 1, 3–4 (2016) (describing how selecting scientists based on publication output tends to produce poorer methods and results). However, while likely due to myriad factors, this effect, of increasing publish-or-perish culture, may also be worsened by publishers' conduct. *See, e.g.*, *infra* notes 325–32 and accompanying text.

[214] For example, attempting the hypothetical monopolist test would be impossible without such data.

[215] And perhaps even a philosophical one. *See* ROLF HVIDFELDT, THE STRUCTURE OF INTERDISCIPLINARY SCIENCE 34 (Palgrave Macmillan 1st ed. 2018) ("[D]isciplinary boundaries do not necessarily track epistemically relevant differences."). It may very well be that a topologist must be familiar with number theory to publish or that a cancer biologist must be familiar with mitochondrial research.

[216] This could perhaps be performed by constructing a model of which journals the articles cited by papers that fall under a classic discipline cite only articles in a subset of journals of that discipline or cite to journals outside that discipline. A similar analysis would likely have to be performed to determine which journals are flagship. For, if the articles in a particular journal are not widely cited within that article's discipline, then the journal is unlikely to be a must-have. Constructing this model falls outside the scope of this paper.

[217] Many courts will use market share as a proxy or cross-check on market definitions though many also acknowledge the metric is imperfect. *See Qualcomm*, 501 F.3d at 307 ("Because market share and barriers to entry are merely surrogates for determining the existence of monopoly power . . . direct proof of monopoly power does not require a definition of the relevant market."); Todd v. Exxon, 275 F.3d 191, 206 (2d Cir. 2001) ("If a plaintiff can show that a defendant's conduct exerted an actual adverse effect on competition, this is a strong indicator of market power. In fact, this arguably is more direct evidence of market power than calculations of elusive market share Figures.").

where a firm has low or even merely moderate market share.[218] For monopoly power, that share must typically be more than 50%.[219] This is much higher than the market share necessary to show market power.[220] Most studies of concentration in the scientific journal publishing market are by global revenues, showing increasing concentration,[221] with the top three publishers having as much as 67.1% market share.[222] This would put each publisher's share far below the threshold for monopoly power and likely below the threshold for market power. However, some of the limited evidence that exists suggests that dominant publishers may have monopoly or market power in specific disciplines. For instance, Elsevier may publish up to seventy-one percent of all psychology articles[223] and over fifty percent of all economics articles.[224] However, as none of these studies strictly defined product markets or determined substitutability, they provide, at best, rough guidance as to market share in a properly defined antitrust market.

D. American Express and the Problem of Scientific Journals as Digital Platforms

Another key challenge to market definition in digital markets is *American Express*.[225] There, the Supreme Court held that intermediary platforms that provide to multiple sides of a market services that are jointly consumed must be conceived as "two-sided."[226] The Supreme Court further ruled that, when examining certain of these two-sided platforms, "transaction platforms," courts must view the relevant product market as integrated because such platforms exhibit particularly strong indirect network effects.[227] On the other hand, intermediary platforms without strong indirect network effects should not be analyzed as integrated.[228] Thus, *American*

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[218] *See, e.g.*, *Rebel Oil*, 51 F.3d at 1434 ("Market power is generally inferred from the defendant's possession of a high market share and the existence of "significant barriers to entry.").

[219] "[A] market share below 50% is rarely evidence of monopoly power, a share between 50% and 70% can occasionally show monopoly power, and a share above 70% is usually strong evidence of monopoly power." Broadway Delivery Corp. v. United Parcel Serv. Of Am., Inc., 651 F.2d 122, 129 (2d Cir. 1981).

[220] Market share sufficient for a finding of market power may be as low as 24%. *See, e.g.*, Twin City Sportservice, Inc. v. Charles O. Finley & Co., 512 F.2d 1264 (9th Cir. 1982); *but see* Jefferson Parish v. Hyde, 466 U.S. 2, 26, 26 n.43 (1984) (30% market share insufficient); Pilch v. French Hosp., No. CV 98-9470 CAS(CWX), 2000 WL 33223382, at *7 (C.D. Cal. Apr. 28, 2000) (33.2% market share insufficient).

[221] Simon van Bellen et al., *supra* note 96, at 8–9 (showing share of articles published by dominant publishers has continued to rise since 2005).

[222] *See* Kim & Park, *supra* note 84, at 153. This is up from the top ten publishers occupying 63.4% of the market in 2004. *See* Edlin & Rubinfeld, *supra* note 6, at 124.

[223] Larivière, Haustein & Mongeon, *supra* note 94, at 7.

[224] Yonghong An, *The Cost of Knowledge: Academic Journal Pricing and Research Dissemination* 13 n.22 (Jan. 10, 2024) (unpublished manuscript), https://people.tamu.edu/~yonghongan/The_Cost_of_Knowledge.pdf; *see also id.* at 43 fig. 1 (finding Elsevier and Wiley each publish over 30% of physics articles); *id.* at 43 fig. 1 (finding Institute of Electrical and Electronics Engineers publishes over 50% of electronic engineering articles).

[225] *AmEx*, 585 U.S. 529, 529 (2018).

[226] *Id.* at 534–55; *see also* Glen E. Weyl, *A Price Theory of Multi-Sided Platforms*, 100 AM. ECON. REV. 1642, 1644–45 (2010) (characterizing two-sided markets); Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 1 J. EUR. ECON. ASSOC. 990, 991–93 (2003) (describing how two-sided markets differ from "textbook" markets).

[227] An integrated market is one where the good in question is the transaction as jointly consumed by both sides of the market, as opposed to considering each side of the platform as selling individual products consumed separately on each side. *AmEx*, 585 U.S. at 544–546.

[228] Such as "the market for newspaper advertising." *Id.* at 546. Lower courts have also interpreted AmEx in this way. *See* US Airways, Inc. v. Sabre Holdings Corp., 938 F.3d 43, 56 (2d Cir. 2019) ("If network effects run in only one direction, a court may consider only one side of a platform."); United States v. Sabre Corp., 452 F. Supp. 3d 97, 137 (D. Del. 2020), *vacated for mootness*, No. 20-1767, 2020 WL 4915824 (3d Cir. 2020) (applying *AmEx* in this way).

Express hinges on establishing a continuum where platforms with high indirect network effects fall at one end and platforms with low indirect network effects fall at the other.[229] It is only when a market falls on the high side of the continuum[230] that a plaintiff must show as part of their *prima facie* case that defendants' conduct caused "net harm" on the combined price, output, or quality.[231]

American Express has been the subject of manifold criticism.[232] This Article adds to that discussion as the scientific publishing market exemplifies a failure in that case's understanding of indirect network effects. In particular, read under the Supreme Court's economic theory, the scientific publishing market should be considered as integrated because the indirect network effects therein are incredibly high: Publishing platforms' value to scientists, and reputation via citation metrics, entirely depends on university access, the value of which in turn depends on the quality of the articles submitted to journals by scientists as measured by those same metrics.[233]

However, as applied, the legal theory fails in three ways. First, demand on each side of a two-sided market for credence goods is not exogenous to a platform's conduct.[234] Two-sided platforms do not merely find demand curves on each side as is and then balance them to determine efficient pricing.[235] Rather, because of indirect network effects, shifts *along* the demand curve on one side can translate to a shift *in* the demand curve on the other.[236] These shifts are not external

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[229] *AmEx*, 585 U.S. at 544 ("A market should be treated as one sided when the impacts of indirect network effects and relative pricing in that market are minor."). Because it structures its discussion of transaction platforms through an analysis of indirect network effects, the Supreme Court's cabining of its reasoning to "transaction platforms" is best understood as a cabining to markets with high indirect network effects. *Id.* at 544–46; *see also id.* at 568. (Breyer, J., dissenting) (explaining that the majorities' justification for "applying a special market-definition rule" is its analysis of indirect network effects).

[230] *Id.* at 545 (Because "two-sided transaction platforms exhibit more pronounced indirect network effects and interconnected pricing and demand[,] [t]ransaction platforms are thus better understood as supplying only one product.") (cleaned up).

[231] *AmEx*, 585 U.S. at 551–52; SC Innovations, Inc. v. Uber Techs., Inc., No. 18-CV-07440-JCS, 2020 WL 2097611, at *9 (N.D. Cal. May 1, 2020) (denying motion to dismiss because plaintiff "addressed both sides of [two-sided] market"); Douglas Melamed & Michael Katz, *Competition Law as Common Law: American Express and the Evolution of Antitrust*, 168 U. PA L. REV. 2061, 2091–92 (citing *AmEx*, 585 U.S. at 546) (noting that under *AmEx* anticompetitive injury can be shown only if "the price of [the transactions in question] were elevated above the competitive level, that the number of such transactions was reduced, or [Defendants' conduct] 'otherwise stifled competition.'").

[232] *See* Chris Sagers, *Platforms, American Express, & the Problem of Complexity in Antitrust,* 98 NEB. L. REV. 389, 404–05 (2019) (describing anticompetitive conduct that could "cause injury only on one side, without changing the quantity of card swipes"); Michael Katz, *Platform Economics and Antitrust Enforcement: A Little Knowledge Is a Dangerous Thing,* 28 J. ECON. & MGMT. STRATEGY 138, 146 (2019) (criticizing the idea that competition is harmed only if conduct raises the two-sided price or reduces output); Douglas Melamed, *The American Express Case: Back to the Future,* 18 COLO. TECH. L.J. 1, 19 (2020) ("The Court focused on the *intrabrand* vertical efficiency and gave short shrift to the anticompetitive *interbrand* effects that were the subject of the litigation.").

[233] For this reason, scientific journal publishers are certainly two-sided platforms. The Supreme Court does distinguish between two-sided platforms and transaction platforms. *See AmEx*, 585 U.S. at 535 ("The key feature of transaction platforms is that they cannot make a sale to one side of the platform without *simultaneously* making a sale to the other.") (emphasis added). However, the Supreme Court's analysis of the economics of simultaneous transaction platforms marks the "most relevant" distinction between such platforms and other two-sided platforms as the strength of indirect network effects. *Id.* at 535–36. Such effects do not occur only when a transaction is simultaneous, but "any time the value of the services that a two-sided platform provides increases as the number of participants on both sides of the platform increases." *Id.*; *see also id.* at 567–68 (Breyer, J., dissenting) (showing how distinguishing platforms based on whether the transaction was "simultaneous" would be vacuous as applied).

[234] *See* Melamed & Katz, *supra* note 131, at 2093–94 (describing how demand on both sides of a two-sided platform shifts in response to "change[s] in price structures"); Michael Katz & Jonathan Sallet, *Multisided Platforms and Antitrust Enforcement*, 127(7) YALE L.J. 2142, 2158 (2018) ("[T]he single-market approach fails to accurately account for product substitution and competitive conditions in multisided platform industries.").

[235] *Id.* at 536–37. (describing how two-sided platforms "balance" prices).

[236] In other words, the products on each side of a two-sided platform are complements, not substitutes. *See* Herbert Hovenkamp, *Platforms and the Rule of Reason: The American Express Case*, 1 COLUM. BUS. L. REV. 34, 64–65 (2019); Melamed & Katz, *supra* note 131, at 2093 (noting that two-sided platforms do not merely sell left and right shoes).

to platforms' conduct, but rather shaped, created, or increased by that conduct. For instance, because credence goods markets are susceptible to supplier-induced demand, a two-sided platform intermediating a credence good market can exploit information asymmetries to shift each side's demand curve and maximize their own profit.[237]

This is an example of a second, more generalized, failure of *American Express*: that the Supreme Court's analysis elides discussion of market failures. Instead, the Supreme Court paints a picture where indirect network effects are an efficient market disciplinary mechanism.[238] According to the Supreme Court, indirect network effects incentivize "two-sided platforms to maximize the value of their services and to compete with their rivals," and disincentivize raising prices on one side because doing so "risks a feedback loop of declining demand."[239] However, when applied to certification markets, this argument repeats the law-and-economics dogma that intermediaries must be efficient despite economic theory to the contrary.[240] In the scientific journal market, as a certification market, it is those market failures that allow for reputation-mining because only intermediaries benefiting from high switching costs, such as those due to high indirect network effects, that can profitably degrade quality. Further, little evidence exists that prices charged to scientists affect the prices charged to universities or vice versa due to factors like scientists' insulation from price increases, universities lock-in, and both sides' low cross-elasticities of demand.[241]

Finally, the efficiency effects of a platform's conduct cannot be examined solely by looking at the two-sided price.[242] Rather, when users on the two sides of the market have diverging interests, the individual prices on each side must be examined because intermediary platforms may

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[237] *See supra* notes 37–41 and accompanying text.

[238] *AmEx*, 585 U.S. at 533–37.

[239] *Id.* at 544–46; *see also id.* at 536 n.1 ("In a competitive market, . . . [i]ndirect network effects thus limit the platform's ability to raise overall prices and impose a check on its market power."). As a result of this balancing, the side of the platform that generates greater network externalities may have zero or negative prices. *See* Alexander Raskovich & John M. Yun, *Zero-Price Platform Services: There Is No Free Lunch in Applying the "No Free Lunch" Principle*, 2 COMPETITION POL'Y INT'L ANTITRUST CHRON. 1, 3 (2022) ("The higher the spillover benefits generated by participation on a given side, the lower the price charged to participants on that side tends to be, because the platform can monetize the resulting spillovers through prices charged to participants on the other side."). However, the hypothesis that consumers truly pay zero price is suspect given the value, like data, that is often given up in exchange. *See* Michal Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 522, 526–28 (2016); John M. Newman, *Antitrust in Zero-Price Markets: Foundations*, 164 U. PA. L. REV. 149, 182 (2015); SHOSHANA ZUBOFF, THE AGE OF SURVEILLANCE CAPITALISM 60–82 (PublicAffairs 2019) (describing how data became a commodity through the development of "click-through rates").

[240] *See supra* notes 45–50 and accompanying text.

[241] These factors may further illustrate the inaccuracy of the theory that indirect network effects efficiently discipline two-sided platform markets. For instance, one of the leading chapters on network effects in two-sided markets summarizes literature that largely ignores switching costs, but notes that in some studies that take such costs into account that "[a]n incumbent with a large legacy network, and thus a large incumbency advantage, [may] prefer[] to 'harvest' its position by charging a high price and keep only consumers with high interaction benefits." Bruno Jullien, Alessandro Pavan, & Marc Rysman, *Two-Sided Markets, Pricing and Network Effects*, 4 HANDBOOK INDUS. ORG. 485, 515 (2021). The inclusion of switching costs may undermine the theory in other ways as well. *See* Emily Kadens, *Cheating Pays*, 119 COLUM. L. REV. 527, 533 (2019) (noting that "[i]n bilateral contracting between repeat actors, for example, private-ordering theory predicts that the parties will not cheat," but only if "switching costs are not too high."); Jonathan Barnett, *supra* note 43, at 494 (When the cost of switching is too high, "users will rationally decline to impose a draconian reputational penalty that would terminate the relationship.").

[242] Melamed & Katz, *supra* note 131, at 2093 (citing Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND J. ECON. 645 (2006)).

exploit diverging interests by favoring the side that has greater power to choose the network.[243] In the scientific publishing market, while reputation is vital to both sides as a marker of quality, both sides' direct interest in quality diverges. Scientists single-home with respect to their individual articles and care more about maximizing reputational markers.[244] In contrast, universities can multi-home and care both about those metrics and about journal quality because higher quality science better aids their own scientists in publishing. In light of these complications, it cannot be assumed that publishers efficiently allocate price (let alone both price and quality) as a two-sided platform.

Ultimately, even if *AmEx* is found fully applicable to all platforms regardless of potential market failures, including those in digital, credence good, or certification markets, a plaintiff may be able to establish publishers' market power through direct evidence. For instance, maximal and increasing rents extracted from both sides of the market, or a reduction in quality affecting both sides of the market, would bely any claimed balancing. Although antitrust law is not one where one plus one always equals two,[245] it is difficult to imagine that, if plaintiffs show these harms affecting both sides of the market, a court will not find they properly alleged a net price increase or net quality reduction for the integrated transaction.

IV. MONOPOLIZATION OF KNOWLEDGE

The market failures of credence goods and certification markets implicate certain antitrust claims, including monopolization. This Section sketches a brief outline of what a potential monopolization case against an intermediary in a credence good market, especially a digital certification market, could take shape. While the Article discusses scientific journal publishers as an example, this is only to illustrate how courts, practitioners, and scholars should engage in legal analysis when the good in question is a credence good in a certification market given such markets' particular dynamics and failures.

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[243] *See* Michael L. Katz, *Platform Economics and Antitrust Enforcement: A Little Knowledge is a Dangerous Thing*, 28 J. ECON. MANAGE. STRAT. 138, 145 (2019); *see also* Sebastian Wismer, Christian Bongard, & Arno Rasek, *Multi-Sided Market Economics in Competition Law Enforcement,* 8 J. EUR. COMPETITION L. PRAC. 257, 260, 260 n. 15 (2017) (stating a transaction platform operating in a single, two-sided market is "feasible only if . . . substitutability of the service from the perspective of each customer group does not differ substantially."); Jullien, Pavan, & Rysman, *supra* note 243, at 524 (noting that, when users of a two-sided platform single-home on one side and multi-home on the other, users on the muti-homing side "de facto choose whether or not to join each platform as if it were a monopoly").

[244] Although scientists can multi-home relative to the corpus of their publications. However, this multi-homing may become constrained as "transformative agreements," are made.

[244] *See generally* Ángel Borrego, Lluís Anglada & Ernest Abadal, *Transformative Agreements: Do They Pave the Way to Open Access?*, 34 LEARNED PUBL'G 216 (2021). "Transformative Agreements" occur when a publisher contracts with a university to both provide access to Big Deal bundles and to publish a certain number of articles written by that universities' scientists and are becoming increasingly common. *See id.* at 221.

[245] *See generally* Daniel A. Crane, *Does Monopoly Broth Make Bad Soup?*, 76 ANTITRUST L.J. 663 (2010) (discussing when anticompetitive effects may or may not be properly aggregated).

A. Monopolization in Markets Exhibiting Market Failures

Section II monopolization is among the most complex of antitrust claims.[246] The germinal definition, articulated by the Supreme Court in *United States v. Grinnell Corp.*, has two elements: "(1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident."[247] With the former being discussed above, this Section focuses on the second element.[248] The core of that element is exclusion, the restriction of rivals' ability or incentive to compete.[249] The Rule of Reason framework is used to examine Sherman Act Section Two monopolization claims.[250] Under this framework, the plaintiff bears the initial burden of proving that the defendant possesses monopoly power and has engaged in exclusionary conduct.[251] Upon establishing their prima facie case, the burden shifts back to the defendant to articulate a legitimate procompetitive justification for the challenged conduct.[252] If the defendant meets this burden, the onus returns to the plaintiff to show that the procompetitive justifications are mere pretexts or that the anticompetitive harms substantially outweigh any procompetitive benefits.[253]

According to the D.C. Circuit in *Microsoft*, proving monopolization is a matter of showing that a firm's conduct is, in general terms, reasonably capable of making a significant contribution to monopoly.[254] Proof of exclusion that would tend to make a sufficient contribution to the dangers of monopoly is sufficient to make this showing; proof of outcome effects is not required.[255] Impairing the opportunities of rivals in the market through means other than competition satisfies *Grinnell*'s second element.[256]

Exclusive conduct under Section II can take many forms,[257] with some of the most challenging to characterize involving efforts to raise barriers to entry or increase rivals' costs.[258]

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[246] *See generally* Daniel Francis, *Making Sense of Monopolization*, 84 ANTITRUST L.J. 779, 806 (2022) (describing conflicting precedent on monopolization).

[247] *Grinnell*, 384 U.S. at 570–71.

[248] *Supra* Section III.

[249] Rambus Inc. v. FTC, 522 F.3d 456, 464–67 (D.C. Cir. 2008) (finding failure to show conduct's exclusive effect defeated monopolization claim); *see also Microsoft*, 253 F.3d at 71 (stating that "substantial, deleterious impact" on rivals is needed); Daniel Francis, *supra* note 246, at 806 ("No exclusion, no monopolization.").

[250] *See Microsoft*, 253 F.3d at 59 (explaining application of Rule of Reason's burden shifting framework to monopolization claims).

[251] *Id.*

[252] *Id.*

[253] *Id.* Throughout this process, the plaintiff retains the ultimate burden of persuasion to establish that the conduct has resulted in anticompetitive effects, such as reduced output, increased prices, or decreased innovation. *Id.*

[254] *But see Rambus*, 522 F.3d at 466–67 (finding alleged conduct incapable of excluding future rivals because FTC acknowledged that, although the agency alleged the conduct could have excluded rivals in the past, the agency could not conclude that it actually did so).

[255] *See* Daniel Francis, *supra* note 246, at 808 & n.182 (collecting cases supporting this proposition); Richard J. Gilbert & A. Douglas Melamed, *Innovation Under Section 2 of the Sherman Act*, 84 ANTITRUST L.J. 1, 10–11 (2021) (same); *see also Microsoft*, 253 F.3d at 79.

[256] *See* Daniel Francis, *Making Sense of Monopolization*, *supra* note 246, at 804 (collecting examples).

[257] For instance, exclusive dealing, pay-for-delay, acquisitions, and the like. *See Dentsply*, 399 F.3d at 192 (exclusive dealing); In re Lipitor Antitrust Litig., 855 F.3d 126, 146 (3d Cir. 2017), *as amended* (Apr. 19, 2017) (pay for delay); *Grinnell*, 384 U.S. at 576 (acquisitions).

[258] Thomas G. Krattenmaker & Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price*, 96 YALE L.J. 209, 211 (1986); United States v. Microsoft, 84 F. Supp. 2d 9, 21 (D.D.C. 1999) ("[I]t is not difficult to understand why it is worthwhile

To my knowledge, this conduct has not been analyzed through the lens of market failure. However, adopting such a framework could bring greater clarity to these complex discussions. First, it is simple economics that, when barriers to entry are higher, it becomes harder for rivals to challenge a monopolist's dominance.[259] And, market failures are closely tied to barriers to entry.[260] For instance, in digital markets, network effects and credence goods characteristics can strengthen these barriers. For instance, when consumers lack complete or accurate information about a product's quality, they cannot easily compare alternatives, even if a new entrant offers a superior or lower-cost option. Credence qualities thus elevate switching costs and lock-in, in turn raising entry barriers.[261] Supplier-induced demand can also raise barriers to entry if a monopolist can leverage its position to foreclose a sufficient percentage of the market.[262] By focusing on instances where markets may deviate from idealized perfect competition, monopolists' conduct in markets with imperfect competition can be better examined for whether it is the type of conduct reasonably capable of contributing significantly to monopoly.[263]

A close comparison in the digital platform context was the Complaint in *Colorado v. Google*.[264] There, plaintiffs alleged that Google built a "moat" of barriers to entry around its monopoly on search advertising and engaged in a practice of problematic self-preferencing that, combined with other conduct, constitutes monopoly maintenance.[265] The Complaint alleged Section II monopolization by reference to the factual whole of Google's alleged anticompetitive conduct, "'without tightly compartmentalizing the various factual components and wiping the slate clean after scrutiny of each.'"[266]

It may be that dominant publishers' conduct builds, entrenches, or exacerbates the barriers to entry created by the nature of the scientific publishing market as a credence good market. Just as alleged in *Google*, such conduct could cumulatively create a moat around current market dominance, as opposed to natural growth or competition on the merits of publishers' products.[267] This conduct could be envisioned as comprising at least two parts: Big Deal Bundling, including double-dipping and NDAs, and self-preferencing. Each of these exacerbates the market failures

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for the principal beneficiary of the applications barrier to devote more resources to augmenting it than aspiring rivals are willing to expend in speculative efforts to erode it.").

[259] Krattenmaker & Salop, *supra* note 258, at 246–47.

[260] *See* Fed. Trade Comm'n v. Surescripts, LLC, 665 F. Supp. 3d 14, 45 (D.D.C. 2023) (discussing how indirect network effects raise barriers to entry) (citing *Microsoft*, 253 F.3d at 55).

[261] *See supra* notes 50, 59–64 and accompanying text.

[262] *Dentsply Int'l*, 399 F.3d at 191 (finding foreclosure "helps keep sales [by rival's] below the critical level necessary for any rival to pose a real threat to [defendant's] market share."). Supplier-induced demand can likely both create and exacerbate foreclosure by supercharging the dominant firm's ability to steer consumers away from rivals.

[263] *See* John M. Newman, *Procompetitive Justifications in Antitrust Law*, 94 IND. L.J. 501, 509–13 (2019) (arguing for a similar approach, but only for analysis of procompetitive effects).

[264] *See* Brief for Am. Antitrust Inst. as Amicus Curiae in Support of Pl. States Opp'n to Google's Mot. for Summ. J., State of Colorado v. Google, 687 F. Supp. 3d 48 (2023) (No. 1:20-cv-03715-APM), at *9 (discussing Complaint at 9, 39, Colorado v. Google, No. 1:20-cv-03715-APM, 2020 WL 7405690 (D.D.C. Dec. 17, 2020).

[265] *Id.* at 9–11.

[266] *Id.* (quoting Cont'l Ore Co. v. Union Carbide & Carbon Corp., 370 U.S. 690, 698–99 (1962)).

[267] *See Google*, 2020 WL 7405690.

attributable to the nature of scientific journal articles as credence goods or foils those failure's typical fixes, thus raising barriers to entry.

Although this Article previously argued that *AmEx* single market analysis should not apply to the scientific journal publishing industry, this Section will analyze anti- and procompetitive benefits as if *AmEx* did apply. Although this Article only sketches the balancing of such effects, if the procompetitive benefits are insufficient to rebut a prima facie showing of exclusionary conduct when the market is considered as integrated, the same is likely true for non-integrated markets.[268]

B. Exclusive Conduct: The Modern Big Deal

Big Deal bundling raises high entry barriers because building a sufficient portfolio of reputable journals can take decades.[269] Big Deals raise the natural barriers to entry imposed by network effects and reputational impressions. For instance, to enter the current form of the market, a new firm would have to compete not merely with the substitutable product, but with the entire bundle.[270] If, for example, a new immunology journal seeks to compete with a lower quality immunology journal owned by a dominant publisher, it would be able to do so absent bundling by varying price levels, offering higher quality peer review and editing, or similar avenues. However, because that lower quality immunology journal would be bundled with must-have journals, competition on price and quality alone is unlikely to allow the new journal to gain a foothold.[271] This effect occurs on both sides of the market as the barrier in the publisher-to-university side of the market would, because of indirect network effects, make scientists are less likely to publish in new journals because their circulation will be limited.[272]

Additionally, the all-or-nothing nature of Big Deal contracts may exploit network effects and universities' low cross-elasticity of demand to create lock-in. Long-term contracts may prevent new entrants from seeking space in a university library's budget except when a contract expires.

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[268] Further, by considering the market in this way, the analysis avoids the potential issue that cross-market effects could be considered procompetitive even absent an integrated market. *See* Epic v. Apple, 67 F.4th at 989; *see* Nat'l Collegiate Athletic Ass'n v. Alston, 594 U.S. 69, 87 (2021) ("The Supreme Court's precedent on cross-market balancing is not clear.").

[269] *See* Edlin & Rubinfeld, *supra* note 5, at 133.

[270] *See* Barry Nalebuff, *Exclusionary Bundling*, 50 ANTITRUST BULL. 321, 328–29 (2005) (describing exclusionary bundling as when a dominant firm has market power in at least one bundled product, as bundled discounts may then compel customers to buy the bundle, leaving insufficient demand for competitors in the market for any individual product).

[271] Simultaneous entry into a bundled market is also significantly more expensive than entry into a single market and shifting buyers' habits is considerably more cumbersome, and less responsive, to variations in competitive offers. *See* Fortner Enters. v. United States Steel Corp., 394 U.S. 495, 512–513 (1969); David R. McGeorge Car Co. v. Leyland Motor Sales, 504 F.2d 52, 57 (4th Cir. 1974), *cert. denied*, 420 U.S. 992 (1975) ("[It is this] foreclosure of competition which offends the antitrust statutes.").

[272] Big Deal bundles could also be viewed as tying under *Jefferson Parish*, 466 U.S. at 14. By tying low quality articles and journals, or even through double-dipping otherwise free open access articles to must-have journals, Big Deal bundling may exploit publishers' "control over the tying product to force the buyer into the purchase of a tied product that the buyer either did not want at all, or might have preferred to purchase elsewhere on different terms." *Id.* at 13. The success of a tying claim would likely depend on several factors, including the extent to which ties remain quasi per se illegal and whether such a claim was brought under a foreclosure or a leverage theory of harm. *See* Einer Elhauge, *Rehabilitating Jefferson Parish: Why Ties Without a Substantial Foreclosure Share Should Not Be Per Se Legal*, 80 ANTITRUST L.J. 463 (2016) (arguing for the quasi per se rule). Under a foreclosure theory of harm, whether there is sufficient foreclosure to establish a tying claim would depend on whether dominant publishers have "sewed up a market so tightly for the benefit of a few [that it] falls within the prohibitions of the Sherman Act." FTC v. Motion Picture Advertising, 344 U.S. 392, 395 (1953) (finding a Sherman Act violation where four companies had tied up three-fourths of a relevant market). The success of a leverage theory of harm would depend on the extent to which courts continue to buy the flawed single monopoly profit theory. *See* Einer Elhauge, *Death of the Monopoly Profit Theory*, 123 HARV. L. REV. 397, 407–11 (2009) (explaining how tying reduces consumer surplus under the leverage theory).

This barrier is exacerbated by the fact that older science, as well as new science published non-Open Access, will always be trapped behind dominant publishers' paywalls.[273]

Further, it is possible that dominant publishers further foreclose competition by new entrants if they predatorily launch a journal in the same discipline as the new entrant. Dominant publishers doing so can both take advantage of their easier access to the Web of Science and the fact that they can add the journal to the bundle offered, allowing it to free ride off the reputation of the must-have journals in that bundle.[274]

Additionally, certain practices by publishers may undermine classical solutions to credence goods market failures, including transparency. Although price transparency is not always a positive in antitrust law,[275] in a credence good market, transparency can solve market failures because it enables consumers to garner sufficient information over repeated interactions to form adequate reputational impressions of the sellers of credence goods. However, Big Deal bundling may tend to obfuscate both pricing and output data to consumers and rivals alike, depriving potential entrants of crucial information they could use to enter markets.[276] Further, this obfuscation increases the difficulty of information gathering by consumers, increasing the cost of switching to a new entrant.[277]

The exacerbation of barrier to entry through price and output obfuscation is exacerbated by publishers' practice of hiding Big Deals behind NDAs.[278] The opacity surrounding Big Deal Bundles directly contributes to price increases, a fact even admitted by Elsevier.[279] And the limited evidence available shows that this absence of pricing information also allows for significant price discrimination, with significant price disparities among clients for essentially the same services that occur irrespective of what other publishers are charging.[280] Even worse, because of potential

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[273] *See, e.g.*, ELSEVIER, POLICIES AND STANDARDS PRICING, https://www.elsevier.com/about/policies-and-standards/pricing [https://perma.cc/4YDS-QXLZ] (stating there will be no "retrospective open access"); Bobtcheff, Caillaud & Lévy, *supra* note 44, at 8.

[274] Typical discussion of predatory launch involves an incumbent using data or pricing to draw demand away from rivals. *See* Lina M. Khan, *supra* note 64, 781–83 (2017); Complaint at ¶ 88, United States v. UnitedHealth Grp., Inc., No. 1:22-cv-00481 (D.D.C. Feb. 24, 2022) ("With this data [gained post-transaction], UnitedHealthcare would have the ability to disadvantage its rivals, including by mimicking their innovative policies to make their rivals' healthcare plans less attractive to customers (relative to UnitedHealthcare). This would reduce the rivals' incentives to innovate in claims edits, which would also reduce innovation in commercial health insurance plan and provider network design.").

[275] Particularly because it may facilitate collusion. *See* Robert Clark, Jean-Francois Houde & Daniel Ershov, *Pricing Algorithms as Third-Party Facilitators of Collusion*, ANTITRUST SOURCE 1, 1 (2024).

[276] Price obfuscation can be part of a Section Two Monopolization claim where such obfuscation equates to a barrier to entry. *See generally* William J. Allender et al., *Price Fairness and Strategic Obfuscation*, 40 MKTING. SCI. 122 (2020).

[277] *See* Barnett, *supra* note 43, at 493 (describing how "the size of the [reputational] penalty [for underperformance] will fluctuate as a continuous function of the switching costs that users bear in the certified market").

[278] NDAs, in general, can promote price competition by reducing the inhibition on price cutting that would result if sellers expected that their rivals would learn of their low price and then match it. However, here the NDAs appear to serve more to prevent universities from gaining leverage in negotiations for Big Deal Bundles.

[279] RigourAndOpenness, *The Debate At #OpenOxford*, YOUTUBE (Apr. 11, 2013), http://www.youtube.com/watch?v=pFJtwSXC6qA [https://perma.cc/WGP4-N79F] (stating that if libraries knew the amount Elsevier charges for access, "everybody would drive down, down and down" on prices, leading to users paying less for accessing these materials).

[280] *See* Bergstrom, *supra* note 99, at 9428.

double-dipping, this obfuscation extends beyond price to output.[281] It is not generally available which titles are and aren't included in each publisher's Big Deal bundle or to what extent universities may be paying to access otherwise free content.[282]

C. Exclusive Conduct: Self-Preferencing

Whether self-preferencing can suffice to show, or even is evidence of, a Section II monopolization claim is heavily contested.[283] Centrally, proponents argue that "the idea that the right to deal more favorably with your own division than with others is at the heart of competitive privilege."[284] The generality of that idea is much untested in courts, which have primarily focused on self-preferencing in the tying, exclusive dealing, and quasi-exclusive dealing contexts.[285] Certainly, commentators have not examined self-preferencing in the context of a certifier preferencing its own products. Self-preferencing in that context, where a dominant certifier enhances the symbolic capital associated with its products or depresses that of its rivals, is particularly harmful because it undermines certification markets' central disciplinary mechanism: reputation. In certification markets, producers and buyers are often both dependent on certification as a marker of the quality of the goods or services therein.[286] Thus, enhancing the difficulty potential entrants face in accumulating reputation, or raising the switching costs associated with moving to an entrant's product as measured by that reputation enhances barriers to entry in such markets.

This self-preferencing is not the stereotypical refusal to deal.[287] Rather, in the scientific publishing market, self-preferencing can potentially be effectuated by manipulating supposedly neutral metrics to advantage a publisher's own journals over their competitors. For instance, Elsevier touts its Citation Impact metric as a more "comprehensive, transparent, [and] current" metric estimating a journal's reputation.[288] However, Elsevier may also preference itself in the

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[281] If double-dipping occurs, publishers' statements that high APCs are necessary to subsidize losses caused by open access publication could also potentially be analyzed as deceptive conduct. Deceptive practices "fundamentally" can do nothing but subvert the competitive process because, at its core, the competitive process requires that "buyers negotiate with and/or choose among sellers." Joseph Farrell et al., *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603, 609 (2007). "[T]his process is undermined if buyers are deceived or manipulated into a deal that they did not knowingly choose*." Id.; see also* Brief for Am. Antitrust Inst. as Amici Curiae In Support of Plaintiff-Appellant, New York v. Facebook, Inc., 66 F.4th 288 (2022) (No. No. 21-7078), at 14–20.

[282] Asai, *supra* note 151, 5164–66 (estimating double dipping indirectly because such data was unavailable).

[283] *Compare* Lina Khan, *supra* note 64, 781–83 (discussing harm from Amazon marketplace preferencing its own products) *with* Daniel Francis, *supra* note 256, at 830 (arguing self-preferencing should be per se legal); *see also generally* Yuta Kittaka, Susumu Sato, & Yusuke Zennyo, *Self-Preferencing by Platforms: A Literature Review*, 66 JAPAN & WORLD ECON. 101191 (2023) (literature review finding impact of self-preferencing on consumers and overall welfare hinges on market-specific factors, including structure, differentiation, and nature of competition).

[284] Daniel Francis, *supra* note 246, at 830.

[285] Herbert Hovenkamp, *Antitrust & Self-preferencing*, 38 ANTITRUST L.J. 5, 10 (2023); *see also Trinko*, 540 U.S. at 411 severely limiting duty to deal in essential facilities context).

[286] *See* Barnett *supra* note 43, at 476 ("Without gatekeepers to supply reliable evaluation and monitoring services, efficient trade would often be distorted, curtailed, or blocked.").

[287] *See, e.g.*, New York v. Facebook, 549 F. Supp. 3d 6, 24–27 (D.D.C. 2021).

[288] Description of citation count. ELSEVIER CONNECT, CITESCORE: A NEW METRIC TO HELP YOU TRACK JOURNAL PERFORMANCE AND MAKE DECISIONS, https://www.elsevier.com/connect/citescore-a-new-metric-to-help-you-choose-the-right-journal [https://perma.cc/DB9A-2GVD].

production of its supposedly objective metrics.[289] Further, dominant publishers may enhance their reputational metrics through self-citation, where articles in a journal are not published unless they cite a sufficient number of articles in the portfolio of the publisher who owns that journal.[290] Such manipulations, if true, would be roughly equivalent to JP Morgan Chase acquiring Standard & Poor's, then publishing credit ratings that made competitors' bonds look like greater credit risks and its own as lesser.

This kind of self-preferencing is particularly harmful because it warps network externalities that could discipline the market.[291] One compelling model of publishers as certifiers, is one where publishers must trade off selectivity, which is necessary to maximize a journal's reputation and attract more submissions, with the fees garnered from publishing more papers.[292] However, self-preferencing could allow publishers to inflate their journals' quality metrics, reducing the impact of being less selective on their reputation. The evidence showing citation inflation is now widespread and increasing exponentially suggests this may be occurring.[293]

If so, the harm could be cognizable under antitrust law because it exacerbates the credence good market failures that create barriers to entry in certification markets. For instance, scientists' decision-making about where to publish utilizes a heuristic equation maximizing over two variables: maximizing citation count and minimizing the costs of rejection.[294] Self-preferencing, where publishers artificially increase their own citation metrics and depress their rivals, warps this heuristic.[295] Increasing relative citation counts may thus entrench dominance through the enhancing of network effects. Further, by distorting quality signals, self-preferencing can enhance information asymmetry and make it more difficult for new entrants to establish credibility. As such, it "is not only potentially insulting to the authors, but may also cancel the original meaning and value of references in scientific writing . . . and distort the true ranking of the journal in the scientific literature."[296]

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[289] One study found Elsevier increasing the citation count of its own journals by up to 20% and depressing its rivals' by up to 40%. Carl T. Bergstrom & Jevin West, *Comparing Impact Factor and Scopus CiteScore*, EIGENFACTOR.COM, http://eigenfactor.org/projects/posts/citescore.php [https://perma.cc/BBZ9-JKWJ].

[290] Maria A. Oveido-Garcia, *Journal Citation Reports and the Definition of a Predatory Journal: The Case of the Multidisciplinary Digital Publishing Institute (MDPI)*, 30 RSCH. EVALUATION 405, 413 (2021) ("[A]ll journals have a level of self-citation, as previously mentioned, and therefore virtually all of them showed a reduction in the journal impact factor without self-citations when compared to the journal impact factor."); Caspar Chorus & Ludo Waltman, *A Large-Scale Analysis of Impact Factor Biased Journals Self-Citations*, 11 PUB. LIBR. SCI. ONE 1, 8 (2016). Another similar practice is citation cartels. *Id.* at 1.

[291] Mark A. Hanson et al., *supra* note 207, at 824–25.

[292] Seeber, Cattaneo & Birolini, *supra* note 207, at 22–23.

[293] Hanson et al., *supra note* 207, at 823 (finding near double growth in impact factor for most dominant publishers in 2022 compared to the previous six years). Although it is unclear the extent to which this may be due to self-preferencing. *See* Seeber, Cattaneo & Birolini, *supra* note 207 ("A for-profit APC business model introduces strong incentives to game journals' reputational indicators.").

[294] *See supra* notes 73–78 and accompanying text.

[295] It is common intuition among scientists that open access articles are more cited, making higher APCS more worthwhile. Chun-Kai Huang, *Open Access Research Outputs Receive More Diverse Citations*, 129 SCIENTOMETRICS 825, 840–41 (2024). However, this intuition could be partially due to this type of self-preferencing.

[296] Matthew Falagas & Vangelis Alexiou, *The Top-Ten in Journal Impact Factor Manipulation*, 56 ARCHIVUM IMMUNOLOGIAE ET THERAPIAE EXPERIMENTALIS 223, 224 (2008).

D. Weighing Procompetitive Benefits

No discussion of Section II monopolization claims is complete without thorough attention to potential procompetitive benefits.[297] It is especially important to analyze procompetitive benefits in a market involving digital platforms.[298] Thus viewed, procompetitive benefits to scientists from exclusionary conduct in the publisher-to-university side of the market could offset the anticompetitive effects of that conduct and vice versa.[299]

There is some question about how high a bar defendants must hurdle to rebut a prima facie case by presenting a procompetitive benefit. Some jurisprudence suggests that defendants must merely assert a procompetitive benefit.[300] Other precedent suggests that defendants must substantiate their rebuttal.[301] For instance, in the recent *Google* decision, Judge Mehta held that although improved search quality may be a cognizable procompetitive benefit, Google had not carried its burden of showing the benefit flowed from Google's exclusionary conduct.[302]

In the scientific journal market, at least three procompetitive benefits may likely be claimed. First, publishers could allege that their practices increase output. After all, the number of articles published and journals launched by top publishers is increasing.[303] One reason for this could be that publishers may tend to reinvest extra revenues garnered from double-dipping in launching new journals. Even so, publishers may face difficulty substantiating this justification because, in order for it to be cognizable, it must be specific to the conduct.[304] However, it would be difficult to show that this procompetitive benefit is specific to the full scope of publishers' conduct, especially given high prices and consistent thirty-five percent plus profit margins.[305] Additionally, this would have to be weighed against the potential lower quality of such journals given that APCs shift publishers' underlying incentivizes, as discussed above.[306] Further, it is

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[297] *See, e.g.*, *Microsoft*, 253 F.3d at 58–59; *Grinnell*, 384 U.S. at 570–71; *Eastman Kodak*, 504 U.S. at 481.

[298] *AmEx*, for example, by requiring the market to be analyzed as integrated, requires such balancing for two-sided platforms.

[299] These theories should be argued explicitly in reference to failures present in the market. Newman, *supra* note 263, at 504 (arguing for a "market failure approach" to procompetitive justifications).

[300] *See, e.g.*, *Microsoft*, 253 F.3d at 59 ("If the monopolist asserts a procompetitive justification—a non-pretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal—then the burden shifts back to the plaintiff to rebut that claim."); FTC v. Shkreli, No. 20-cv-00706, 2022 WL 135026, at *33 (S.D.N.Y. Jan. 14, 2022) (defendant's obligation is to "proffer" a justification).

[301] Epic v. Apple, 67 F.4th at 985 (requiring "non-pretextual, legally cognizable procompetitive rationales" to rebut plaintiffs prima facie case); *see also* Douglas Melamed, *Exclusive Dealing Agreements and Other Exclusionary Conduct- Are There Unifying Principles*, 73 ANTITRUST L.J. 375, 379 n.6 (2006) (arguing that the court did not merely accept Microsoft's asserted procompetitive justification, but required a showing); Daniel Francis, *supra* note 246, at 816 (arguing that "there are compelling reasons to reject this approach, and require a defendant to show not just the existence of a justification, but its sufficiency").

[302] *Google*, 2024 WL 3647498 at *253 ("[E]ven if there is a link between more competitive browsers and search output, Google not shown how the exclusivity of its agreements has produced that benefit.").

[303] Hanson et al., *supra* note 207, at 286. Edlin and Rubinfeld also note that Big Deal bundling could increase output in terms of access to smaller journals. *See supra*, note 5, at 150–51. However, this argument is weaker in the digital era than in 2002. The benchmark is now open access, not print journals. Including hybrid journals in bundles, for instance, does not increase access to the articles published therein when scientists may have already paid APCs to make those articles open access.

[304] *Google*, 2024 WL 3647498 at *254–57 (holding procompetitive benefits must be, "as opposed to a host of other market forces[,] . . . a substantial cause of that result") (citing United States v. Apple, Inc., 791 F.3d 290, 334 (2d Cir. 2015)).

[305] *See supra* note 199.

[306] Whether and how output is increasing is a fact-specific question beyond the scope of this paper. However, there is some evidence that

likely that, despite increased output, higher journal prices and publishers' increasing market power may actually reduce scientists' access to articles.[307] As such, scientific publishers' strategic noncompliance with regulators' open access mandates, like the Obama and Biden Orders, also may reduce access to knowledge by up to thirty percent.[308] Publishers' strategic behavior also reduces the capacity for collaboration between scientists who face barriers to knowledge because disparities in access complicate effective communication between institutions.[309] Such restrictions on access may also hamper scientific innovation.[310]

Second, publishers could argue that their conduct is procompetitive as necessary for preserving the quality of science, especially while the market is transitioning to open access. Ensuring the quality of published papers has always been a herculean task. With the advent of the Internet, which has lowered costs of submission, and the explosion of growth in academia due to globalization, it may be that publishers must charge higher prices to be able to serve as more vigorous gatekeepers and ensure the effectiveness of the peer review process, thereby safeguarding the sanctity of the production of knowledge. Among the most significant emerging challenges are paper mills[311] and artificial intelligence.[312]

There would be some doubt as to whether quality benefits are cognizable. In *Society of Professional Engineers*, the Supreme Court held that a professional association's proffered procompetitive justification, that a practice prevented engineers from performing "inferior work with consequent risk to safety and health," was not cognizable. [313] More recently, in *Alston*, the Supreme Court rejected the NCAA's argument that the organization's amateurism restrictions advance the "societally important non-commercial objective of higher education" for the same reason.[314] In general, just because conduct is a professional norm does not mean that conduct is immune from antitrust scrutiny.[315] Ultimately, such assertions of procompetitive benefits, which

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output may not be increasing in a procompetitive way. For instance, Wiley bought a quickly growing open access journal, Hindawi, in 2021, but closed it due to quality issues. *See* Dorothy Bishop, Red Flags for Paper Mills Need to Go Beyond the Level of Individual Articles: A Case Study of Hindawi Special Issue 2–3 (June 20, 2024) (unpublished manuscript) (on file with Center for Open Science); Ellie Kincaid, *Wiley to Stop Using "Hindawi" Name Amid $18 Million Revenue Decline*, RETRACTION WATCH (Dec. 6, 2023) https://retractionwatch.com/2023/12/06/wiley-to-stop-using-hindawi-name-amid-18-million-revenue-decline/. The extent to which these issues were created or exacerbated post-acquisition is unclear.

[307] Yonghong An, *supra* note 211, at 3 (finding "an article's citations and the number of citing authors of these citations were substantially lower with higher journal prices and stronger publishers' market power.").

[308] As determined by citation count. *Id.* at 30.

[309] *Id.* at 27.

[310] *See* Richard Smith, *The Business of Academic Publishing: "A Catastrophe"*, 392 LANCET 1186, 1186–87 (2018). Further, the pay-to-publish culture that has been produced among scientists itself warps the production of science as they tailor their research to what they believe is most publishable. *See* Buranyi, *supra* note 1 ("[S]cience became a strange co-production between scientists and journal editors, with the former increasingly pursuing discoveries that would impress the latter.").

[311] Bishop, *supra* note 186, at 2–3.

[312] Chris Stokel-Walker, *AI Chatbots Have Thoroughly Infiltrated Scientific Publishing*, SCI. AM. (May 1, 2024), https://www.scientificamerican.com/article/chatbots-have-thoroughly-infiltrated-scientific-publishing/ [https://perma.cc/J3W2-5Q57].

[313] *Nat'l Soc'y of Prof'l Eng'rs*, 435 U.S. at 692–94; *see also Ind. Fed'n of Dentists*, 476 U.S. at 462–63 (holding argument that increased competition would reduce quality of care not to state a cognizable procompetitive benefit).

[314] *Alston*, 594 U.S. at 92–93.

[315] *See* Decision and Order, Nat'l Acad. of Arbitrators, Dkt. No. C-4070, at 2–3 (F.T.C. Dec. 3, 2002) (finding the NAA's Code of Professional Responsibility advertising restrictions deprived consumers of information).

essentially argue that the dynamics of a market should allow it to be exempt from the usual operation of the antitrust laws, face a high bar for cognizability as they "should be directed to Congress, not a court."[316]

However, if the argument holds water in any industry, it would be this one. Maintaining the sanctity of the peer review process is arguably essential to preserving any viable market for scientific journal articles. Scientific journal articles are credence goods, for which a market can only exist because reputation metrics represent the imperfect solution to the three-part coordination problem addressing what science is worth writing, publishing, and accessing by scientists, publishers, and universities respectively. As such, quality is not merely a differentiable characteristic of the good provided, as in *Society of Professional Engineers* and its progeny, but underpins the entire academic and scientific community's demand for the good in the first place. As such, it is questionable whether a functioning market could exist without consideration of quality and its reputational markers. Therefore, unlike in markets not exhibiting credence good market failure, courts should hold the maintenance of that quality to be a properly cognizable procompetitive benefit.[317]

However, although likely cognizable, it could be difficult for publishers to show that quality maintenance is sufficiently connected to their conduct. First, the claim that publishers' practices are currently maintaining the quality of science may face a high bar given the various crises of quality science now finds itself in.[318] Second, given low costs and high profits, publishers would have to show that they would invest less in AI tools or other technologies to detect papers with artificially produced data or writing in a world where they only accrued twenty percent profit margins instead of thirty-five.[319] Third, it is unclear that the current form of peer review, as managed by dominant publishers, has ever been the best mechanism to maintain of the quality of science.[320] For instance, peer reviewers may have misaligned incentives because they are simply unpaid.[321] Without compensation, many senior scientists may decline to participate in the process

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[316] Epic v. Apple, 67 F.4th at 946 (citing *Allston*, 141 S. Ct. at 2160); *see also* Newman, *supra* note 258, at 530 ("Crediting non-welfare justifications [like quality improvements] during rule of reason analyses creates awkward, and essentially intractable, commensurability problems.").

[317] Not to mention that quality effects, while incommensurate with price effects, are still consumer welfare effects. *See* Ezrachi & Stucke, *supra* note 38, at 19–30 (discussing the relationship between quality and consumer welfare).

[318] *See infra* notes 204–206 and accompanying text.

[319] *See* Clive Cookson, *Detection Tool Developed to Fight Flood of Academic Publishers,* FIN. TIMES (Apr. 13, 2023), https://www.ft.com/content/1e49f64b-e8ab-48c0-8890-b33be56e5c31 (describing publishers' investments to combat AI and paper mills).

[320] Diana Proctor et al., *Problems with Peer Review Shine a Light on Gaps in Scientific Training*, AM. SOC'Y OF MICROBIOLOGY, May–June 2023, at 1–2 (discussing issues with peer review, including that reviewers do not receive training); *What Errors Do Peer Reviewers Detect, and Does Training Improve Their Ability to Detect Them?*, 101 J. ROYAL SOC'Y MED. 507, 510 (2008) (finding peer reviewers found on average less than one-third of errors). These concerns predate the digital era. *See* Schriger et al., *From Submission to Publication: A Retrospective Review of the Tables and Figures in a Cohort of Randomised Controlled Trials Submitted to the British Medical Journal*, 48 ANNALS EMERGENCY MED. 750, 755 (2006) (finding little evidence peer review improves the quality of manuscripts).

[321] This is one reason why even high impact journals struggle to find qualified reviewers. Scott Henderson et al., *Finding Reviewers: A Crisis for Journals and Their Authors*, 54 AUSTRALIAN & NEW ZEALAND J. PSYCHIATRY 957, 958–59 (describing difficulties finding peer reviewers, in part because "money is one of the most powerful motivators"). Although scientists who agree to perform peer review services are largely motivated by a desire to improve their field and to peer review to stay abreast of novel developments, they also incredibly busy. *Id.*

in a way that markedly improves reviewed papers or weeds out those of low quality.[322]

Another reason why this procompetitive benefit would be difficult to establish is because publishers' incentives as certifiers have shifted as they not only own the goods they are certifying but also charge APCs. The addition of APCs fundamentally shifts publishers' business models because it adds an additional revenue source from the other side of the market. Therefore, instead of merely providing access to journals, publishers have an additional incentive to publish as many articles as possible in order to collect APCs.[323] While publishers cannot publish too many articles, as each marginal article would likely be of lower and lower quality, APCs incentivize publishers to degrade that quality to the point where universities will not subscribe to a competitor or new entrant's portfolio instead. In other words, to show a procompetitive benefit of maintaining quality, publishers would have to show that they do so despite structural incentives to degrade quality.[324]

The third and final potential procompetitive benefit to be considered is that publishers' practices may be necessary to facilitate the movement to open access. More specifically, the argument would be that practices such as Big Deal bundling or double-dipping are necessary to subsidize a transition to full open access that will ultimately further expand output (as access to articles will be free) and increase citation counts for scientists (as open access articles are more widely accessed and therefore cited). To substantiate this claim, publishers would likely have to explain why they dragged their feet by implementing inferior forms of open access like green and hybrid instead of gold.[325] Additionally, publishers would have to cohere this argument with both evidence of double-dipping[326] and the fact that APCs for hybrid open access journals are higher than those for gold open-access journals even though universities also pay for subscription fees to hybrid open access journals.[327]

E. Net Effects on the Culture of Science and Innovation

On net, publishers' conduct may worsen the "publish or perish" culture plaguing modern science. Scientists' career progress relies on reputational metrics on which many grants, fellowships, postdoctoral positions, and tenure-track professorships are based.[328] Given this reality, artificially inflated citation counts increase the opportunity cost of engaging in research

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[322] *See id*.; Complaint at 15–20, Dr. Lucina Uddin v. Elsevier et al., No. 1:24-cv-06409-HG (E.D.N.Y. Sep. 12, 2024) (alleging harm to the public interest as a result of agreement to not pay peer reviewers).

[323] *See* Seeber, Cattaneo & Birolini, *supra* note 207, at 22 ("[I]ncentives to adopt undesirable practices may be to some extent intrinsic to the APC model and prevail in the long term even when adopted by traditionally subscription-fee publishers.").

[324] Such change in incentives may explain why publishers' retraction numbers are increasing. *See* Ivan Oransky, *Retractions are Increasing, But Not Enough*, 608 NATURE 9, 9 (2022). In fact, publishers' ability to retract may even incentivize quality decreases because for-profit publishers can keep APCs paid by authors of retracted papers. *See Publisher Donating Author Fees from Retracted Articles to Charity*, RETRACTION WATCH (Dec. 29, 2023), https://retractionwatch.com/2023/12/29/publisher-donating-author-fees-from-retracted-articles-to-charity/ [https://perma.cc/NC76-F3F6] (calling for APCs for retracted papers not to be kept by publishers). Nor are retractions effective in keeping bunk science out of academic discourse. *See* Cortegiani et al., *Inclusion of Predatory Journals in Scopus is Inflating Scholar's Metrics and Advancing Careers*, 65 INT'L J. PUB. HEALTH 1, 3–4 (2020) (finding many retracted articles continue to be cited even after discontinuation).

[325] *See supra* notes 148–150 (including accompanying text).

[326] *See* Asai, *supra* note 151, at 5159.

[327] *See* Butler et al., *supra* note 94, at 789.

[328] *See supra* notes 73, 74 (including accompanying text discussing the importance of metrics to scientists' careers).

that requires more time to complete as publishing less often results in fewer publications and lower citation count. Similarly, artificially inflated citation counts may increase the opportunity cost of engaging in more novel or riskier research. Journals tend to publish articles that are incremental improvements or engagements with existing frameworks, rather than breakthrough or novel research.[329] Increasing the cost of that rejection through increasing the opportunity cost of foregone, inflated citation counts can disincentivize this "moonshot" research.[330] Increasing APCs also makes acquiring a funding source to subsidize publishing costs even more essential. Given that funders are more likely to fund those with stronger publication records, the culture cannot help but become worse.[331] Scientists themselves are well aware of these effects, including that publishers' practices exacerbate the effects of publish or perish culture on science.[332]

By worsening publish or perish culture, publishers' conduct may decrease the diversity and innovativeness of scientists' research. By comparison, Lina Khan described how Amazon's conduct as a buyer allowed it to monopsonistically warp the incentives of book publishers, causing them to be less likely to produce "weightier and riskier books."[333] Before Amazon, publishing houses would use the currency garnered from surefire investments to fund more critical or more novel, and therefore riskier, types of publications.[334] However, in the face of rising fees charged by Amazon, publishers become less able to invest in such books, leading to "fewer books that espouse unusual, quirky, offbeat, or politically risky ideas, as well as books from new and unproven authors" and "impoverish[ing] America's marketplace of ideas."[335] Likewise may rising APCs charged by scientific publishing intermediaries cause scientists to adopt the same risk-aversion.

On one hand, these effects may be self-correcting as universities and scientists catch on to inflated metrics. On the other, reputational markers are the core, and perhaps only disciplinary mechanism, in the market. The question becomes whether reputation in this essential certification market remains neutral currency or becomes a hollow badge. For, if scientists and universities' trust in reputational metrics fail, it is hard to imagine what could take their place.[336]

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[329] *See* Buranyi, *supra* note 1.

[330] *See id.*

[331] *See* STM GLOBAL, *supra* note 97 (discussing concentration of funding).

[332] Neil Young et al., *supra* note 66, at 1419–20; *How Academic Publishers Profit from the Publish-or-Perish Culture*, FIN. TIMES (May 26, 2024), https://www.ft.com/content/575f72a8-4eb2-4538-87a8-7652d67d499e [https://perma.cc/XZT2-ZSTT].

[333] Khan, *supra* note 64, at 766.

[334] *Id.*

[335] *Id.* at 767 (citing Letter from Authors United to William J. Baer, Assistant Att'y Gen., Antitrust Div., Dep't of Justice (July 14, 2015), http://www.authorsunited.net/july/longdocument.html [http://perma.cc/G8QF-5LYY]).

[336] Consideration of antitrust remedies to rectify issues the scientific journal publishing industry is beyond the scope of this Article, which centrally uses that industry as a case study to advance the literature on antitrust in digital and certification markets. However, antitrust remedies addressing the issues identified here could include measures to lower artificially raised barriers to entry, such as unbundling, horizontal divestitures of journals (particularly where acquisitions have conferred dominant market shares in specific disciplines), vertical divestitures of assets that generate reputational metrics, and the prohibition of NDAs governing Big Deal Bundles. Policy remedies could also play a critical role. For instance, the 2022 Biden Order could be reissued with enhanced oversight mechanisms to ensure agency compliance. Alternatively, the Order could promote bypassing intermediaries altogether by providing funding to universities to directly launch, fund, or operate journals themselves. Regardless, this Article may provide a foundation for subsequent work to explore remedies tailored to the complexities of this industry.

CONCLUSION

The debate about the efficiency of two-sided platforms is deep, with empirical evidence on both sides. How that debate translates to the digital is similarly hotly contested. What this debate often misses, however, is the nature of the goods in question. In particular, as markets move to the digital (and as digital platforms gain dominance), goods and services often take on additional credence characteristics. The lessons of this Article will only become more prescient as more goods take on credence-good qualities through digitization, as more goods are sold on more online marketplaces with their own opaque search functions, as more consumers forfeit their data, and as more goods either become or are invented with the typical characteristics of digital goods: intangibility, ephemerality, or technicality.

First, contrary to the implication of *American Express* that two-sided platforms are self-regulating as they inherently balance demand elasticities on both sides of the market, courts and practitioners should apply scrutiny when digital platforms use their dominance on one side of the market to become extractive of the other side.[337] A core tenet of *American Express* is that, when two-sided platforms exhibit indirect network effects, where increased demand on one side of a network may yield benefits that spill over to the other side, some efficiency can be presumed as those platforms must balance these spillover effects when they set prices. However, when a market, such as those for credence goods, exhibits imperfect competitive conditions, those same positive feedback loops can also create lock-in, allowing supposedly two-sided platforms to no longer be constrained by their two-sidedness, but rather to become two-sidedly extractive. In other words, in the presence of market failure, digital intermediaries can become more powerful than the goods they intermediate.[338]

Second, for Section II monopolization claims, especially in adjudicating whether procompetitive benefits offset anticompetitive harms, courts and practitioners should be particularly attentive not just to price and output effects, but to what extent alleged conduct exacerbates any market failures that may be present due to the nature of the good in question. This approach requires proactivity as, when digital markets take on credence goods quality, price increases or output effects may be increasingly obscured, or their observation delayed. Waiting until after market failures undermine a market's self-regulation mechanisms for deleterious effects to be realized risks exacerbating those harms.[339]

The scientific journal publishing industry epitomizes the importance of engaging in analysis that focuses on the nature of the goods in question. Underneath the production of scientific

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[337] For instance, by narrowing application of *AmEx* to two-sided platforms with transactions that are simultaneous. *See* Sagers, *supra* note 232, at 406 (advocating for this limitation).

[338] Perhaps symbolizing this shift in the scientific publishing market, Elsevier has rebranded itself from a scientific publisher to an information analytics company. *See* Posada & Chen, *supra* note 96, at 25; *see also* Nilay Patel, *DOJ's Jonathan Kanter Says the Antitrust Fight Against Big Tech Is Just Beginning*, THE VERGE (Feb. 12, 2024), https://www.theverge.com/24067873/jonathan-kanter-doj-antitrust-google-policy-monopoly-big-tech [https://perma.cc/C36U-VV64] (discussing this trend, but outside the market failure context).

[339] *See also* Khan, *supra* note 64, at 761, 768 (raising the concern that digital platforms can exploit dominance for future price increases and advising that increased prices may be difficult to detect).

knowledge lies peculiar economic machinery: a market for credence goods moderated by reputational network effects and where inelastic demand is insulated from price increases by both lock-in effects and grants from academic and governmental institutions. Publishers' conduct, including bundling and self-preferencing, may exacerbate market failures due to scientific articles' credence qualities or undermine their solutions. What constitutes "good" science is ambiguous, constructed at least partially by the underlying market dynamics around the entities that produce, mediate, and consume it. Although the academic culture surrounding the production of science has long been criticized as "publish or perish," recent conduct by for-profit publishers may force an aphoristic update for the digital era: "pay to publish and pay to access or perish." This shift deeply affects the quality, novelty, and innovativeness of science and must be given strict attention by practitioners and courts alike.