

The Myth of Free

John M. Newman*

ABSTRACT

Myths matter. This Article is the first to confront a powerful myth that pervades modern economic, technological, and legal discourse: the Myth of Free. The prevailing view is that consumers capture massive welfare surplus from a flood of innovative new products that are offered free of charge. Economists, legal scholars, and industry stakeholders created an origin story—a myth—to explain how these products became “Free.”

But that orthodox origin story is fatally flawed. This Article formalizes, then debunks, the Myth of Free and its underlying assumptions. The Myth is riddled with internal inconsistencies, logical errors, and factual inaccuracies. In their place, this Article provides a revisionist history of Free, one that offers greater descriptive and predictive accuracy. Along the way, it solves several puzzles: Why has Free become the default online business model? Why does the age of abundance—so often predicted—always fail to materialize? And why is society nonetheless drawn to such predictions?

The task is urgent: the Myth of Free is not benign. It has misled courts into granting protected legal status to Free-product suppliers in cases ranging from contract disputes to antitrust and privacy litigation. It has also motivated policy proposals that call for eliminating market interventions—or competitive markets themselves—without adequate justification in either case. Moreover, policies designed for a post-scarcity world necessarily overlook the persistent problems attendant to scarcity, thereby creating substantial allocative inefficiencies. This Article seeks to dispel the Myth of Free before it can wreak further harm to societal welfare and the rule of law.

TABLE OF CONTENTS

INTRODUCTION	514
I. THE ORTHODOX ORIGIN STORY	518
A. Digitization and Online Distribution	518
B. Expansion Offline	521
C. The Formal Account	523
II. FREEECONOMICS 101: DEBUNKING THE MYTH OF FREE .	524
A. Defects of the Major Premise	525

* Assistant Professor, University of Memphis Cecil C. Humphreys School of Law. For their invaluable comments and suggestions, I would like to thank Chris Hoofnagle, Maurice Stucke, Salil Mehra, Laurent Sacharoff, Mark Patterson, Allen Grunes, Don Marti, William Kratzke, Boris Mamlyuk, and workshop participants at the Fordham University School of Law, the University of Arkansas (Fayetteville) School of Law, and the University of Memphis School of Law. Thanks also to Devon C. Muse for providing outstanding research assistance and insightful critique. For their unflagging support, thanks to Emma, Lillian, and Calvin.

1. The Stubborn Persistence of Costs.....	525
a. Halving Costs Are Asymptotic	526
b. The Friction of the Real.....	527
2. Costs (Always) Matter: “Close to Zero” Is Not Close Enough.....	531
B. Defects of the Minor Premise	535
1. Misguided Marginalism and Fixed Costs	535
2. Imperfect Competition.....	541
a. Product Differentiation.....	543
b. Entry Barriers	544
c. Imperfect Information.....	548
d. Imperfect Rationality	550
C. The Flawed Conclusion: Free Is Not Free	551
III. FREE: PAST, PRESENT, AND FUTURE	555
A. Whence Free? A Revisionist History	556
1. The Internet’s Original Sin	556
2. Copyright Infringement: The Zero-Price Competitor	560
3. The Zero-Price Effect	562
4. Difficulty Assessing Costs	562
B. Whither Free?	564
1. The (Continuing) Zero-Price Advantage.....	564
2. Abundance: The Exception, Not the Rule	566
3. Completing the Dynamic View: Demand as a Moving Target	571
IV. THE DANGERS OF MYTHOLOGIZING FREE	574
A. Granting an Undeserved “Protected Status”	575
B. Overlooking the Ongoing Need for Markets	579
C. Overlooking the Ongoing Need for Market Interventions	580
D. Failing to Confront the Persistence of Scarcity	584
CONCLUSION	586

INTRODUCTION

“Free,” in all of its many facets, is a powerful term. At a high level, it can be disambiguated into two signifiers: “free” as in *libre* and “free” as in *gratis*.¹ The former serves as a rallying cry for groups ranging from civil-rights activists to anarchists, evoking cherished ideals

¹ See LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* 12 (2001).

like freedom of speech and of the press. The latter, on the other hand, is perhaps most beloved by marketers seeking to lure new customers.²

And it is the latter usage, free-as-in-*gratis*, that has come to dominate the discourse surrounding modern digital markets.³ Following the explosive growth of internet-based products, a powerful myth arose—the Myth of Free. According to this myth, the convergence of digitization and networking ushered in a “New Economy” with new rules.⁴

Standard economics takes as a central principle the scarcity of resources.⁵ Given scarcity, the allocation of resources becomes the fundamental problem of economics.⁶ In the popular view, the centrality of scarcity renders economics a cynical enterprise, the dismal science. As early as 1938, “There ain’t no such thing as [a] free lunch”⁷ (often denoted by the acronym “TANSTAAFL”) encapsulated the lay understanding of modern economics.⁸

The ascendance of the New Economy, however, supposedly destroyed that fundamental principle. In 2009, Chris Anderson, then Editor-in-Chief of *WIRED* magazine, published *Free*, a book that has become one of the leading texts in the Myth of Free’s canon.⁹ *Free* claims that “[t]wenty-first-century Free is different from twentieth-century Free. . . . Somehow an economy had emerged around Free before the economic model that could describe it.”¹⁰ The New Econ-

2 See generally David Adam Friedman, *Free Offers: A New Look*, 38 N.M. L. REV. 49, 72 (2008) (“Social and cognitive psychology explain the power of the word ‘free’ and may explain to a certain extent the widespread use of the term in marketing.”).

3 See, e.g., CHRIS ANDERSON, *FREE: THE FUTURE OF A RADICAL PRICE* 3 (2009) (“[T]his ‘free’ wasn’t just a marketing gimmick like the free samples and prizes inside that we’re used to in traditional retail. This free . . . wasn’t just a lure for a future sale, but genuinely gratis.”).

4 See, e.g., J. Bradford DeLong & Lawrence H. Summers, *The ‘New Economy’: Background, Historical Perspective, Questions, and Speculations*, FED. RES. BANK KAN. CITY ECON. REV., Fourth Quarter 2001, at 29, 34–35; Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925, 925–26 (2001).

5 See, e.g., PAUL A. SAMUELSON, *ECONOMICS: AN INTRODUCTORY ANALYSIS* 17 (7th ed. 1967) (“[W]hile it recognizes the important germ of truth in the notion that America has become an affluent society, economics must still contend with scarcity as a basic fact of life.”).

6 See *id.* at 16–18.

7 Fred Shapiro, *Quotes Uncovered: The Punchline, Please*, FREAKONOMICS (July 16, 2009, 11:40 AM), <http://freakonomics.com/2009/07/16/quotes-uncovered-the-punchline-please/> [https://perma.cc/55KG-8GD5]; see also *Economics in Eight Words*, PITT. PRESS, Mar. 13, 1958, at 16, <https://news.google.com/newspapers?nid=1144&dat=19580313&id=jPoeAAAAIBAJ&sjid=EU4EAAAAIBAJ&pg=7426,4042997&hl=en> [https://perma.cc/Z7AK-QVUS].

8 See David R. Henderson, *TANSTAAFL, There Ain’t No Such Thing as a Free Lunch*, LIBR. ECON. & LIBERTY (Mar. 3, 2014), <http://www.econlib.org/library/Columns/y2014/Hendersontanstaaf.html> [https://perma.cc/6RV5-JPST].

9 ANDERSON, *supra* note 3.

10 *Id.* at 3–4.

omy (we are told) heralded an age of abundance that will render economics—and capitalism—unnecessary. Another commentator, for example, announces that “capitalism[’s] . . . once unchallenged prowess is diminishing, making way for an entirely new way of organizing economic life in an age characterized by abundance rather than scarcity.”¹¹

Under this view, “Freeconomics” has replaced standard economics.¹² The marginal costs of digital products supposedly fell to zero, causing prices to follow.¹³ Scarce goods are costly; abundant goods are Free. And standard economics cannot account for Free.¹⁴

Or so the story goes. The premises underlying the Myth of Free have gone largely unchallenged—yet, under close scrutiny, those premises exhibit fatal flaws. The new Freeconomics proves to be an illusion. The New Economy signals neither the end of standard economics nor the demise of capitalism.

This Article seeks to dispel the Myth of Free. Part I begins by briefly describing both the standard account of Free’s rise to prominence and the recent scholarly predictions that Free will soon expand beyond digital markets. Part II then formalizes into a syllogism the sometimes imprecise claims underlying Freeconomics. While temporarily withholding judgment on the accuracy of the premises, Part I concludes that the syllogism’s formal structure is valid.

Part II turns to the descriptive accuracy of the Myth’s major and minor premises. Those premises fail in any meaningful way to describe reality. First, the major premise—“marginal costs equal zero”—ignores the persistence of costs and the scarce resources involved in providing Free products. And because it depends on the supposed ubiquity of an objectively irrational scheme, the most common variation of the major premise (“marginal costs are *close* to zero”) also lacks descriptive value. Second, by co-opting—and misusing—the neoclassical theory of marginalism, the minor premise (“price equals marginal cost”) fails to describe the long-run functioning of Free markets. By incorrectly assuming that Free markets exhibit the economic ideal of perfect competition, the minor premise falls short yet again. Given its flawed premises, the Myth of Free unsurprisingly yields a

11 JEREMY RIFKIN, *THE ZERO MARGINAL COST SOCIETY: THE INTERNET OF THINGS, THE COLLABORATIVE COMMONS, AND THE ECLIPSE OF CAPITALISM* 9 (2014).

12 See ANDERSON, *supra* note 3, at 13.

13 *E.g., id.* at 3.

14 See *id.* at 4 (“Somehow an economy had emerged around Free before the economic model that could describe it.”).

flawed conclusion. “Free” products, this Article demonstrates, are not free at all.

Part III takes up the task of revising Free’s origin story. In place of zero marginal costs and “too cheap to matter,” Part III posits that Free is the result of a combination of several factors: (1) early defects in online-payments architecture; (2) the adoption of advertising, and the derived demand for personal information, as the dominant online business model; (3) the stubborn persistence of intellectual property (“IP”) infringement as a zero-price substitute for legitimate, positive-price content; (4) the Zero-Price Effect, an irrational consumer preference for zero-price products; and (5) the inherent difficulty consumers experience in attempting to calculate nonprice attention or information costs. Because the majority of these factors remain in effect, Free-based business models will likely continue to prevail in the digital markets that lie at the core of the Myth of Free.

But Part III concludes that—although some analysts propose otherwise—*truly* free (as in zero-cost) products will never characterize even core, information-centric Free markets, let alone expand into offline markets. Abundance will remain scarce. Projections of future abundance fall into the common trap of adopting a dynamic supply-side, but a static demand-side, viewpoint. Demand, however, is a moving target, causing true abundance to recede, mirage-like, ever further into the future.

The Myth of Free is not benign. Part IV identifies the dangers of mythologizing Free and condemns, on deontological and consequentialist grounds, Myth-based policy decisions and proposals. Legal institutions have already begun to grant an undeserved protected status to the suppliers of Free products. Such suppliers have received *de facto* or *de jure* immunity from certain laws, as well as favorable treatment in close cases. This is so despite the reality that these firms engage in for-profit transactions that are structurally identical to traditional, positive-price transactions. That unjustified protected status undermines the rule of law and distorts natural market competition, harming total welfare. Moreover, in response to the Myth of Free, analysts have proposed altering existing regulatory regimes—even going so far as to propose the elimination of market competition—in ways that will necessarily yield suboptimal outcomes. Finally, policies designed around the Myth overlook the persistent, compelling problems attendant to scarcity, thereby inefficiently misdirecting much-needed societal resources.

I. THE ORTHODOX ORIGIN STORY

You can make money giving things away. There really is a free lunch. Sometimes you get more than you pay for.

—Chris Anderson¹⁵

The accepted version of Free's origin story generally begins with the modern internet exploding onto the scene in the mid-1990s.¹⁶ It is, of course, true that widespread internet adoption marked the dawn of a new era. Millions of personal digital computers, which had been growing both more powerful and less expensive for decades, were suddenly connected. The cost of reproducing and distributing content-based products (recorded music, films, books, and various other forms of media) fell substantially. In fact, according to the Myth of Free—and this is one crucial point at which the Myth departs from reality—costs plummeted all the way to zero. Soon after, under this view, competition drove the prices of those goods down to match their cost. In other words, zero costs begat zero prices. Everything became Free.

A. Digitization and Online Distribution

More specifically, the Myth begins with a particular type of cost—marginal costs—dropping to either zero or “near-zero.”¹⁷ Standard economic theory has long held that marketplace competition will set the market price of a given product at its marginal cost to sellers.¹⁸

¹⁵ *Id.*

¹⁶ See, e.g., *id.* Of course, “free” products had been offered in the past—Anderson, for example, discusses the famous Gillette strategy of “giving away the razors” while selling disposable, complementary blades. Chris Anderson, *Free! Why \$0.00 Is the Future of Business*, WIRED (Feb. 25, 2008, 12:00 PM), <https://www.wired.com/2008/02/ff-free/> [<https://perma.cc/EEZ4-NZB8>]. Broadcast radio and television would seem to fit the description as well. But it was “[t]wenty-first-century Free”—not “twentieth-century Free”—that (we are told) changed everything. ANDERSON, *supra* note 3, at 3–4.

¹⁷ See ANDERSON, *supra* note 3, at 2–3; Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460, 466–67, 481 (2015); Salil K. Mehra, *Competition Law for a Post-Scarcity World*, 4 TEX. A&M L. REV. 1, 3 (2016); Mike Masnick, *The Importance of Zero in Destroying the Scarcity Myth of Economics*, TECHDIRT (Nov. 8, 2006, 12:57 PM), <https://www.techdirt.com/articles/20061025/014811.shtml> [<https://perma.cc/MFB6-8LDW>]. DeLong and Summers note that “[h]igh initial fixed costs and low, even zero, marginal costs pose difficult questions but also open up enormous opportunities for economic policy.” DeLong & Summers, *supra* note 4, at 48 (emphasis added).

¹⁸ See, e.g., MASSIMO MOTTA, *COMPETITION POLICY: THEORY AND PRACTICE* 39 (2004) (defining “market power” as “the ability of firms to set prices above marginal costs”). Sellers continue producing additional units until the cost of making one more unit (the marginal cost) equals the extra (marginal) revenue that unit will yield. Beyond that point, costs start to outweigh revenues, and it becomes irrational to produce and sell any additional output. This assumes a perfectly competitive market.

The Myth of Free draws upon this commonly invoked proposition to argue that where digitization and digital distribution caused marginal costs to drop to zero, prices fell to zero as a necessary corollary.¹⁹ And even where marginal costs dropped only to “near zero” or “almost zero,” the Myth posits that the difference was still close enough for sellers to round down the difference and adopt a price of zero.²⁰ According to the Myth of Free, then, marginal costs became “too cheap to meter,” and thus “too cheap to matter.”²¹

This zero-cost-equals-zero-price dynamic has been embraced as an “iron law.”²² In 1984, technologist and author Stewart Brand famously quipped that “information wants to be free, because the cost of getting it out is getting lower and lower all the time.”²³ Brand’s statement has become “a battle cry for the relentless march of the Internet”²⁴ and is often repeated by those who embrace Free as an economic inevitability.²⁵ In the same vein, Anderson’s *Free* contends that “you can try to keep Free at bay with laws and locks, but eventually the force of economic gravity will win.”²⁶ Rather more bluntly, another commentator observes that “1990 isn’t going to come back. . . . Trying to protect a system that’s now fundamentally broken is like trying to reroute a raincloud to go and thunderstorm over a different town. You’re better off dealing with the facts, and grabbing your umbrella.”²⁷

¹⁹ Masnick, *supra* note 17.

²⁰ See ANDERSON, *supra* note 3, at 92 (“Price has fallen to the marginal cost, and the marginal cost of everything online is close enough to zero that it pays to round down.”).

²¹ *Id.* at 77 (stating that “computer processing power, digital storage, and bandwidth . . . really are getting too cheap to meter”); *id.* at 75 (chapter titled “Too Cheap to Matter”); cf. Clayton M. Christensen & Derek van Bever, *The Capitalist’s Dilemma*, HARV. BUS. REV., June 2014, at 60, 64 (“A fundamental tenet of economics is that some of the inputs required to make a product or service are abundant and cheap—like sand. We don’t need to account for such inputs and can waste them, if need be.”).

²² Malcolm Gladwell, *Priced To Sell: Is Free the Future?*, NEW YORKER (July 6 & 13, 2009), <http://www.newyorker.com/magazine/2009/07/06/priced-to-sell> [<https://perma.cc/7BLQ-W5F5>] (“Anderson does not consider this a passing trend. Rather, he seems to think of it as an iron law . . .”).

²³ *About That Quote “Information Wants to Be Free,”* PRICEONOMICS (May 29, 2014), <http://priceonomics.com/about-that-quote-information-wants-to-be-free/> [<https://perma.cc/J6WU-M78K>]. Less often quoted is the rest of Brand’s observation: “[I]nformation wants to be expensive, because it’s so valuable. . . . So you have these two fighting against each other.” *Id.*

²⁴ *Id.*

²⁵ E.g., CORY DOCTOROW, INFORMATION DOESN’T WANT TO BE FREE: LAWS FOR THE INTERNET AGE 94 (2015) (quoting Stewart Brand).

²⁶ ANDERSON, *supra* note 3, at 241.

²⁷ Amanda Palmer, *Foreword* to DOCTOROW, *supra* note 25, at xvii. Palmer is also known as “Amanda (Fucking) Palmer.” *Interview with Amanda Palmer by Fawn Neun*, BATTERED

Where costs dropped to zero, the Myth continues, supply became infinite.²⁸ Infinite supply, in turn, means nothing less than the end of scarcity and the beginning of an age of abundance.²⁹ The birth of Free thus marked the dawn of what one scholar calls the “zero marginal cost society,” wherein capitalism will be largely replaced by a “[c]ollaborative [c]ommons.”³⁰ Under this view, markets will increasingly be released “from the ordinary economic rules of the physical world.”³¹

For users and consumers, the birth of Free was supposed to have represented a massive windfall. As Anderson puts it, “[T]his ‘free’ wasn’t just a marketing gimmick like the free samples and prizes inside that we’re used to in traditional retail. . . . [It was] genuinely gratis.”³² Some legal scholars contend that “the most obvious and pervasive benefit to be realized in the Big Data era has been the ability of firms to offer heavily subsidized, often free, services to consumers as consumers give those firms permission to monetize consumer data on the other side of their business.”³³ To these scholars, data-driven Free “is undoubtedly a benefit to consumers.”³⁴ Others similarly conclude that “[f]ree goods often provide real benefits to consumers and are clearly procompetitive.”³⁵ This Free-as-consumer-surplus argument seems to carry an intuitive appeal, one so powerful that even skeptics tend to cede this ground.³⁶ If a product were to

SUITCASE (June 2009), <http://www.vagabondagepress.com/90601/V2I1IN1.html> [<https://perma.cc/X6UF-A2GL>].

²⁸ Masnick, *supra* note 17.

²⁹ See RIFKIN, *supra* note 11, at 273 (“When the marginal cost of producing additional units of a good or service is nearly zero, it means that scarcity has been replaced by abundance.”). See generally PETER H. DIAMANDIS & STEVEN KOTLER, *ABUNDANCE: THE FUTURE IS BETTER THAN YOU THINK* (2012).

³⁰ Jeremy Rifkin, *Market Share*, RSA, no. 2, 2015, at 33, 33 (“Capitalism is giving birth to a progeny. It is called the sharing economy on the Collaborative Commons.”). To be sure, Rifkin offers a brief concession: “Even after the IoT is fully paid for and plugged in, there will always be some costs in generating and distributing information and energy. For that reason, we always use the term *near zero* when referring to the marginal cost of delivering information, green energy, and goods and services.” RIFKIN, *supra* note 11, at 84. For a discussion of “near zero” and other qualifiers, see *infra* Section II.A.2.

³¹ Chris Jay Hoofnagle & Jan Whittington, *Free: Accounting for the Costs of the Internet’s Most Popular Price*, 61 UCLA L. REV. 606, 612 (2014).

³² ANDERSON, *supra* note 3, at 3.

³³ D. Daniel Sokol & Roisin Comerford, *Antitrust and Regulating Big Data*, 23 GEO. MASON L. REV. 1129, 1133 (2016).

³⁴ *Id.*

³⁵ Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 523 (2016).

³⁶ Schneier, for example, essentially concedes that digital goods are massively beneficial to

actually carry no cost, then consumers of that product would ipso facto receive more than what they paid for, necessarily reaping a welfare surplus.³⁷ The gains would be infinite in relation to the costs.³⁸ Of course, the validity of this argument depends on Free products actually being free, a premise analyzed and rejected below.³⁹

B. *Expansion Offline*

Some analysts predict that Free will spread beyond internet-centric, information-dominated markets.⁴⁰ Under this vision, Free has already begun to, or will soon, expand offline. These narratives identify several incipient or near-term technological advances that will drive offline marginal costs to zero (or almost zero). Normatively, these analysts argue that the end of offline scarcity will carry massive—even unthinkable—ramifications for the institutional design and governance of societies.⁴¹ Disruptive as it was, the birth of Free is predicted to pale in comparison with the metastatic spread of Free to every corner of the globe.⁴² As Anderson puts it, “In the old paradigm, digital goods too cheap to meter counted as an almost unimaginable cornucopia. But in the new paradigm, it’s hardly worth counting at all.”⁴³

The particular technologies that are supposed to spur offline Free vary. One scholar points, for example, to the Internet of Things

consumers; with that point yielded, Schneier is forced to argue that society must “‘stop the slide’ away from privacy, . . . not because privacy is ‘profitable or efficient, but because it is moral.’” Jack Goldsmith, *The Ends of Privacy*, NEW RAMBLER, <http://newramblerreview.com/book-reviews/law/the-ends-of-privacy> [https://perma.cc/AMC4-5JNV] (reviewing BRUCE SCHNEIER, *DATA AND GOLIATH: THE HIDDEN BATTLES TO COLLECT YOUR DATA AND CONTROL YOUR WORLD* (2015)).

³⁷ Cf., e.g., Martin Wolf, *Same as It Ever Was: Why the Techno-Optimists Are Wrong*, FOREIGN AFF., July–Aug. 2015, <https://www.foreignaffairs.com/articles/2015-06-16/same-it-ever-was> [https://perma.cc/YH23-F53E] (“Moreover, say the techno-optimists, the ‘consumer surplus’ in digital products and services—the difference between the price and the value to consumers—is huge.”).

³⁸ Cf., e.g., *id.* (“Techno-optimists point out that before June 2007, an iPhone was out of reach for even the richest man on earth. Its price was infinite. . . . Moreover, say the techno-optimists, the ‘consumer surplus’ in digital products and services—the difference between the price and the value to consumers—is huge.”).

³⁹ See *infra* Section II.C; see also MAURICE E. STUCKE & ALLEN P. GRUNES, *BIG DATA AND COMPETITION POLICY* § 1.26 (2016) (“Consumers do not invariably benefit when services are ‘free,’ because these services are not actually free. Consumers pay with their personal data and privacy.”).

⁴⁰ See, e.g., ANDERSON, *supra* note 3, at 5.

⁴¹ See *id.*

⁴² See *id.*

⁴³ *Id.* at 213.

(“IoT”) as providing a new general-purpose technology platform.⁴⁴ Atop the IoT, society will witness the merger of (1) the now-familiar communications internet, (2) a developing renewable energy internet, and (3) an entirely automated transportation internet.⁴⁵ This hybridized IoT will allow zero-cost energy to power zero-cost offline distribution of goods.⁴⁶ Technology will thus pierce the “firewall” that previously existed between online and offline markets.⁴⁷ And the “Zero Marginal Cost Society” will emerge, bringing with it a “collaborative commons” that will unleash human potential even further.⁴⁸ Market capitalism, it goes almost without saying, will occupy a much-diminished role.⁴⁹

In a recent article, Mark Lemley highlights one relatively established and three emerging technologies as the drivers of a “world without scarcity.”⁵⁰ First, the modern internet brought about the end of scarcity as to content.⁵¹ Second, 3D printing promises to do to physical goods what online peer-to-peer file-sharing services did to content: separate creation from production and distribution, eliminate distribution costs, and put production in the hands of end users.⁵² Third, synthetic biology will do the same to the manipulation of living tissue and organisms.⁵³ Finally, the advent of general-purpose robotics promises a similar disruption of the service economy by (again) dropping marginal costs “towards zero.”⁵⁴

Other analysts incorporate the “sharing economy” into the fold of offline-scarcity-ending innovations. Sharing-economy platforms connect owners of various underutilized assets (vehicles, housing, luxury handbags, etc.) with customers desiring temporary ownership-like access.⁵⁵ Though certainly not “sharing” in the traditional sense,⁵⁶ such trades greatly increase efficiency by increasing capacity-utilization

⁴⁴ See Alexander Hellemans, *Jeremy Rifkin on the Internet of Things and the Next Industrial Revolution*, IEEE SPECTRUM (Apr. 14, 2015, 1:00 PM), <http://spectrum.ieee.org/tech-talk/telecom/internet/jeremy-rifkin-on-the-internet-of-things-and-the-next-industrial-revolution> [<https://perma.cc/38CW-DREK>].

⁴⁵ See *id.*

⁴⁶ See *id.*

⁴⁷ *Id.*

⁴⁸ See RIFKIN, *supra* note 11, at 1–2.

⁴⁹ See *id.* at 2–11 (describing “the eclipse of capitalism”).

⁵⁰ Lemley, *supra* note 17, at 466–81.

⁵¹ *Id.* at 470–71.

⁵² *Id.* at 474–75.

⁵³ *Id.* at 475–79.

⁵⁴ *Id.* at 479–81.

⁵⁵ TOM SLEE, WHAT’S YOURS IS MINE: AGAINST THE SHARING ECONOMY 10 (2015) (“The Sharing Economy . . . promises to be a sustainable alternative to mainstream commerce, helping

rates. The sharing economy turns consumer products into capital goods, and consumers into capitalists.⁵⁷ As one scholar, describing these and other technologies, concludes, “Increasingly, economic thinkers have come to take seriously the possibility that such developments are the result of moves towards a ‘post-scarcity’ society.”⁵⁸

C. *The Formal Account*

The Myth of Free can be restated as a syllogism comprising a major premise, a minor premise, and a conclusion. As with any syllogism, the argument may fail one of two ways: either as a matter of form or of substance. Thus, testing the validity of Free’s origin story requires inquiry into both its formal logic and the descriptive accuracy of its premises.

Most fundamental to the orthodox account of Free is the major premise, here termed the “Zero-Cost Premise.” In its simplest form, the Zero-Cost Premise holds that the internet and related digital technologies have caused the cost of many products to drop to zero.⁵⁹ The prevailing focus is on marginal costs,⁶⁰ though some also suggest a similar dynamic may be reaching (or will soon reach) fixed costs. A common permutation of this argument begins instead with “almost” or

us to make better use of under-utilized resources. . . . We can choose access over ownership . . . Well, that was the promise.”).

⁵⁶ *Id.* at 11 (“There is a contradiction built into the name ‘sharing economy.’”). Catherine Rampell describes polling a group of five-year-olds on the meaning of sharing (after having attended a conference on the “sharing economy”). The preschoolers decried the notion that “sharing” could be done in exchange for payment. Catherine Rampell, *What Preschoolers Can Teach Silicon Valley About “Sharing,”* WASH. POST (May 15, 2014), https://www.washingtonpost.com/opinions/catherine-rampell-paying-for-your-fair-share-in-an-app-based-economy/2014/05/15/007da348-dc66-11e3-8009-71de85b9c527_story.html [<https://perma.cc/7KVV-LGEV>].

⁵⁷ Given this dynamic, it is striking that proponents of the sharing economy often herald it as an antidote to capitalism. Thus, for example, Robin Chase, one of Zipcar’s founders, predicts that the sharing economy will give rise to a “new collaborative economy,” and observes that, as a result, “[w]e are witnessing the end of capitalism as we know it.” Robin Chase, *Bye, Bye Capitalism. We’re Entering the Age of Abundance.*, MEDIUM: BACKCHANNEL (July 16, 2015), <https://medium.com/backchannel/see-ya-later-capitalism-the-collaborative-economy-is-taking-over-34a5fc3a37cd#ecyesulf4> [<https://perma.cc/998T-5EKH>]. If anything, the sharing economy would seem to bolster capitalism.

⁵⁸ Mehra, *supra* note 17, at 2.

⁵⁹ At the same time, the convergence of digitization and the internet—particularly in the age of “Big Data”—can also allow for increases in product quality. *See* STUCKE & GRUNES, *supra* note 39, § 2.24 (“Firms can use data in providing ‘smart’ products that increase energy efficiency and overall welfare.”).

⁶⁰ *See infra* Section II.A.1.

“near” zero costs, and adds the “close enough” assumption: almost zero is *close enough* to be treated as immaterial.⁶¹

Following from this is the minor premise, the “Marginalist Premise.” The Marginalist Premise holds that competition in Free markets has driven prices down to marginal cost.⁶² This premise depends on an often-unstated assumption: that competition in such markets is “perfect,” a condition that in turn depends on several additional assumptions. Thus, stated more fully, the Marginalist Premise is that perfect competition has driven prices to marginal cost.⁶³

Finally, the “Zero-Price Conclusion” is that prices in Free markets are zero.⁶⁴ Thus, Free products are free-as-in-gratis, that is, zero cost to consumers.

In sum, as to a given market featuring Free products, the argument is as follows:

- (1) Marginal cost equals zero.
- (2) Price equals marginal cost.
- (3) Price equals zero.

In form, the Myth of Free is valid. The Zero-Price Conclusion follows from the Zero-Cost and Marginalist Premises. The syllogism avoids common formal fallacies like that of the undistributed middle.⁶⁵ But a logically valid syllogism may also fail if it depends upon descriptively false premises. The following discussion tests the premises underlying the Myth of Free, as well as their permutations and their underlying assumptions. It also examines the accuracy of the conclusion.

II. FREEECONOMICS 101: DEBUNKING THE MYTH OF FREE

Advocates of the Myth of Free purport to have discovered a new system of economics, “Freeeconomics,” that has filled a gaping void left in standard economics.⁶⁶ Freeeconomics rests on the formal premises

⁶¹ See *infra* Section II.A.2.

⁶² See *infra* Section II.B.1.

⁶³ See *infra* Section II.B.2.

⁶⁴ See, e.g., Lemley, *supra* note 17, at 485 (arguing that, as the marginal cost of online content dropped to zero, so did prices).

⁶⁵ Daniel Kahneman describes an experiment involving the following syllogism, which features an undistributed middle: “All roses are flowers. Some flowers fade quickly. Therefore some roses fade quickly.” DANIEL KAHNEMAN, THINKING, FAST AND SLOW 45–46 (2011). A large majority of subjects failed to identify the logical flaw: not all “flowers” in the middle premise are disposed of by either the major premise or the conclusion. See *id.*

⁶⁶ See ANDERSON, *supra* note 3, at 4 (“Somehow an economy had emerged around Free before the economic model that could describe it.”).

set forth above—yet both of those premises, when subjected to close scrutiny, reveal fatal flaws. Unsurprisingly, given the inaccurate nature of both the major and minor premises, the Myth’s conclusion—that zero costs caused the price of many products to fall to zero—turns out to also lack descriptive power. The Myth is revealed to be just that: myth, rather than reality.

A. *Defects of the Major Premise*

The Zero-Cost Premise, though it has been invoked by scores of economists and legal scholars,⁶⁷ fails to describe reality. As it is usually formulated, it depends upon a mathematical impossibility: costs that continuously halve will eventually reach zero. Under an alternative (charitable) understanding, the Zero-Cost Premise fails to account for both the stubborn persistence of costs and what is referred to herein as “the friction of the real.” Even the weak form of this premise (marginal costs are *close enough* to zero) fails: a cost that is “close” to zero is not close enough for a rational firm to simply ignore it. The following subparts discuss each failure in turn.

1. *The Stubborn Persistence of Costs*

In its simplest form, the major premise of Free’s origin story depends on “zero” marginal costs. The orthodox accounts fall into two camps. First, some expressly countenance the existence of zero marginal costs.⁶⁸ Prominent economists, for instance, have observed that “low, *even zero*, marginal costs pose difficult questions but also open up enormous opportunities for economic policy.”⁶⁹ Second, some ana-

⁶⁷ See, e.g., *infra* notes 68–70.

⁶⁸ Put another way, the works of present interest employ the idea of zero marginal costs descriptively; these are to be distinguished from works that adopt “zero marginal costs” as an assumption. For an example of the latter, see William R. Johnson, *The Economics of Copying*, 93 J. POL. ECON. 158, 160–61 (1985).

⁶⁹ DeLong & Summers, *supra* note 4, at 48 (emphasis added); see also James Boyle, *Cruel, Mean, or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 VAND. L. REV. 2007, 2012 (2000) (“Information is a public good, non-excludable and non-rival. It is hard to stop one unit from satisfying an infinite number of users at zero or close to zero marginal cost.”); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1053 (2005) (“[I]n an information industry, marginal cost . . . is zero or close to it”); Thomas M. Lenard & Paul H. Rubin, *Big Data, Privacy and the Familiar Solutions*, 11 J.L. ECON. & POL’Y 1, 19 (2015) (“Many virtual goods, such as apps and software, also have high fixed costs and low or even zero marginal costs.”); Eben Moglen, *Freeing the Mind: Free Software and the Death of Proprietary Culture*, 56 ME. L. REV. 1, 3 (2004) (“For the first time in human history, we face an economy in which the most important goods have zero marginal cost.”); Henry E. Smith, *Institutions and Indirectness in Intellectual Property*, 157 U. PA. L. REV. 2083, 2116 (2009) (“[E]xclusion is costly because of the nonrival nature of information. If an

lysts qualify their references to zero marginal costs with terms like “almost,” “near,” or “effectively.”⁷⁰ The discussion in the following two Sections addresses the claims of the first group: that many markets now exhibit zero marginal costs.

a. Halving Costs Are Asymptotic

To explain how marginal costs fell to (actual, not almost) zero, the Myth of Free points to the long-term development trajectories of computer processing power, digital storage, and bandwidth.⁷¹ Over the past several decades, the cost of these technologies has followed a constant downward curve. As to processing, for example, Moore’s Law famously holds that semiconductors double the number of transistors they can hold every eighteen months.⁷² The corollary is that the cost of a given unit of processing halves every two years.⁷³ Digital storage capacity doubles each year, meaning its cost halves annually.⁷⁴ Bandwidth speed doubles every nine months, with a corresponding nine-month half-life for its cost per unit.⁷⁵

According to the Myth, once information-based products could be reproduced and distributed digitally, the marginal cost of such products began to map onto the ever-halving cost trendlines of

additional person can use the information at zero marginal cost, excluding anyone from the information makes little sense in terms of direct interests.”). *But see* Daniel F. Spulber, *Public Prizes Versus Market Prices: Should Contests Replace Patents?*, 97 J. PAT. & TRADEMARK OFF. SOC’Y 690, 703 (2015) (“The ‘marginal cost price’ of technology is not equal to zero.”).

⁷⁰ See, e.g., RIFKIN, *supra* note 11, at 11 (“nearly zero”); Keith N. Hylton, *Patent Uncertainty: Toward a Framework with Applications*, 96 B.U. L. REV. 1117, 1123 (2016) (“essentially zero”); Seth F. Kreimer, *Pervasive Image Capture and the First Amendment: Memory, Discourse, and the Right to Record*, 159 U. PA. L. REV. 335, 386 (2011) (“close to zero”); Lemley, *supra* note 17, at 461, 514 (“effectively to zero” and “near zero”); Jiarui Liu, *Copyright for Blockheads: An Empirical Study of Market Incentive and Intrinsic Motivation*, 38 COLUM. J.L. & ARTS 467, 490 (2015) (stating that the marginal cost of musical works “is near zero in the digital age”); Mehra, *supra* note 17, at 3, 10 (“near-zero-marginal-cost” and “quite low or zero”); Johan David Michels, *False Sovereigns and Poor Stewards: Why Copyright Law Should Liberate the Transformative Author*, 21 B.U. J. SCI. & TECH. L. 317, 326 (2015) (“close to zero”); Georgios I. Zekos, *Cyber Versus Conventional Personal Jurisdiction*, J. INTERNET L., Apr. 2015, at 3, 13 (“essentially zero”). Even this author has trafficked in this trope. See John M. Newman, *Copyright Freeconomics*, 66 VAND. L. REV. 1409, 1426 (2013) (contemplating “[m]arginal costs approaching zero”).

⁷¹ ANDERSON, *supra* note 3, at 77.

⁷² *Id.*

⁷³ See *id.* at 77–78.

⁷⁴ *Id.*

⁷⁵ *Id.* at 78.

processing, storage, and bandwidth.⁷⁶ Eventually costs became so low that prices inevitably dropped to zero.⁷⁷ Free was born.

But, when tested, this account rings hollow. To illustrate, consider Zeno's Paradox. The ancient Greek philosopher Zeno of Elea devised a set of paradoxes that seemed to prove that all motion is illusory.⁷⁸ The most famous of these, known simply as Zeno's Paradox, is often retold by reference to the wall nearest the reader.⁷⁹ To touch that wall, you must first cross half the distance to the wall.⁸⁰ Next, you must cross half the remaining distance—half of the half. After that, you must again cross half the remaining distance, then half again, and so forth, such that you may infinitely approach the wall but never quite touch it.⁸¹

A similar principle applies to—and derails—the orthodox account of zero marginal costs. Money is infinitely divisible. Thus, even if costs continue to fall by half every two years (or year, or nine months, etc.) forever, they will never reach zero.⁸² The cost curves of processing, storage, and bandwidth described above are asymptotic: they may approach infinitely ever closer to, but would never touch, zero. As the Myth of Free would have it, when technologies halve in cost each year, zero marginal costs are inevitable.⁸³ In fact, the opposite is true: when technologies halve in cost each year, zero marginal costs are impossible.

b. The Friction of the Real

Can the Zero-Cost Premise be saved via charitable interpretation? Though it does not appear to have yet been made, a variation of the argument made by the Myth of Free's many proponents could avoid the asymptotic cost-curve problem. Perhaps, this more nuanced argument would run, instead of costs halving within a specified time period, costs decline *linearly*, i.e., by a fixed dollar amount within each

⁷⁶ See *id.*

⁷⁷ *Id.* at 75 ("When something halves in price each year, zero is inevitable.").

⁷⁸ *Zeno's Paradox of the Tortoise and Achilles*, PLATONIC REALMS, <http://platonicroalms.com/encyclopedia/zenos-paradox-of-the-tortoise-and-achilles> [<https://perma.cc/XDS5-22WV>]. There is a mathematical explanation for Zeno's Paradox, but it does not save the Zero-Cost Premise. See *id.*

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² And there is room to doubt that the same rate of innovation will continue forever. As Tyler Cowen points out, the rate of productivity growth indicates slowing rates of human innovation. See TYLER COWEN, *THE GREAT STAGNATION* 19–23 (2011).

⁸³ See ANDERSON, *supra* note 3, at 75.

specified time period. If this were the case, marginal costs could theoretically reach zero, causing prices to follow.⁸⁴

Processing, storage, and bandwidth are abstract in one sense: they occur and exist in a meaningful sense beyond the realm of human perception. Online interactions seem to occur in a separate place, apart from the constraints of the familiar physical world. Early analysts addressing the interplay between the internet and the law stressed this aspect. Two legal scholars, for instance, famously argued that “[c]yberspace has no territorially based boundaries, because the cost and speed of message transmission on the Net is almost entirely independent of physical location.”⁸⁵ As a later commentator explained, “Cyberspace was once thought to be the modern equivalent of the Western Frontier. . . . [A]n abstract place, where land was free for the taking, explorers could roam, and communities could form with their own rules.”⁸⁶

The early understanding was misguided, and particularly so for present purposes. To those grappling with, for example, how jurisdictional analyses ought to map onto online interactions, users’ perceptions (even if technically incorrect) of digital markets may well matter.⁸⁷ But understanding the economics of Free—and particularly the question of whether marginal costs can reach actual, not near, zero—requires rejecting the misperception that digital interactions occur in an abstract realm. As one scholar observed, “the idea that the Internet is literally a place in which people travel is not only wrong but faintly ludicrous.”⁸⁸ The same is true of the idea that the internet is an abstract place through which products are delivered.

Computer processing, digital storage, and bandwidth occur and exist in the familiar, physical world. They require real-world re-

⁸⁴ The present discussion sets aside, for the moment, the remaining problems with the Myth of Free, discussed *infra* Parts I, II.

⁸⁵ David R. Johnson & David Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367, 1370 (1996).

⁸⁶ Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CALIF. L. REV. 439, 442–43 (2003) (footnote omitted); see also Julie E. Cohen, *Cyberspace as/and Space*, 107 COLUM. L. REV. 210, 211 (2007) (“[T]he claim that cyberspace is deeply and essentially different from ‘real space’ was a compelling one for many scholars.”).

⁸⁷ See, e.g., Cohen, *supra* note 86, at 255 (arguing cyberspace should be “understood as connected to and subsumed within an emerging, networked space that is inhabited by real, embodied users and that is apprehended through experience”); Hunter, *supra* note 86, at 441 (“[E]nclosing cyberspace and imposing private property conceptions upon it . . . creat[es] a digital anticommons where suboptimal use of Internet resources will be the norm.”); Johnson & Post, *supra* note 85, at 1367 (“Cyberspace requires a system of rules quite distinct from the laws that regulate physical, geographically-defined territories.”).

⁸⁸ Mark A. Lemley, *Place and Cyberspace*, 91 CALIF. L. REV. 521, 523 (2003).

sources: metals for wiring, sand for silicon and glass, petroleum for rubber and plastic. In the real world, these elements have always been, and will always remain, scarce. There is not, and there will never be, an infinite, costless supply of metal, sand, or petroleum. These three related technologies also require electricity, the generation of which entails consumption of real-world materials. Even renewables are not—and cannot be—truly costless: generation and transmission require physical materials.⁸⁹ Digital processing, storage, and bandwidth do not occur in some abstract realm that transcends scarcity. They occur in the real world, which means they come with real costs. Those costs may be quite low, and may decrease lower still, but they cannot reach zero.

Consider two examples of declining costs cited in Anderson's *Free*: processor chips⁹⁰ and YouTube's streaming costs.⁹¹ "In 1961, a single transistor cost \$10"; by 2009, Anderson claimed, it would cost only a fraction of a penny, making processing "too cheap to meter."⁹² YouTube's streaming costs for a given unit of audiovisual content were likewise predicted to decline year over year—again, becoming at some point "too cheap to meter."⁹³

But the sale of pure computer processing power, even remote processing power that is distributed online, remains a profitable enterprise—an unlikely outcome if the marginal cost of producing and distributing such power were truly zero. According to the Myth of Free, zero marginal cost ought to lead to zero prices. Yet, to take one example, Amazon reaps most of its considerable income not from its online retail business, sales of its e-readers and e-books, or video-streaming service, but instead from Amazon Web Services ("AWS"), its cloud-computing arm.⁹⁴ AWS supplies on-demand computing power: the use

⁸⁹ See, e.g., J.P., *The Cost of Renewable Energy: New Numbers, Same Conclusion*, *ECONOMIST* (Aug. 22, 2014), <http://www.economist.com/blogs/freeexchange/2014/08/cost-renewable-energy> [<https://perma.cc/S2LS-NQCU>] (discussing research on how best to calculate the costs of zero- and low-carbon energy).

⁹⁰ It is worth noting that although many Free products are provided by multisided platforms, processor chips are typically supplied via vertical supplier-customer relationships. The Myth of Free thus purports to extend beyond multisided contexts.

⁹¹ ANDERSON, *supra* note 3, at 78.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ See Evan Niu, *Amazon Web Services Is Amazon.com's Shining Profitable Star*, *MOTLEY FOOL* (Oct. 25, 2015, 1:00 PM), <http://www.fool.com/investing/general/2015/10/25/amazon-web-services-is-amazoncoms-shining-profitab.aspx> [<https://perma.cc/3J45-CBQU>]. For a general background on cloud computing, see Damon C. Andrews & John M. Newman, *Personal Jurisdiction and Choice of Law in the Cloud*, 73 MD. L. REV. 313 (2013).

of (supposedly) too-cheap-to-meter processors delivered via (supposedly) too-cheap-to-meter bandwidth. But AWS is not Free. As of 2015, AWS generated “wholly half of Amazon’s consolidated operating income.”⁹⁵ The profitability of AWS and competing cloud-services providers stands as compelling evidence that neither processing nor bandwidth have become too cheap to meter or matter.⁹⁶

Similarly, YouTube’s streaming costs may be decreasing on a per-unit basis, but have not reached zero. Such costs are variable, meaning they contribute to (and perhaps compose the bulk of) YouTube’s marginal cost to deliver an incremental unit of streaming video to a viewer. As to a given unit of content, YouTube’s bandwidth costs have declined over time.⁹⁷ But streaming costs continue to have a sizeable impact on YouTube’s bottom line.⁹⁸ Bandwidth remains scarce enough that its costs offset every dollar of revenue YouTube managed to take in during 2014.⁹⁹ To YouTube, bandwidth has not become too cheap to meter—and certainly not too cheap to matter.

Those who claim the existence of zero marginal costs fall into the same trap as those who chase the elusive dream of perpetual motion.¹⁰⁰ It is possible to imagine a perpetual-motion machine that runs

⁹⁵ Niu, *supra* note 94. By October 2015, AWS had already brought in over \$5 billion that year. Julie Bort, *Amazon’s Huge and Profitable Cloud-Computing Business Is Up 78%*, BUS. INSIDER (Oct. 22, 2015, 4:42 PM), <http://www.businessinsider.com/amazon-cloud-business-is-up-78-percent-2015-10> [https://perma.cc/PS73-AJ8E].

⁹⁶ In fact, cloud providers like AWS make money precisely via metering: monitoring how much computing power a customer uses and charging the customer accordingly. Andrews & Newman, *supra* note 94, at 327.

⁹⁷ See Ron Amadeo, *Cheaper Bandwidth or Bust: How Google Saved YouTube*, ARS TECHNICA (Apr. 23, 2015, 9:05 AM), <https://arstechnica.com/gadgets/2015/04/cheaper-bandwidth-or-bust-how-google-saved-youtube/> [https://perma.cc/7U4H-UY4V]. See generally Henry Blodget, *Economics of Online Video 2: Unit Cost Structure*, BUS. INSIDER (Sept. 10, 2007, 10:05 AM), <http://www.businessinsider.com/2007/9/economics-of-on> [https://perma.cc/84Z4-LWUS].

⁹⁸ See sources cited *supra* note 97. YouTube is owned by Google, a subsidiary of its parent company Alphabet. Rob Price & Mike Nudelman, *One Chart that Explains Alphabet, Google’s Parent Company*, BUS. INSIDER (July 23, 2016, 4:07 AM), <http://www.businessinsider.com/chart-alphabet-google-parent-company-deepmind-gv-x-nest-etc-2016-7> [https://perma.cc/M3FL-TFZL].

⁹⁹ See Rolfe Winkler, *YouTube: 1 Billion Viewers, No Profit*, WALL ST. J. (Feb. 25, 2015, 4:02 PM), <http://www.wsj.com/articles/viewers-dont-add-up-to-profit-for-youtube-1424897967> [https://perma.cc/234Z-VHGM].

¹⁰⁰ Would-be inventors have filed so many perpetual-motion-machine patent applications that the U.S. Patent & Trademark Office promulgated a unique rule requiring such applicants to submit a working prototype. See Gene Quinn, *Turning Your Idea into an Invention*, IPWATCHDOG (July 29, 2017), <http://www.ipwatchdog.com/2017/07/29/turning-idea-invention/id=86224/> [https://perma.cc/S4CG-RER2]. But see *Newman v. Quigg*, 877 F.2d 1575, 1577, 1580 (Fed. Cir. 1989) (holding that a device that outputs more energy than it inputs is impossible and unpatentable).

forever without violating the First Law of Thermodynamics.¹⁰¹ But such machines are impossible in practice.¹⁰² All are doomed by friction, the slightest amount of which will eventually cause an unpowered machine to grind to a halt.¹⁰³ This is the friction of the real.

At the heart of the attractions to both perpetual-motion machines and zero marginal costs are fundamental—and uniquely human—impulses. These fictions appeal to both “the best and worst sides of human nature: the urge to transcend the limits of the possible, against the desire to get something for nothing.”¹⁰⁴ The dream of zero marginal costs and the Myth of Free similarly exude optimism, even utopianism, while at the same time holding forth the illusory promise that businesses can give, and consumers can get, “something for nothing.”¹⁰⁵

But marginal costs are persistent. Even if the costs of processing, storage, and bandwidth continue to halve each year for eternity, they will never reach zero. And because each of these inputs occurs and exists in the physical world, each requires scarce elements. Scarcity means costs—the friction of the real. As a result, zero marginal cost remains an impossibility, and accounts of its existence remain mythical.

2. Costs (Always) Matter: “Close to Zero” Is Not Close Enough

The stubborn persistence of marginal costs presents a difficulty for Free’s traditional origin story. In response, some analysts offer a more nuanced argument: costs have not fallen to zero, but they have

¹⁰¹ In a closed system, energy cannot be created or destroyed. Clara Moskowitz, *Fact or Fiction?: Energy Can Neither Be Created nor Destroyed*, SCI. AM. (Aug. 5, 2014), <https://www.scientificamerican.com/article/energy-can-neither-be-created-nor-destroyed/> [<https://perma.cc/6M68-F6AN>]. But so long as perpetual-motion machines only run forever, without performing any kind of useful work, they skirt the First Law. See Christopher Wadlow, *Patents for Perpetual Motion Machines*, 2 J. INTELL. PROP. L. & PRAC. 136, 137 (2007).

¹⁰² See Wadlow, *supra* note 101, at 137. There are two different types of perpetual-motion machines; both are impossible in practice. See *id.* One not only runs forever, but also performs useful work, without any energy inputs. *Id.* This type runs afoul of the First Law of Thermodynamics. *Id.* The other, discussed above, does not violate the First Law but may violate the Second—such machines are closed systems that fail to tend toward entropy. *Id.*

¹⁰³ See *id.*

¹⁰⁴ Christopher Wadlow, *Abstract to Wadlow, supra* note 101, <http://jiplp.oxfordjournals.org/content/2/3/136.abstract> [<https://perma.cc/NNJ2-SPEW>].

¹⁰⁵ ANDERSON, *supra* note 3, at 216. Recall the quote from Anderson at the beginning of Part I: “You *can* make money giving things away. There really *is* a free lunch. Sometimes you get *more* than you pay for.” *Id.* at 4. The “you” in this passage manages to capture both for-profit businesses (in the first sentence) and consumers (in the third). All of society can, in other words, have its cake and eat it too.

dropped to a point that is “close to zero” or “almost zero.”¹⁰⁶ Under this view, the Zero-Cost Premise holds that marginal costs are *close to* zero.

Yet this shift requires an important logical leap. The often-unspoken assumption at play is that “close to zero” is also close *enough* to zero—close enough to zero that sellers rationally round down the difference (i.e., ignore costs) when setting prices.¹⁰⁷ Some even make this assumption explicitly, arguing, for example, that near-zero costs are “too cheap to meter,”¹⁰⁸ and that too cheap to meter is also “too cheap to matter.”¹⁰⁹

It is important to note that those who point to close-to-zero costs and the rounding down of “too cheap to matter” do so when describing the conduct of for-profit firms, not that of natural persons. Natural persons may exert uncompensated labor for a number of reasons despite the fact that doing so entails positive costs. Such individuals may be guided by social norms, incentivized by loose quid pro quo arrangements, or rewarded by intrinsic positive affect.¹¹⁰ The need for the asserted rounding-down response to close-to-zero costs thus arises only when analyzing the behavior of for-profit firms.

But, to a for-profit firm, “close to zero” can never be close enough to zero. Or, to put it another way, even almost-zero costs are not too cheap to matter. The crux of the problem with this particular strain of Free’s founding myth is that it casts for-profit suppliers as the actors supposedly rounding down their near-zero marginal costs. Rounding down such costs—i.e., charging nothing to offset them—would make any given transaction unprofitable.

106 Broadcast media—television and radio—may be the only real-world example of products that exhibit true zero marginal costs. Assuming a constant signal strength, an additional viewer or listener who tunes into a broadcast entails no marginal cost to the station. The author thanks Professor Laurent Sacharoff for this insight. *See also* Paul A. Samuelson, *Aspects of Public Expenditure Theories*, 40 REV. ECON. & STAT. 332, 335 (1958) (“[W]hat . . . are the true marginal costs of having one extra family tune in on the program? They are literally zero.”). But this dynamic can hold true only for one-way broadcast media. *Cf.* Stephen J. Bailey & Peter Falconer, *Charging for Admission to Museums and Galleries: A Framework for Analysing the Impact on Access*, 22 J. CULTURAL ECON. 167, 173 (1998) (noting that despite common claims that marginal costs of visits to museums are at or near zero, marginal costs—in the form of allowing an additional visitor to occupy space that could be used for other purposes—are present). And such media are not the focal point of the Myth of Free.

107 *See* Hoofnagle & Whittington, *supra* note 31, at 612 (“Anderson therefore argues that it makes sense to ‘round down’ and charge consumers nothing for many internet services.”).

108 ANDERSON, *supra* note 3, at 76–78.

109 *Id.* at 75 (chapter titled “Too Cheap to Matter”).

110 *See* Lemley, *supra* note 17, at 487–96 (positing a number of explanations for zero-price creative output).

A single unprofitable transaction is unlikely to lead to a firm's demise, particularly when the negative profit margin is small (the difference between "almost"¹¹¹ zero and true zero). But to see why this dynamic matters a great deal for the viability of Free's orthodox origin story, consider the embezzling scheme known as "salami slicing."¹¹² Salami slicing consists of taking a small cut from each of a large number of transactions.¹¹³ While the individual sums are small, the total amount embezzled can be substantial.¹¹⁴

The rounding-down version of the Zero-Cost Premise, however, requires reverse salami slicing. Such rounding down would mean *losing* a small cut from each of a large number of transactions.¹¹⁵ While the individual sums would be small, the total amount of revenue lost would be substantial. And in a cruel paradox, the more successful a product became, the more money its supplier would lose.¹¹⁶ Crucially, this dynamic remains in effect no matter how low costs get, so long as they do not reach true zero. And, as shown above, costs can never reach true zero.¹¹⁷

¹¹¹ It may bear noting that increasing a dollar amount from zero to any positive number represents an infinite increase, raising the question of whether "almost" zero is a logical concept at all. John M. Newman, *Antitrust in Zero-Price Markets: Applications*, 94 WASH. U. L. REV. 49, 66 n.95 (2016).

¹¹² Salami slicing has repeatedly appeared in Hollywood films, including *Superman III*, *Hackers*, and *Office Space*. Rob Wile, *High-Frequency Trading Is Kind of Like What Richard Pryor Did in 'Superman 3'*, BUS. INSIDER (Apr. 2, 2014, 9:22 AM), <http://www.businessinsider.com/superman-3-and-high-frequency-trading-2014-4> [<https://perma.cc/9WP9-ZAUA>]. In fact, as *Office Space*'s would-be thieves discuss their scheme, one observes, "This sounds familiar." A second replies, "Yeah. They did it in Superman III." *Office Space Quotes*, MOVIE-QUOTESANDMORE, <http://www.moviequotesandmore.com/office-space-quotes-1/> [<https://perma.cc/KB62-T84L>].

¹¹³ See, e.g., TERRY L. LEAP, DISHONEST DOLLARS: THE DYNAMICS OF WHITE-COLLAR CRIME 65 (2007) ("[A] technique known as 'salami-slicing' has been used to divert large sums of money from banks by rounding off account amounts to the lowest cent and transferring the fraction of a cent to a special account.").

¹¹⁴ See, e.g., *id.* ("Although damage to a single account is miniscule, the perpetrator can garner huge sums of money by salami-slicing thousands of accounts repeatedly.").

¹¹⁵ This scheme is literally a joke: "[t]he old business joke of selling at a loss but making it up on volume." STEVEN J. PALEY, THE ART OF INVENTION: THE CREATIVE PROCESS OF DISCOVERY AND DESIGN 181 (2010).

¹¹⁶ As the saying goes, "A billion here, a billion there, and pretty soon you're talking real money," a quote often (perhaps apocryphally) attributed to Senator Everett Dirksen, whose loquacity earned him the moniker "Wizard of Ooze." Mike Pesca, *The Wizard of Ooze*, SLATE (Mar. 24, 2015, 6:52 PM), http://www.slate.com/articles/podcasts/gist/2015/03/the_gist_angelina_jolie_s_bravery_and_todd_purdum_on_everett_dirksen.html [<https://perma.cc/M5VW-PBFM>]; *Senator Everett McKinley Dirksen Dies*, U.S. SENATE, https://www.senate.gov/artandhistory/history/minute/Senator_Everett_Mckinley_Dirksen_Dies.htm [<https://perma.cc/6C4A-MATX>].

¹¹⁷ See *supra* Section II.A.1.

Rounding down costs in this manner would violate one of the first principles of economics: rational, self-interested behavior. A firm that indefinitely sets prices below its costs will eventually be forced to exit the market.¹¹⁸ And while the Myth of Free is presented as a paradigm shift in economic thinking, its progenitors do not appear willing to dispense with the standard assumption of rationality.¹¹⁹

Again, consider the example of YouTube, a service invoked by Anderson as a prototypical example of Free.¹²⁰ At the time *Free* was published, YouTube's streaming costs had been declining year over year—but those costs were not, nor had they ever been, zero.¹²¹ And YouTube streams a great deal of video each year. As one commentator points out, “‘close enough to free’ multiplied by seventy-five billion is still a very large number.”¹²² By 2014, YouTube had become the third-most visited website in the world, boasting more than one billion users per month.¹²³ But YouTube's streaming costs were also approximately \$4 billion.¹²⁴ In other words, even five years after Anderson's book saw print, YouTube's costs were still substantial enough to make its entire business model unprofitable.

Some of the human users who contribute content to YouTube's platform may do so for nonmonetary (or at least not directly monetary) reasons.¹²⁵ But these individuals are not the headline-grabbing

118 At least absent some subsidization mechanism. And Anderson's book is, to be sure, filled with examples of clever subsidization mechanisms. See generally ANDERSON, *supra* note 3. Yet the concept of subsidization is nothing new—and the Myth of Free purports to describe a new phenomenon with new economic laws.

119 Consider, for example, one of the alternative subtitles of Anderson's book: “How Today's *Smartest Businesses Profit* by Giving Something for Nothing” (emphasis added).

120 ANDERSON, *supra* note 3, at 91–93.

121 See *supra* Section II.A.1.

122 Gladwell, *supra* note 22 (emphasis added). Gladwell's review cited a Credit Suisse estimate that YouTube would lose “close to half a billion dollars” in 2009. *Id.* Proponents of Free's orthodox origin story pointed in response to potential errors in the Credit Suisse projections. Mike Masnick, *Chris Anderson, Malcolm Gladwell and a Look at Free*, TECHDIRT (July 1, 2009, 10:57 AM), <https://www.techdirt.com/articles/20090701/0422125421.shtml> [<https://perma.cc/8N3V-DH76>]. But even the reassessment cited to by Masnick estimated YouTube's operating loss for 2009 at \$174 million—lower than the \$470.6 million figure from Credit Suisse, but decidedly not zero. John Paczkowski, *Credit Suisse Far Better at Analyzing Derivatives than YouTube Infrastructure Costs*, ALL THINGS D (June 17, 2009, 7:06 AM), <http://allthingsd.com/20090617/credit-suisse-far-better-at-analyzing-derivatives-than-youtube-infrastructure-costs/> [<https://perma.cc/57L3-PESU>].

123 Yoni Heisler, *The Third Most Popular Website on the Planet Still Can't Make a Profit*, BGR (Feb. 26, 2015, 5:50 PM), <http://bgr.com/2015/02/26/google-youtube-profits/> [<https://perma.cc/QA8Z-G9VN>].

124 Winkler, *supra* note 99.

125 Newman, *supra* note 70, at 1442–43.

subjects of the Myth of Free, which instead concerns itself with for-profit firms. And YouTube itself is a for-profit intermediary. YouTube provides the inputs (servers, bandwidth, etc.) needed for video storage and distribution not out of charitable goodwill, but in hopes of capturing positive net revenue. Like any market competitor, it cannot hope to do so by simply rounding down—i.e., ignoring—its costs.

The broader point, of course, does not depend on the rise or fall of any particular business; YouTube may well become profitable.¹²⁶ But rounding down costs in the sense contemplated by Free’s orthodox origin story can never be rational. So long as costs are not truly zero—and they can never be truly zero¹²⁷—any company that decides to treat them as such will be reverse salami slicing: losing a small amount of money on each transaction. A single slice may be too cheap to matter. But small slices add up quickly. “Close to zero” is not close enough.

B. Defects of the Minor Premise

The Marginalist Premise—which holds that competition in Free markets has driven prices to match marginal costs—exhibits two major defects. First, it misapplies the economic theory of marginalism. Second, it rests upon the factually invalid assumption of perfect competition. The following Section discusses each defect in turn.

1. Misguided Marginalism and Fixed Costs

The Marginalist Premise (“marginal costs equal zero”) invokes the economic concept of “marginalism”: the idea that individual actors make economic decisions “at the margin,” that is, unit-by-unit.¹²⁸ The following discussion tests—and rejects—not marginalism itself, but the Marginalist Premise’s misguided application of marginalism.¹²⁹ “Zero marginal cost” has become both a shibboleth (signaling that the relevant narrative belongs to the canon comprising the Myth of Free)

¹²⁶ For present purposes, “profitability” is used in a narrow sense to signify a business unit that takes in more direct revenues than it spends in a given year. In a broader sense, YouTube may well be “profitable” to Alphabet, Google’s parent company. Adam Candeub argues, for example, that YouTube plays a role in making Google the “lowest cognitive cost” option for users vis-à-vis other internet portals, increasing Google’s competitive advantage. Adam Candeub, *Behavioral Economics, Internet Search, and Antitrust*, 9 I/S 407, 429 (2014).

¹²⁷ See *supra* Section II.A.1.

¹²⁸ Herbert Hovenkamp, *The Marginalist Revolution in Legal Thought*, 46 VAND. L. REV. 305, 306 (1993).

¹²⁹ The Marginalist premise also depends on the often-unstated assumption of perfect competition; the shortcomings of that assumption are discussed *infra* Section II.B.2.

and a key that unlocks the door to an age of abundance.¹³⁰ As such, it allows authors to make an easy end run around the traditional economic law of scarcity. Yet this powerful phrase has, to date, largely escaped critical examination.

Marginalism plays a pervasive, yet often underemphasized, role in modern social sciences and policymaking.¹³¹ In the early twentieth century, economists waged a fierce battle over whether market participants set prices with reference only to marginal costs (marginalism), or to fixed costs also (full-cost pricing).¹³² This debate carried implications far broader than its immediate contours, ultimately becoming one of the key formative events in the development of neo-classical microeconomic theory.¹³³

Under the marginalist view, firms continue producing until the marginal cost of producing an additional unit would outweigh the marginal revenue from doing so. Prices are set at the intersection of marginal cost and marginal revenue. To a marginalist, “[f]ixed costs vanish from the firm’s optimization problem and therefore do not factor into the optimal price.”¹³⁴

Full-cost pricing, on the other hand, involves adding together direct variable costs, an allocated portion of fixed costs, and a predetermined profit margin.¹³⁵ Unlike marginalist pricing, full-cost pricing does not take as its sole aim short-run profit maximization. “Rather the pricing procedure is designed to enable the firm to reproduce itself and grow.”¹³⁶ Proponents of full-cost pricing criticized marginalism as

¹³⁰ It is, among other things, the title of an encyclopedic entry on wiseGEEK, John Markley, *What Is Zero Marginal Cost?*, WISEGEEK, <http://www.wisegeek.com/what-is-zero-marginal-cost.htm> [https://perma.cc/TY4D-7E69] (last updated Feb. 27, 2018), and the subject of posts on the well-regarded blog *Techdirt*, see, e.g., Mike Masnick, *Is the Zero Marginal Cost Society the End of Capitalism. . . Or a Way to Fix Capitalism?*, TECHDIRT (Apr. 1, 2014, 1:06 PM), <https://www.techdirt.com/articles/20140329/07150626725/is-zero-marginal-cost-society-end-capitalism-way-to-fix-capitalism.shtml> [https://perma.cc/MSX5-SL64].

¹³¹ See Herbert Hovenkamp, *Appraising the Progressive State*, 102 IOWA L. REV. 1063, 1073–74 (2017) (“These [marginalist] models were to have profound implications, not only for economic thought but also for the social sciences and policy concerning risk management. . . . The impact of marginalism on legal thought is difficult to exaggerate.”).

¹³² See Frederic S. Lee, *The Marginalist Controversy and the Demise of Full Cost Pricing*, 18 J. ECON. ISSUES 1107, 1107 (1984).

¹³³ Roger E. Backhouse, *Friedman’s 1953 Essay and the Marginalist Controversy*, in THE METHODOLOGY OF POSITIVE ECONOMICS 217, 217 (Uskali Mäki ed. 2009).

¹³⁴ Jacob P. Gramlich & Korok Ray, *Reconciling Full-Cost and Marginal-Cost Pricing* 2 (Wash.: Bd. of Governors of the Fed. Reserve Sys., Finance and Economics Discussion Series 2015-072, 2015), <https://www.federalreserve.gov/econresdata/feds/2015/files/2015072pap.pdf> [https://perma.cc/ZW6G-6DL3].

¹³⁵ *Id.* at 21–22.

¹³⁶ Lee, *supra* note 132, at 1108.

being unworkable in practice and, consequently, deficient in descriptive power.¹³⁷

In response, Milton Friedman's classic 1953 work, *The Methodology of Positive Economics*, provided what has become the most enduring defense of marginalism.¹³⁸ Friedman argued that the value of a given theory lies not in the descriptive accuracy of its assumptions, but solely in its predictive value.¹³⁹ Thus, even assuming firms do not in practice behave marginally, they may nonetheless reach outcomes similar to those predicted by marginalist theory. This instrumentalist justification insulated marginalism from empirically grounded critiques.

Among economists, marginalism emerged largely victorious, and full-cost pricing was relegated to the dustbin of history.¹⁴⁰ But full-cost pricing has, from time to time, been resurrected by economists in search of a theoretical explanation for economic problems that cannot be adequately solved via marginalism.¹⁴¹ And it remains true, as in the early twentieth century, that the bulk of empirical evidence indicates that most real-world firms include not just marginal costs, but also fixed costs, in setting prices.¹⁴² Recently, some formal economic models have begun to follow suit.¹⁴³ Given the theoretical and empirical questions surrounding marginalism,¹⁴⁴ and the apparent descriptive value offered by full-cost pricing, the near-complete demise of full-cost pricing in mainstream economic discourse is rather remarkable.

¹³⁷ The most famous critic was perhaps Lester, whose article, *Shortcomings of Marginal Analysis for Wage-Employment Problems*, published in 1946 in the *American Economic Review*, occupied a prominent role in the debate. Richard A. Lester, *Shortcomings of Marginal Analysis for Wage-Employment Problems*, 36 AM. ECON. REV. 63 (1946).

¹³⁸ MILTON FRIEDMAN, *The Methodology of Positive Economics*, in *ESSAYS IN POSITIVE ECONOMICS* 3 (1953).

¹³⁹ *Id.* at 15.

¹⁴⁰ Lee, *supra* note 132, at 1107.

¹⁴¹ *Id.*

¹⁴² See Gramlich & Ray, *supra* note 134, at 4 (citing several accounting studies from the 1980s and 1990s showing “that full-cost pricing dominates managerial practices”). But see M.R. Lukas, *Pricing Decisions and the Neoclassical Theory of the Firm*, 14 MGMT. ACCT. RES. 201, 201 (2003) (criticizing accountants’ empirical work but admitting that “the empirical evidence supporting neoclassical price theory is not strong”). The common law of contracts generally recognizes that sophisticated parties engage in full-cost pricing. See, e.g., *Vitex Mfg. Corp. v. Caribtex Corp.*, 377 F.2d 795, 797–99 (3d Cir. 1967).

¹⁴³ Gramlich & Ray, *supra* note 134, at 24.

¹⁴⁴ Some modern critics contend that it was neither theoretical nor empirical shortcomings that spurred the demise of full-cost pricing. Rather, “the doctrinal need to deflect any criticism of . . . neoclassical price theory” played a dominant role in marginalism’s ascendance. Lee, *supra* note 132, at 1124.

Moreover, even assuming that marginalism holds instrumentalist value, that value is limited. Suppose that a state of perfect competition obtains in practice.¹⁴⁵ Standard theory tells us that suppliers in that market would set prices at marginal cost. But such a strategy would be rational only in the extreme short run. A firm selling at marginal cost effectively achieves a negative profit on each sale because it fails to recoup its fixed costs.¹⁴⁶ Such firms will, in the long run, fail and exit the market.

Yet the Myth of Free adopts marginalism not solely to describe short-run pricing decisions in response to environmental changes, but to describe long-run equilibrium prices. According to the orthodox account, Free is the new normal, brought about by marginal costs declining to zero.¹⁴⁷ Friedman's instrumentalist defense of marginalism does not, however, imply that prices, even in a perfectly competitive market, will equal marginal cost *in the long run*. As another staunch defender observed, marginalism was designed for the express purpose of predicting changes in prices and output resulting from a given change in that firm's environment.¹⁴⁸ It was, in short, not "designed to serve to explain and predict the behavior of real firms" as to a particular price or output rate over time.¹⁴⁹

Those who argue that a new zero-price equilibrium obtains in Free markets misunderstand, and therefore misapply, the theory of marginalism. Where marginalism can neither describe firms' decision-making processes, nor accurately model strategic pricing behavior,¹⁵⁰ it ought not serve as the foundation for analysis. Yet it has been co-opted to do both by proponents of the Myth of Free.¹⁵¹

These problems are compounded in many of the markets that currently exhibit Free pricing behaviors. Digital products distributed online (search, social networks, creative and informational content, etc.) tend to carry fixed costs that are high relative to their marginal costs.¹⁵² The primary costs attendant to such services comprise startup

¹⁴⁵ This is, of course, impossible. *Id.* at 1111.

¹⁴⁶ *Cf. supra* Section II.A.2 (describing the irrationality of reverse salami slicing).

¹⁴⁷ *See supra* text accompanying notes 20–22 (describing the conception of Free as an "iron law").

¹⁴⁸ Fritz Machlup, *Marginal Analysis and Empirical Research*, 36 AM. ECON. REV. 519, 521 (1946).

¹⁴⁹ Lee, *supra* note 132, at 1115 (quoting Fritz Machlup, *Theories of the Firm: Marginalist, Behavioral, Managerial*, 57 AM. ECON. REV. 1, 9 (1967)).

¹⁵⁰ In this case, long-run behavior.

¹⁵¹ *See* RIFKIN, *supra* note 11, at 5.

¹⁵² *Cf., e.g.,* Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 J. ECON. PERSP. 57, 58 (2005) ("Intellectual property is often very costly to create, but the

and ongoing R&D, advertising, and the like. The marginal cost of serving one additional user tends to be relatively miniscule.¹⁵³

That attribute—fixed costs that are high relative to marginal costs—permeates markets that exhibit Free pricing behaviors.¹⁵⁴ But this type of cost structure makes marginalism particularly unattractive as a basis for pricing. In short, a firm with high fixed costs and negligible marginal costs cannot afford to focus exclusively on its marginal costs as a means of setting its price.¹⁵⁵ Where a product's fixed costs are high relative to its marginal costs, marginalist pricing would lead

costs of creation, being invariant to output, are fixed costs once incurred. In contrast, the costs that vary with output . . . often are very low, at least relative to the fixed costs; in the case of software distributed over the Internet (including digitized musical recordings), variable cost, and hence marginal cost, are close to zero.”). Consider, for example, Google Maps, a popular online mapping application. Even in its initial iteration, Google Maps represented an agglomeration of technologies developed by several firms that Google had purchased. Liz Gannes, *Ten Years of Google Maps, from Slashdot to Ground Truth*, RECODE (Feb. 8, 2015, 6:00 PM), <https://www.recode.net/2015/2/8/11558788/ten-years-of-google-maps-from-slashdot-to-ground-truth> [https://perma.cc/8K3V-T6V4]; see Noah Shachtman, *Exclusive: Google, CIA Invest in ‘Future’ of Web Monitoring*, WIRED (July 28, 2010, 7:30 PM), <http://www.wired.com/2010/07/exclusive-google-cia/> [https://perma.cc/62RP-JHUC]. Over time, Google added various complex features (Google Traffic, public-transit information, Street View, etc.) to arrive at the multifunctional incarnation of Google Maps that, in 2013, became the most widely used mobile application in the world. Jamie Hinks, *Google Maps Is the World’s Most Popular Smartphone App*, ITPROPORTAL (Aug. 8, 2013), <http://www.itproportal.com/2013/08/08/google-maps-is-the-worlds-most-popular-smartphone-app/> [https://perma.cc/X9XZ-H32B]. This buildout required several years and untold millions of dollars spent purchasing various companies, paying an army of programmers to write code, constructing specially outfitted camera cars, and collecting over 20 petabytes of street-view imagery. See Gannes, *supra*; Leo Kelion, *Google Maps Uses Ground Truth Project to Battle Apple*, BBC NEWS (Sept. 10, 2012), <http://www.bbc.com/news/technology-19536269> [https://perma.cc/EGC7-8TBM]. Yet the marginal cost of delivering a mapping search result is relatively quite low.

¹⁵³ The Department of Justice’s (“DOJ”) high-profile antitrust lawsuit against Microsoft in the 1990s yielded another example. *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001). Some observers thought that Microsoft’s pricing of Internet Explorer (“IE”) was just a reflection of low marginal costs and could not have been predatory. (In fact, the DOJ ultimately dropped the predatory-pricing portion of its case.) But even if Microsoft’s marginal costs of distributing additional copies of IE were low, the fixed costs of producing and maintaining IE were high—well over \$100 million per year. See Newman, *supra* note 111, at 103–04 (citing Christopher R. Leslie, *Predatory Pricing and Recoupment*, 113 COLUM. L. REV. 1695, 1722 (2013)).

¹⁵⁴ Cf. Posner, *supra* note 152, at 58 (describing intellectual property as property with a “high ratio of fixed to variable costs”).

¹⁵⁵ See Lee, *supra* note 132, at 1121 (arguing that “because businesspeople view their firm as a going concern, short period profit maximization is not adopted as a policy since it would lead to the firm’s demise in the long period”); see also Patricia M. Danzon & Adrian Towse, *Differential Pricing for Pharmaceuticals: Reconciling Access, R&D and Patents*, 3 INT’L J. HEALTH CARE FIN. & ECON. 183, 185 (2003) (“Marginal cost pricing would suffice to cover the expenses of copy products that incur only production and distribution costs with negligible R&D or promotion expense. But marginal cost pricing cannot generate sufficient revenue to cover the

to suppliers (1) rapidly being driven out of business; (2) halting production of the product; or (3) as to potential suppliers, deciding not to enter the market.¹⁵⁶ Suppliers of such products thus necessarily engage in a substantial amount of full-cost pricing.¹⁵⁷ In other words, they depend for their very existence on rejecting (or at least largely rejecting) purely marginalist pricing strategies.¹⁵⁸

Even if the marginal costs of Free products were zero (or “almost zero,” a proposition explored further below), the persistence of relatively high fixed costs in Free markets undermines any descriptive or predictive power marginalism—at least as that theory is employed by proponents of the Myth of Free—might otherwise possess vis-à-vis such markets. Substantial, underexplored questions remain as to whether the universality of the marginalist assumption in modern economics is warranted.¹⁵⁹ For present purposes, however, it is enough to observe that marginalism was not designed for use in describing or predicting a long-run equilibrium price. Furthermore, by focusing exclusively on marginal costs, the orthodox account of Free ignores fixed costs, despite the crucial role that such costs play in real-world behavior.¹⁶⁰

Even viewed in isolation, the Marginalist Premise fails to withstand scrutiny and should be rejected accordingly. Long-run prices in Free markets cannot equal marginal cost: zero is not the new normal. As a result, both the major and minor premises of Free’s formal account lack validity. But the Marginalist Premise cannot be viewed in isolation. It could hold true only if an interrelated, and equally prob-

R&D costs of innovator firms. Hence free entry and the resulting marginal cost pricing are incompatible with sustained incentives for R&D.”).

¹⁵⁶ See, e.g., Posner, *supra* note 152, at 58 (“When fixed costs are a high percentage of total costs, a price equal to marginal cost is unlikely to cover total costs unless marginal cost is sharply rising.”).

¹⁵⁷ See Eric Raymond, *Zero Marginal Thinking: Jeremy Rifkin Gets It All Wrong*, ARMED & DANGEROUS (Apr. 3, 2014), <http://esr.ibiblio.org/?p=5558> [<https://perma.cc/6A7G-CYWJ>] (“Even for pure information goods [setup] costs can be quite high. . . . If those setup costs are not reliably priced into the final good, production of [pure information goods like] music will not remain economically viable.”).

¹⁵⁸ A similar dynamic is generally thought to apply to public utilities—Coase, for example, assumed that public utilities were unable to set prices at marginal cost, because “in [such] case a loss is made.” See R.H. Coase, *The Marginal Cost Controversy*, 13 *ECONOMICA* 169, 173 (1946).

¹⁵⁹ See *supra* Section II.B.1.

¹⁶⁰ As Brett Frischmann asks, “What about the fixed costs? Who is going to supply the infrastructures necessary for the various near zero marginal cost systems to function?” Brett Frischmann, *Who Will Pay for the Zero Marginal Cost Society?*, HUFFINGTON POST (Dec. 6, 2017), http://www.huffingtonpost.com/brett-frischmann/fixed-costs-zero-marginal-cost-society_b_5124945.html [<https://perma.cc/42M6-V9EX>].

lematic, assumption were also to hold true—that of perfect competition.

2. *Imperfect Competition*

The Marginalist Premise underlying Free's orthodox origin story—"price equals marginal cost"—requires not only that suppliers of Free products engage in marginalist pricing, but also that competition in Free markets is perfect. Perfect competition is a standard economic idealization. It describes the functioning of a marketplace that meets several conditions, including perfect knowledge among all participants, low barriers to entry and exit, etc.¹⁶¹ Only if each condition is met will the market price be driven to match marginal cost.¹⁶² And only if price matches marginal cost could the orthodox account of Free hold true.¹⁶³

Most analysts agree that Free markets (online or offline) exhibit at least some degree of competition.¹⁶⁴ But general consensus holds that perfect competition remains impossible in practice.¹⁶⁵ Perfect competition is a theoretical construct that is not—and was not intended to be—descriptive of real markets. It is useful instead as a workable (if reductive) modeling tool, or a benchmark against which to measure the relative imperfection of marketplace competition in various sectors of the economy.¹⁶⁶

In the early days of electronic commerce, some commentators suggested that online markets heralded the possibility, if not the birth,

¹⁶¹ FRANK H. KNIGHT, *RISK, UNCERTAINTY AND PROFIT* 51–93 (Univ. of Chi. Press 1971) (1921). Knight also assumed lack of collusion and monopoly instead of "many producers," though "many producers" has subsequently become the preferred condition. *Id.*

¹⁶² See generally Herbert Hovenkamp, *The Sherman Act and the Classical Theory of Competition*, 74 IOWA L. REV. 1019, 1025 (1989) ("Within the modern neoclassical model, 'perfect competition' describes a state of affairs in which price is driven to marginal cost and firms are forced to minimize their costs through innovation and growth to the optimal size.").

¹⁶³ Some platforms offer "free" (or even negative-price) products to one group of customers in order to attract a paying group of customers, with the latter effectively subsidizing the former. This business model does not per se indicate market imperfection. See, e.g., STUCKE & GRUNES, *supra* note 39, § 1.26 ("Prices can be positive, zero, or negative (where consumers are subsidized).").

¹⁶⁴ See, e.g., *id.* § 7.20. But cf. Katherine J. Strandburg, *Free Fall: The Online Market's Consumer Preference Disconnect*, 2013 U. CHI. LEGAL F. 95, 95 (2013) ("There is no functioning market based on exchanges of personal information for access to online products and services.").

¹⁶⁵ See, e.g., Daniel M. Hausman, *Philosophical Foundations of Normative Economics, in DEVELOPMENT DILEMMAS: THE METHODS AND POLITICAL ETHICS OF GROWTH POLICY* 40, 54 (Melvin Ayogu & Don Ross eds., 2005) ("[P]erfect competition is impossible.").

¹⁶⁶ See Alan J. Meese, *Price Theory and Vertical Restraints: A Misunderstood Relation*, 45 UCLA L. REV. 143, 156–58 (1997) (explaining how perfect competition is often misunderstood, particularly by pro-interventionists, whom Meese refers to as "Populists").

of real-world perfect competition.¹⁶⁷ Yet even such optimistic claims typically carried caveats—for example, “the Internet offers *the closest thing* to a perfectly competitive market in the world today.”¹⁶⁸ Others argued that online markets “approach” perfect, or “are closer to” perfect, etc.¹⁶⁹ Skeptics responded that such caveats were well warranted, pointing to a variety of deviations from the idealized state of perfect competition.¹⁷⁰

For present purposes, it would be enough simply to note that even the staunchest advocates of Free’s orthodox origin story admit (explicitly or implicitly) that Free markets are not perfect. The caveats doom the premise. As noted above, any deviations from perfect competition, no matter how slight, mean that price is not driven to match marginal cost, even in theory.¹⁷¹ And even a price slightly higher than, or that almost equals, marginal cost means that the relevant product is not Free.¹⁷² Scarcity prevails again.

With that in mind, only a brief examination of the state of Free market competition is required. The aim is much the same as in Section III.A.2, which critiqued the premise that marginal costs are now “close enough” to zero. Here again, the formal account has already been discarded, but the alternative argument may yet retain some rhetorical force. The following discussion serves to curb that force. It does so by analyzing whether four of the conditions required to realize the state of perfect competition are present in Free markets.

¹⁶⁷ See, e.g., *Frictions in Cyberspace*, ECONOMIST (Nov. 18, 1999), <http://www.economist.com/node/346410> [<https://perma.cc/ET99-GZ6X>] (“[T]he explosive growth of the Internet promises a new age of perfectly competitive markets. . . . Or so we are led to believe.”).

¹⁶⁸ THOMAS L. FRIEDMAN, *THE LEXUS AND THE OLIVE TREE: UNDERSTANDING GLOBALIZATION* 81 (Picador 2012) (1999) (emphasis added) (quoting Edward Yardeni, then–Chief Economist for Deutsche Bank).

¹⁶⁹ John W. Bagby, *Business Method Patent Proliferation: Convergence of Transactional Analytics and Technical Scientifics*, 56 BUS. LAW. 423, 457 (2000) (“Economists studying the ‘new economy’ frequently argue that Internet commerce rapidly approaches perfect competition.”) (citing HAL VARIAN & CARL SHAPIRO, *INFORMATION RULES* (1999)); see also Sandra Marco Colino, *On the Road to Perdition? The Future of the European Car Industry and Its Implications for EC Competition Policy*, 28 NW. J. INT’L L. & BUS. 35, 57 (2007) (“Online auctions have been described as the closest one could reasonably get to perfect competition”); Robert E. Litan & Alice M. Rivlin, *Projecting the Economic Impact of the Internet*, 91 AM. ECON. REV. 313, 315 (2001) (arguing that the internet will “bring[] many markets closer to the economists’ textbook model of perfect competition”).

¹⁷⁰ See Richard A. Epstein, *Before Cyberspace: Legal Transitions in Property Rights Regimes*, 73 CHI.-KENT L. REV. 1137, 1145–53 (1998) (pointing to network effects); see also Maureen A. O’Rourke, *Shaping Competition on the Internet: Who Owns Product and Pricing Information?*, 53 VAND. L. REV. 1965, 1972–75 (2000).

¹⁷¹ See *supra* Section II.B.1.

¹⁷² See *supra* Section II.B.1.

a. *Product Differentiation*

A core condition required for perfect competition is that the relevant products be homogeneous, that is, perfectly fungible commodity goods.¹⁷³ During the Industrial Revolution, the critical lines of commerce in developed nations comprised homogeneous commodities: steel, oil, aluminum, cement, pipes, wires, etc.¹⁷⁴ These “smokestack industries,”¹⁷⁵ along with agricultural outputs like grains and tobacco, dominated economies and were the primary objects of government oversight.¹⁷⁶ Homogeneous products facilitate competition by facilitating (relative to heterogeneous products) low-cost, rapid, and comprehensive comparisons of price and quality by customers.¹⁷⁷ Because such products are perfect substitutes for one another, customers can easily shop around and play one firm off of another to obtain the highest quality product at the lowest possible cost.¹⁷⁸

But Free markets differ markedly from such traditional markets. These products tend to be differentiated, not perfect substitutes.¹⁷⁹ Take, for example, online social-networking platforms. Even *ex ante*, such platforms tend to feature different site designs, functionality, branding, and target audiences.¹⁸⁰ And once social networks begin to function, “*ex-ante identical sites can acquire differentiated market positions that spontaneously emerge from user-generated content.*”¹⁸¹ The same is true of online search, where a given search engine’s algorithm generally yields different results based on the unique user queries that have been run using that engine in the past.¹⁸²

¹⁷³ See O’Rourke, *supra* note 170, at 1967–68.

¹⁷⁴ See Posner, *supra* note 4, at 926 (listing “steel, automobiles, pipe, wire, aluminum, railroad cars, roadbuilding materials, and cigarettes”).

¹⁷⁵ *Id.* at 925.

¹⁷⁶ See, e.g., *id.* at 926; see also John M. Newman, *Anticompetitive Product Design in the New Economy*, 39 FLA. ST. U. L. REV. 681, 687 (2012).

¹⁷⁷ See Newman, *supra* note 176, at 710 (discussing substitution effect on competition in relation to software products).

¹⁷⁸ See *id.*

¹⁷⁹ See *id.* at 687–89 (discussing differences in network markets).

¹⁸⁰ See *id.* at 689 (discussing networking platforms such as Facebook).

¹⁸¹ Kaifu Zhang & Miklos Sarvary, *Social Media Competition: Differentiation with User-Generated Content* 1, 3 (Feb. 2012) (unpublished manuscript), <https://www.parisschoolofeconomics.eu/IMG/pdf/PSE-comm-and-beliefs-june2012-Sarvary-Zhang.pdf> [<https://perma.cc/FNE9-678P>] (pointing to Facebook and MySpace as examples of differentiated social networks). Additionally, if a social network tailors its users’ feeds based on users’ connections and past behavior, even a single network may be differentiated as to different users. See Jake Linford, *Scarcity of Attention in a World Without Copyright* 14–15 (July 2017) (unpublished manuscript), <http://serci.org/wp-content/uploads/2017/07/Linford.pdf> [<https://perma.cc/4EQX-C2YN>].

¹⁸² But see *DuckDuckGo Privacy*, DUCKDUCKGO, <https://duckduckgo.com/privacy> [<https://>

Differentiated products are understood to be a condition not of perfect competition, but of monopolistic competition.¹⁸³ Many, if not most, Free products are highly differentiated relative to archetypical offline-market products.¹⁸⁴ In this regard, then, the shift to Free appears to be a shift away from, not toward, the idealized state of perfect competition.

b. Entry Barriers

The perfect competition model also assumes low barriers to entry. It has grown commonplace to claim that online markets, many of which feature Free products, are characterized by low entry barriers. Multiple U.S. courts, for example, have taken this view.¹⁸⁵ Other analysts reach the same (or sometimes an even broader) conclusion.¹⁸⁶

perma.cc/2PSB-NPHE] (“When you search at DuckDuckGo, we don’t know who you are and there is no way to tie your searches together. . . . This is a very unusual practice . . .”).

¹⁸³ See *Monopolistic Competition and Product Differentiation*, U.C. SANTA CRUZ, <http://people.ucsc.edu/~nuclear/econ1/testinfo/chapter16.pdf> [<https://perma.cc/Y2M3-UNUC>] (answer key to PAUL KRUGMAN & ROBIN WELLS, *MICROECONOMICS* (2d ed. 2009)) (“The three conditions for monopolistic competition are (1) a large number of producers, (2) differentiated products, and (3) free entry and exit.”). Economists “Edward Chamberlin and Joan Robinson are usually credited with simultaneously and independently developing the theory of monopolistic or imperfect competition.” Don Bellante, *Edward Chamberlin: Monopolistic Competition and Pareto Optimality*, 2 J. BUS. & ECON. RES. 17, 17 (2004).

¹⁸⁴ John M. Newman, *Antitrust in Zero-Price Markets: Foundations*, 164 U. PA. L. REV. 149, 178 (2015) (citing Zhang & Sarvary, *supra* note 181, at 3).

¹⁸⁵ See, e.g., *Am. Library Ass’n v. United States*, 201 F. Supp. 2d 401, 416 (E.D. Pa. 2002) (“The Internet presents low entry barriers to anyone who wishes to provide or distribute information.”), *rev’d*, 539 U.S. 194 (2003); *Shea ex rel. Am. Reporter v. Reno*, 930 F. Supp. 916, 929 (S.D.N.Y. 1996) (“[T]he Internet presents extremely low entry barriers to those who wish to convey Internet content or gain access to it.”); *ACLU v. Reno*, 929 F. Supp. 824, 877 (E.D. Pa. 1996) (“[T]he Internet presents very low barriers to entry.”).

¹⁸⁶ See, e.g., Ilene Knable Gotts & Joseph G. Krauss, *Antitrust Review of New Economy Acquisitions*, ANTITRUST, Fall 2000, at 59, 59 (referring to “the low entry barriers in the Internet space”); Geoffrey A. Manne & Joshua D. Wright, *Google and the Limits of Antitrust: The Case Against the Case Against Google*, 34 HARV. J.L. & PUB. POL’Y 171, 195 (2011) (asserting, as to online search, “that competition really is ‘just a click away’ for a significant number of users”); Henry H. Perritt, Jr., *Cyberspace and State Sovereignty*, 3 J. INT’L LEGAL STUD. 155, 161 (1997) (“[T]he most important differentiating characteristic of the Internet is its extremely low barriers to entry.”); Deborah T. Tate, *Net Neutrality 10 Years Later: A Still Unconvinced Commissioner*, 66 FED. COMM. L.J. 509, 518 (2014) (“The Internet’s low entry costs and lack of barriers to create, upload, start up, and sell goods and services are especially beneficial to women and minorities with less access to capital than established firms.”); Yana Welinder, *A Face Tells More than a Thousand Posts: Developing Face Recognition Privacy in Social Networks*, 26 HARV. J.L. & TECH. 165, 189 (2012) (“[T]he Internet offers a platform for projects that require very little capital investment—thus lowering the barriers to entry.”); *Barriers to Entry, Exit and Mobility*, ECONOMIST (July 13, 2009), <http://www.economist.com/node/14025576> [<https://perma.cc/8QXU-YX5U>] (“Old ideas about barriers to entry were given a new twist with the development of e-

But, as in all other contexts, the type and magnitude of barriers to entering Free markets vary widely across individual markets.¹⁸⁷ On one end of the spectrum are products like simple mobile applications. Barriers to entry may consist only of a few thousand dollars and a small amount of time.¹⁸⁸ At the other end of the spectrum are complex products that require years of time, considerable expertise, and tens or hundreds of millions of dollars (some of this in the form of sunk costs, and coupled with substantial risk of losing same) to launch and maintain.¹⁸⁹ During the U.S. government's high-profile antitrust prosecution of Microsoft in the late 1990s, for example, it emerged that Microsoft spent hundreds of millions of dollars developing and maintaining Internet Explorer ("IE"), its downloadable web browser¹⁹⁰—a prototypical Free product. Academic publishers Reed Elsevier and Wiley similarly invested hundreds of millions of dollars developing and launching digital-format publications.¹⁹¹

Moreover, the proper focus is not merely on whether some type of entry can occur, but on whether the type of entry that would provide a meaningful competitive check on dominant firms can occur. Consider the comprehensive mapping service Google Maps, another prominent Free product as of this writing.¹⁹² Over a period of several years, Google developed Maps by purchasing multiple companies and integrating their individual proprietary technologies, compiling available mapping data and satellite imagery, constructing specially outfitted camera cars, collecting over 20 petabytes (21.5 billion megabytes) of street-view imagery, integrating various ratings and reviews appli-

commerce. By using the internet, firms can sometimes surmount traditional barriers with an ease not previously available.").

¹⁸⁷ Cf. STUCKE & GRUNES, *supra* note 39, § 10.05 ("The reality is that entry analysis for data-driven markets, as in other markets, will likely be fact-specific.").

¹⁸⁸ See, e.g., Carter Thomas, *How Much Does It Cost to Develop an App?*, BLUECLOUD SOLUTIONS (Mar. 25, 2015), <http://www.bluecloudsolutions.com/blog/cost-develop-app/> [<https://perma.cc/X4RY-3G96>] (estimating that simple, table-based mobile apps cost between \$1000 and \$4000 to develop).

¹⁸⁹ See Christopher R. Leslie, *Predatory Pricing and Recoupment*, 113 COLUM. L. REV. 1695, 1721–22 (2013).

¹⁹⁰ *Id.*

¹⁹¹ Adam Mossoff, *How Copyright Drives Innovation: A Case Study of Scholarly Publishing in the Digital World*, 2015 MICH. ST. L. REV. 955, 975.

¹⁹² In a 2008 decision, a U.S. district court described a similar dynamic in play among then-dominant paid mapping services NAVTEQ and Tele Atlas. See *Tele Atlas N.V. v. NAVTEQ Corp.*, No. C-05-01673 RMW, 2008 WL 4809441, at *22 (N.D. Cal. Oct. 28, 2008) ("This is also a market with incredibly high barriers to entry. Compiling a database like those developed by NAVTEQ and Tele Atlas takes years of time and immense sums of money. A digital map maker must invest enormous sunk costs before licensing a single copy.").

cations, and spending millions on building out and maintaining the infrastructure necessary to deliver the service to fixed and mobile computing devices.¹⁹³ Perhaps it is possible for a small team of programmers to rapidly develop a rudimentary online mapping service—in other words, there may be low entry barriers, depending on how the relevant market is defined. But developing a service that would act as a meaningful constraint on Google's product remains no small task, as even well-heeled rivals like Apple have discovered.¹⁹⁴

In addition to time and sunk costs (plus risk of losing the same), network effects may also constitute a barrier to entering Free markets.¹⁹⁵ Network effects are present where the value of a product varies along with the number of that product's users.¹⁹⁶ The direction of network effects may be positive or negative, i.e., the value of a product subject to network effects may be positively or inversely correlated with user-base growth.¹⁹⁷ Positive (but not negative) network effects may create a barrier to entry that favors a dominant incumbent or oligopoly.¹⁹⁸ Thus, the discussion that follows focuses on positive effects.

Network effects may also be direct or indirect.¹⁹⁹ Some Free products appear to exhibit direct network effects. Social networks, for example, attract new users by presenting them with the opportunity to interact with other users.²⁰⁰ The value of a given network to users thus increases along with the size of the network.²⁰¹ Other Free products may exhibit indirect network effects. As to online search engines, for example, indirect effects may arise "because users will not consider, when deciding whether to run another query, that the results of their query and subsequent clicking behavior on suggested links are stored by the search engine."²⁰² Some argue that search quality is "only

¹⁹³ Kelion, *supra* note 152.

¹⁹⁴ See, e.g., Chance Miller, *Apple Maps Now Used 3x as Often as Google Maps on iOS, Serving 5B Requests Per Week*, 9TO5MAC (Dec. 7, 2015, 7:11 PM), <http://9to5mac.com/2015/12/07/apple-maps-usage-numbers/> [<https://perma.cc/Y2DK-Y3C8>].

¹⁹⁵ Stucke and Grunes offer a comprehensive analysis of network effects in "data-driven markets," many of which involve Free products. See generally STUCKE & GRUNES, *supra* note 39.

¹⁹⁶ S.J. Liebowitz & Stephen E. Margolis, *Network Externality: An Uncommon Tragedy*, 8 J. ECON. PERSP. 133, 135 (1994).

¹⁹⁷ See Newman, *supra* note 176, at 688–89.

¹⁹⁸ *Id.* at 689.

¹⁹⁹ *Id.* at 688.

²⁰⁰ *Id.* at 689.

²⁰¹ See STUCKE & GRUNES, *supra* note 39, §§ 11.06–11.08.

²⁰² Cédric Argenton & Jens Prüfer, *Search Engine Competition with Network Externalities*, 8 J. COMPETITION L. & ECON. 73, 76 (2012).

weakly affected” by search providers’ storage of query data, citing “conversations . . . with industry insiders” as support.²⁰³ Yet the importance of such stored data for search engine quality—at least over the short run—is “widely acknowledged by the computer science literature.”²⁰⁴

Network effects may cause multisided Free platforms to also exhibit the “chicken-or-the-egg” barrier to entry. The chicken-or-the-egg problem arises where a group of customers on one side of the platform prefers a large installed group of customers on the other side of the platform, and vice versa.²⁰⁵ Thus, for instance, “having a credit or charge card on a particular network . . . is more valuable to the cardholder when there are more merchants willing to accept that card and, conversely, the value to merchants of accepting [those] cards increases with the number of cards on that network in circulation.”²⁰⁶ And it is merchant interchange fees that subsidize issuers’ offering free (or even negative-price) credit card services to cardholders.²⁰⁷ As to advertising markets, the picture is more complex—magazine readers, for example, appear to “value magazine advertising,” while “TV viewers are advertising-averse.”²⁰⁸ But where Free prices obtain on the user side of an advertising-supported platform—and there is reason to believe that Free may be a particularly sticky price²⁰⁹—advertising is the mechanism by which the platform is able to offer a Free product. Thus, even if users are (in a narrow sense) “advertising-

²⁰³ Manne & Wright, *supra* note 186, at 212.

²⁰⁴ Argenton & Prüfer, *supra* note 202, at 76. The long-run competitive significance of such data is questionable. See, e.g., Article 29 Data Protection Working Party, *Opinion 1/2008 of the Article 29 Data Protection Working Party on Data Protection Issues Related to Search Engines*, 00737/EN/WP 148, at 19 (Apr. 4, 2008) (“In view of the initial explanations given by search engine providers on the possible purposes for collecting personal data, the Working Party does not see a basis for a retention period [for such data] beyond 6 months.”). Some may argue that this rapid rate of data decay points to a lack of entry barriers in data-intensive markets. But a dominant firm that enjoys a much larger stream of data may nonetheless enjoy a competitive advantage over potential or new entrants. Analogizing to water, the size of the reservoir may not matter (much), but the rate of input flow does.

²⁰⁵ See *United States v. Microsoft Corp.*, 253 F.3d 34, 55 (D.C. Cir. 2001).

²⁰⁶ *United States v. Am. Express Co.*, 88 F. Supp. 3d 143, 155 (E.D.N.Y. 2015). To the extent it is relevant, the author represented the United States in this matter. All views expressed herein are purely those of the author and do not reflect the views of the United States. None of the views expressed herein depend or draw upon any confidential information.

²⁰⁷ *Id.* at 160.

²⁰⁸ See W. Wayne Fu et al., *Search Advertising: Is There a Feedback Effect?* 2 (TPRC 43: The 43rd Research Conference on Comm’n, Info. and Internet Policy Paper, Aug. 14, 2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2588245 [<https://perma.cc/BX5D-7YSC>].

²⁰⁹ Newman, *supra* note 184.

averse,”²¹⁰ the positive affect created by Free may mean that such users actually value advertising, albeit in a roundabout manner.

The foregoing is not meant to suggest that all Free markets exhibit high barriers to entry. But many of the product markets at the core of Free’s orthodox origin story do entail substantial entry barriers. Time, sunk costs, and network effects all contribute to this structural deviation from a state of perfect competition.

c. Imperfect Information

For perfect competition to exist, all market participants—suppliers and customers alike—must have access to perfect, costless information about all available products and partners. The advent of digitization and widespread internet access (the technologies hailed as bringing about the birth of Free) made certain types of information easier to acquire. Suppliers in particular have benefited—software firms both “know more” and “will progressively know more about the users of their software.”²¹¹

But customers present a different story. At least as to one aspect of market information, the rise of Free has degraded—not increased—customers’ ability to acquire relevant data points. Worse still, that aspect is perhaps the most crucial to customers’ ability to act as an effective check on firms’ behavior.

Comparing costs in traditional, positive-price markets is a relatively straightforward exercise, often involving nothing more than comparing price tags. But comparing costs in Free markets is relatively difficult. Money is a perfectly fungible baseline for comparison: one dollar is as costly to give up as another. Information and attention costs are far more complex. One advertisement may be less costly to view than another,²¹² just as one piece of personal data may be less

²¹⁰ Fu et al., *supra* note 208, at 2.

²¹¹ Irina D. Manta & David S. Olson, *Hello Barbie: First They Will Monitor You, Then They Will Discriminate Against You. Perfectly.*, 67 ALA. L. REV. 135, 173 (2015).

²¹² In fact, a well-constructed advertisement may create a valuable, positive experience, or impart valued product information, to consumers. See, e.g., Art Markman, *What Does Advertising Do?*, PSYCHOL. TODAY (Aug. 31, 2010), <https://www.psychologytoday.com/blog/ulterior-motives/201008/what-does-advertising-do> [<https://perma.cc/2UUC-T9RR>]. Model online-search advertisements (also known as nonorganic search results) as being demanded by users, a dynamic that creates “two-way feedback effect[s]”—more advertisements equal more users, and vice versa. Fu et al., *supra* note 208, at 3, 7. There would, however, seem to be upper bounds to this dynamic. If such advertisements represented a positive experience to all users in all cases, established search providers would abandon organic search results. Such is not the case: a typical Google search-results page features one or a few nonorganic results, followed by dozens of organic results. And as Luca et al. empirically demonstrate, users are “more likely to engage with

costly to surrender than another.²¹³ Accurately assessing attention costs often requires first experiencing the desired product²¹⁴ and is frustrated by the possibility that firms will, unbeknownst to consumers, engage in behavioral advertising.²¹⁵ And accurately assessing information costs, whether *ex ante* or *ex post*, is so difficult that many users simply choose to remain ignorant.²¹⁶ As one scholar points out, “[T]he problem of consumers’ failure to read or understand privacy policies remains a possible source of market failure.”²¹⁷ Moreover, suppliers’ use of Free instead of positive prices also imposes unique monitoring costs on customers.²¹⁸

All of this suggests that while the technologies that gave rise to Free substantially increased the amount and decreased the cost of information available to suppliers, the same is not universally true of customers. Nonprice cost information is relatively complex, inexact, and expensive to gather. Free markets thus exhibit another important deviation from perfect competition.

universal search results . . . when the results are organically determined relative to when they contain only Google content.” Michael Luca et al., *Does Google Content Degrade Google Search? Experimental Evidence* 1 (Harv. Bus. Sch., Working Paper No. 16-035, 2015), <http://people.hbs.edu/mluca/SearchDegradation.pdf> [<https://perma.cc/2NLZ-76BF>].

²¹³ See, e.g., Claire Cain Miller, *Americans Say They Want Privacy, but Act as if They Don’t*, N.Y. TIMES (Nov. 12, 2014), <http://www.nytimes.com/2014/11/13/upshot/americans-say-they-want-privacy-but-act-as-if-they-dont.html> [<https://perma.cc/54EN-LMD8>] (discussing the results of a Pew Research survey). According to the survey responses, “The types of digital information that people consider to be most sensitive are their Social Security numbers, health information, the content of emails and phone calls and their location. They are least sensitive about their purchasing habits, media consumption, political and religious views, and the identities of their friends.” *Id.*

²¹⁴ As Hannibal Travis, describing IP-protected digital content, explains, “the quality and characteristics of experience goods typically ‘can be assessed only after they are bought.’” Hannibal Travis, *Google Book Search and Fair Use: iTunes for Authors, or Napster for Books?*, 61 U. MIAMI L. REV. 87, 101–02 (2006) (quoting MICHAEL PARKIN, MICROECONOMICS 468 (2d ed. 1994)). This experience requirement introduces the possibility that path dependence, rather than inherent product qualities, will drive the direction of markets. *Cf.* Gal & Rubinfeld, *supra* note 35, at 558 (“[W]hen path dependence is created, which eventually leads to lower quality than is optimal even if goods are free, welfare can be harmed.”).

²¹⁵ See Newman, *supra* note 111, at 68.

²¹⁶ Hoofnagle and Whittington use a transaction-cost economics approach to identify the substantial costs to users of assessing and monitoring information costs. See generally Hoofnagle & Whittington, *supra* note 31.

²¹⁷ Howard A. Shelanski, *Information, Innovation, and Competition Policy for the Internet*, 161 U. PA. L. REV. 1663, 1691 (2013).

²¹⁸ See, e.g., Hoofnagle & Whittington, *supra* note 31, at 610–11; Jan Whittington & Chris Jay Hoofnagle, *Unpacking Privacy’s Price*, 90 N.C. L. REV. 1327, 1328 (2012).

d. *Imperfect Rationality*

Perfect competition requires that all actors in a given market are perfectly rational and act so as to maximize their own utility.²¹⁹ Rational actors accurately assess the costs and benefits of all available courses of action and choose the option that yields the greatest welfare surplus (or least welfare deficit).²²⁰ Deviations from such rationality create a state of imperfect competition, wherein price will not necessarily equal marginal cost.²²¹

Human customers display at least two, likely interrelated, behavioral deviations in Free markets. First, such customers exhibit an irrationally strong demand response to the introduction of zero prices. In other words, “people appear to act as if zero pricing of a good not only decreases its cost but also adds to its benefits,” even where an objective cost-benefit analysis would seem to favor choosing the positive-price option.²²² This response, known as the Zero-Price Effect, is not explained away by either the absence of transaction costs or the possibility of “ratio-based” customer analysis.²²³ Second, human customers’ outsized preference for Free may contribute to wasteful or inefficient behavior: “[O]verconsumption, scarcity, and even hoarding [can occur] when resources are provided without charge.”²²⁴

Such irrational behavior distorts the functioning of markets. These behavioral deviations may not be exhibited by firms; existing research on the Zero-Price Effect is limited to human subjects.²²⁵ But

²¹⁹ Some have dubbed this curious creature “*homo economicus*,” implying that she does not in fact exist outside the abstract world of neoclassical economic theory. See, e.g., Jules L. Coleman, *Markets, Methods, Morals and the Law*, 66 ALA. L. REV. 169, 172 (2014) (defining “conditions of ‘perfect competition’”); Max Huffman, *Marrying Neo-Chicago with Behavioral Antitrust*, 78 ANTITRUST L.J. 105, 115, 121 n.81 (2012) (describing the inception of the behavioral economics movement).

²²⁰ See Coleman, *supra* note 219, at 172.

²²¹ See *id.* at 189.

²²² Kristina Shampianier et al., *Zero as a Special Price: The True Value of Free Products*, 26 MARKETING SCI. 742, 742 (2007). The basic structure of the experiments that first confirmed the existence of the zero-price effect involved (as in the example used above) two different sets of prices for the same two competing products. See *id.* at 743. The first pairing of prices offered to consumers generally consisted of two positive prices (e.g., \$0.01 for one product and \$0.15 for the other). See *id.* The researchers then offered the same goods to consumers with the second set of prices, this time establishing one positive price and one zero price (e.g., \$0 for the product that had previously been offered at \$0.01 and \$0.14 for the product previously offered at \$0.15). See *id.*

²²³ See *id.* at 745, 748–49.

²²⁴ Benjamin Edelman, *Priced and Unpriced Online Markets*, J. ECON. PERSP., Summer 2009, at 21, 21–22.

²²⁵ See Newman, *supra* note 184, at 187.

many of the markets at the core of Free's orthodox origin story comprise products delivered to human users and consumers.²²⁶ Mainstream economics is increasingly accepting the likelihood that humans act in ways that are boundedly rational.²²⁷ There is no principled reason to think that humans respond to Free with a particularly high degree of rationality—on the contrary, there is a great deal of support for the proposition that humans respond to Free with a particularly high degree of irrationality.²²⁸ As a result, competition in Free markets is necessarily—and perhaps particularly—imperfect.

C. *The Flawed Conclusion: Free Is Not Free*

The Myth of Free concludes that the price of Free products is zero. Search, social media, many mobile applications, travel booking, navigation and mapping systems—all are (the story goes) now available to consumers free of charge. Economists,²²⁹ regulators,²³⁰ courts deciding cases involving antitrust,²³¹ contract,²³² and consumer-protection laws,²³³ and the United States itself;²³⁴ all have labeled such products “free.”

That conclusion is descriptively inaccurate: Free is not free-as-in-*gratis*. When used as a product descriptor, “free,” in common usage,

²²⁶ See *supra* Part I.

²²⁷ See, e.g., Douglas Clement, *Interview with Richard Thaler*, FED. RES. BANK MINNEAPOLIS (Oct. 3, 2013), <https://www.minneapolisfed.org/publications/the-region/interview-with-richard-thaler> [<https://perma.cc/FV8B-2TEL>] (“In 2015, [Richard] Thaler will become president of the American Economic Association—an ironic but telling indicator of the gradual embrace of behavioral economics by a profession undergoing continuous evolution.”).

²²⁸ See David Adam Friedman, *Free Offers: A New Look*, 38 N.M. L. REV. 49, 72 & n.167 (2008) (“Social and cognitive psychology explain the power of the word ‘free’ and may explain to a certain extent the widespread use of the term in marketing.”).

²²⁹ See, e.g., Geoffrey Manne & Joshua Wright, *What's an Internet Monopolist? A Reply to Professor Wu*, TRUTH ON MKT. (Nov. 22, 2010), <https://truthonthemarket.com/2010/11/22/whats-an-internet-monopolist-a-reply-to-professor-wu/> [<https://perma.cc/62EV-9NTN>].

²³⁰ See, e.g., Press Release, U.S. Dep't of Justice, Justice Department Files Antitrust Lawsuit to Stop H&R Block Inc. from Buying TaxACT (May 23, 2011), <https://www.justice.gov/opa/pr/justice-department-files-antitrust-lawsuit-stop-hr-block-inc-buying-taxact> [<https://perma.cc/CN4A-HHUU>].

²³¹ See, e.g., *Kinderstart.com, LLC v. Google, Inc.*, No. C 06-2057 JF (RS), 2007 WL 831806, at *5 (N.D. Cal. Mar. 16, 2007).

²³² See, e.g., *Darnaa, LLC v. Google, Inc.*, No. 15-cv-03221-RMW, 2015 WL 7753406, at *2–3, *5 (N.D. Cal. Dec. 2, 2015).

²³³ See Hoofnagle & Whittington, *supra* note 31, at 657 (citing *In re Facebook Privacy Litig.*, 791 F. Supp. 2d 705 (N.D. Cal. 2011)).

²³⁴ See Note by the Delegation of the United States, *Roundtable on Two-Sided Markets*, at 3, DAF/COMP/WD(2009)68 (June 4, 2009), <https://www.ftc.gov/sites/default/files/attachments/us-submissions-oecd-and-other-international-competition-fora/roundtabletwosided.pdf> [<https://perma.cc/2GK7-45BB>].

denotes zero cost.²³⁵ But many of the products at the core of the Myth of Free are provided by for-profit firms. Calling such products “free” without explaining how or why for-profit firms would offer them begs the question.²³⁶ Some may simply be mistaken: “[F]ree online products and services may give people the impression that firms do not need to recoup the cost of producing the goods they consume. This is not the case.”²³⁷ But purposefully calling the output of for-profit firms “free” is misleading; it amounts to “the substitution of rhetoric for argument.”²³⁸

A few Free products truly are free-as-in-*gratis*, at least to consumers. Online encyclopedia Wikipedia,²³⁹ for example, is operated by the Wikimedia Foundation, a nonprofit organization.²⁴⁰ The Foundation’s motives are (presumably) philanthropic; its free-to-use product is subsidized by charitable donations.²⁴¹ Beyond philanthropic organizations, some Free products are the result of collaborative efforts spurred by various selfish, social, and reputational motives. As an example of such efforts, some point to “Free and Open Source Software, such as Linux, MySQL and Apache.”²⁴² The development (if not necessarily the installation and maintenance)²⁴³ of open-source products is effectively subsidized by zero-cost labor (which can be, in turn, the

²³⁵ See, e.g., LESSIG, *supra* note 1, at 12 (“[W]henever one says a resource is ‘free,’ most believe that a price is being quoted—free, that is, as in zero cost.”).

²³⁶ Newman, *supra* note 184, at 152.

²³⁷ Hoofnagle & Whittington, *supra* note 31, at 620.

²³⁸ Herbert Hovenkamp, *Rhetoric and Skepticism in Antitrust Argument*, 84 MICH. L. REV. 1721, 1721 (1986); see also David Foster Wallace, *Tense Present: Democracy, English, and the Wars over Usage*, HARPER’S MAG., Apr. 2001, at 39, 47 n.23 (“[L]anguage is . . . irreducibly public, political, and ideological.”); *id.* at 55 (“Usage is always political, of course . . .”).

²³⁹ See Jodi L. Wilson, *Proceed with Extreme Caution: Citation to Wikipedia in Light of Contributor Demographics and Content Policies*, 16 VAND. J. ENT. & TECH. L. 857, 859 (2014) (“Wikipedia is well known as the free, online encyclopedia that anyone can edit.”).

²⁴⁰ See Verne G. Kopytoff, *Wikipedia Marks 10 Years of Edit-It-Yourself*, N.Y. TIMES (Jan. 13, 2011, 9:27 AM), <http://bits.blogs.nytimes.com/2011/01/13/wikipedia-marks-10-years-of-edit-it-yourself/> [<https://perma.cc/4YCN-W2TM>].

²⁴¹ See Sydney Ember, *Wikipedia Begins Taking Donations in Bitcoin*, N.Y. TIMES (July 30, 2014, 6:48 PM), <http://dealbook.nytimes.com/2014/07/30/wikipedia-begins-taking-donations-in-bitcoin/> [<https://perma.cc/923U-2Y6U>]; Kopytoff, *supra* note 240.

²⁴² Gal & Rubinfeld, *supra* note 35, at 527; see also Heidi S. Bond, Note, *What’s So Great About Nothing? The GNU General Public License and the Zero-Price-Fixing Problem*, 104 MICH. L. REV. 547, 548 (2005).

²⁴³ Popular open-source content management system Drupal, for example, can cost tens or hundreds of thousands of dollars to deploy. See, e.g., Tom Kenooy, *The True Cost of a CMS*, MEDIUM RARE INTERACTIVE, INC. (Feb. 3, 2012) <http://mediumrareinc.com/the-true-cost-of-a-cms/> [<https://perma.cc/A9SD-52ZM>] (noting that “‘Free’ still costs money”).

result of the various concerns noted above).²⁴⁴ Both of these types of Free products are free in at least some limited sense of the term.²⁴⁵

Yet retellings of the Myth of Free rarely mention, let alone focus on, such products.²⁴⁶ Instead, the orthodox account of Free celebrates the output of for-profit firms: Google's online search, email, video-hosting, and mapping services; Facebook's social network; etc. That output is rarely, if ever, free in the common-usage, zero-cost sense of the term.²⁴⁷

When for-profit firms operate in Free markets, they do not do so out of charitable goodwill. Offering Free products entails real, and often substantial, costs.²⁴⁸ For-profit firms must recoup those costs.²⁴⁹ To recoup their costs, they extract payment from consumers.²⁵⁰ Instead of paying with fiat currency, consumers pay with their attention or personal information.²⁵¹ And where consumers pay, no matter the medium of exchange, Free is not free.

Industry insiders agree: "Advertising, or the promise of advertising, is the economic foundation of the world wide web."²⁵² Free business models depend on advertising.²⁵³ Some Free business models depend on external advertisements: displaying third-party advertisements to users. Thus, for example, streaming audio and audiovisual

²⁴⁴ See *supra* notes 108–09 and accompanying text.

²⁴⁵ Of course, even nonprofit-provided "free" products entail costs, hence (for example) Wikipedia's frequent requests for user donations. See *supra* notes 240–41 and accompanying text.

²⁴⁶ This neglect is, perhaps, unsurprising: nonprofit institutions have long offered products and services free of charge.

²⁴⁷ Newman, *supra* note 111, at 79–82.

²⁴⁸ See *supra* Section II.A.

²⁴⁹ See *supra* Section II.A.2 (discussing the problems inherent in reverse salami-slicing schemes).

²⁵⁰ See, e.g., STUCKE & GRUNES, *supra* note 39, § 1.26 ("[T]hese services are not actually free. Consumers pay with their personal data and privacy.").

²⁵¹ Newman, *supra* note 111, at 54; see also STUCKE & GRUNES, *supra* note 39, § 1.26.

²⁵² Maciej Ceglowski, The Internet with a Human Face, Address at Beyond Tellerrand (May 20, 2014), http://idlewords.com/talks/internet_with_a_human_face.htm [<https://perma.cc/BXX5-KTHE>]; cf. Mike Masnick, *Scarcity Isn't as Scarce as You Might Think*, TECHDIRT (Mar. 22, 2007, 1:04 PM), <https://www.techdirt.com/articles/20070322/024237.shtml> [<https://perma.cc/XP25-HA28>] ("By creating a tremendously useful index of information (a non-scarce good), [Google] has brought together a community, and it is effectively selling that community's *attention* (a very scarce good) to those who value it—advertisers.").

²⁵³ See Ethan Zuckerman, *The Internet's Original Sin*, ATLANTIC (Aug. 14, 2014), <http://www.theatlantic.com/technology/archive/2014/08/advertising-is-the-internets-original-sin/376041/> [<https://perma.cc/4YZX-4LWW>] ("Advertising became the default business model on the web . . . because it was the easiest model for a web startup to implement, and the easiest to market to investors.").

services, search, etc., often use a multisided-platform model to connect advertisers with users.²⁵⁴ Other Free models depend on internal advertisements. “Freemium” businesses, for example, function by exposing all users to the product—i.e., advertising—in hopes of eventually enticing some users to pay in fiat currency.²⁵⁵

And for-profit firms’ demand for increasingly effective (and therefore valuable) advertisements drives the interrelated demand for personal information.²⁵⁶ Ethan Zuckerman, one of the inventors of the pop-up advertisement, observes, “Demonstrating that you’re going to target more and better . . . requires moving deeper into the world of surveillance.”²⁵⁷ Users of many Free products now pay with both their attention *and* their information.²⁵⁸ Demand for the latter derives from demand for the former.²⁵⁹

A few governmental institutions have recognized that Free is not free,²⁶⁰ but those decisions are more the exception than the rule. U.S.

²⁵⁴ Rifkin, rather curiously, predicts that user-generated content delivered via “sites like YouTube, Flickr, Facebook, etc.” spell the end of advertising—“When consumers become prosumers and exchange content for free with one another in a sharable economy, what added value is corporate advertising bringing to the table?” RIFKIN, *supra* note 11, at 250.

²⁵⁵ See generally ANDERSON, *supra* note 3, at 26–27 (describing freemium business models). Some firms accept Bitcoin, not a fiat currency, but a true “currency” in the sense that, e.g., data is not, despite increasingly common observations to the effect that “data is the new currency.” See Marjorie Censer, *Six People to Watch: Helping Government Agencies Use Big Data*, WASH. POST (June 17, 2012), https://www.washingtonpost.com/business/capitalbusiness/six-people-to-watch-helping-government-agencies-use-big-data/2012/06/15/gJQAbUcqjV_story.html [https://perma.cc/WG25-X4RS] (quoting Bill Perlowitz, Vice Chairman, Big Data Commission).

²⁵⁶ Personal information may also be used to improve the quality of a product, James C. Cooper, *Privacy and Antitrust: Underpants Gnomes, the First Amendment, and Subjectivity*, 20 GEO. MASON L. REV. 1129, 1130 (2013), but it is information as an exchanged cost that is relevant here.

²⁵⁷ Zuckerman, *supra* note 253.

²⁵⁸ Don Marti provocatively argues that—although seemingly a paradoxical outcome—the more targeted advertisements become, the less valuable they are. Don Marti, *Targeted Advertising Considered Harmful*, ZGP, <http://zgp.org/targeted-advertising-considered-harmful/> [https://perma.cc/6NRW-TRZR]. This is so because the signaling value of advertisements is diluted as they are targeted at increasingly narrow slivers of the population. See *id.*

²⁵⁹ The demand for advertising itself can also be understood as derived demand—buyers desire cost-saving information, generating demand for advertising by the seller. Isaac Ehrlich & Lawrence Fisher, *The Derived Demand for Advertising: A Theoretical and Empirical Investigation*, 72 AM. ECON. REV. 366, 366 (1982).

²⁶⁰ During the mid-1980s, a Texas prisoner named Steve Jennings filed an unusual lawsuit against a local radio station. According to Jennings, KSCS promised its listeners to always play “at least three-[songs]-in-a-row, or we pay you \$25,000.” Jennings v. Radio Station KSCS, 708 S.W.2d 60, 61 (Tex. App. 1986). KSCS allegedly played only two songs in a row, then refused to pay Jennings when he demanded the promised \$25,000. *Id.* In response to Jennings’s breach of contract claim, KSCS argued that there was no consideration for its promise—in essence, that its programming was free to Jennings. *Id.* The court rejected the defense: KSCS benefitted by draw-

courts have stated that users of free services are not “consumers” under state consumer protection law,²⁶¹ that online search is not “sold” to users,²⁶² and that an online video-hosting platform ought to be able to contract away liability for negligence in part because it “is offering a service for free to the public.”²⁶³ That courts could reach such conclusions demonstrates the enduring power of the myth of Free.

Because Free is not free, the “Free equals consumer-welfare surplus” argument (often raised in connection with policy arguments based on the Myth of Free)²⁶⁴ lacks validity. Skeptics need not have ceded this ground.²⁶⁵ The bare fact that a product is offered at a price of zero does not necessarily indicate consumer benefits.²⁶⁶ Consumers who pay for a product via attention or information nonetheless pay for that product.²⁶⁷ And there is no principled reason to think that consumers are particularly advantaged vis-à-vis Free-product suppliers, such that consumers would necessarily extract a surplus of value from zero-price transactions.

The cost of many Free products—and particularly the high-profile products most often associated with Free as a phenomenon—is not zero. Free is not free. The orthodox origin story of Free depends on flawed major and minor premises. It comes as no surprise that the conclusion proves to be false as well.

III. FREE: PAST, PRESENT, AND FUTURE

The demise of Free’s orthodox origin story leaves a void and raises multiple questions: If Free is not the inevitable result of zero marginal costs, why did it become so prevalent? If Free was a response to the initial lack of online payment architecture, why has it

ing in listeners like Jennings, who pay not with money, but with attention. *Id.* at 62 (“Appellee also benefitted by the promise. KSCS gained new listeners, like appellant, who listened in the hope of winning \$25,000.00.”). In a similar case, a state court held that a gambler gave consideration by allowing a casino to track her spending habits—i.e., paying with personal information. *Gottlieb v. Tropicana Hotel & Casino*, 109 F. Supp. 2d 324, 329–30 (E.D. Pa. 2000).

²⁶¹ See *Hoofnagle & Whittington*, *supra* note 31, at 657 (citing *In re Facebook Privacy Litig.*, 791 F. Supp. 2d 705 (N.D. Cal. 2011)).

²⁶² E.g., *KinderStart.com, LCC v. Google, Inc.*, No. C 06-2057 JF (RS), 2007 WL 831806, at *5 (N.D. Cal. Mar. 16, 2007).

²⁶³ *Lewis v. YouTube, LLC*, 197 Cal. Rptr. 3d 219, 224 (Ct. App. 2015); accord *Darnaa, LLC v. Google, Inc.*, No. 15-cv-03221-RMW, 2015 WL 7753406, at *5 (N.D. Cal. Dec. 2, 2015).

²⁶⁴ See *supra* notes 31–35 and accompanying text.

²⁶⁵ See *supra* note 36 and accompanying text.

²⁶⁶ See *STUCKE & GRUNES*, *supra* note 39, § 1.26.

²⁶⁷ See *id.*

remained the default price of the internet, now that high-quality on-line payment systems are ubiquitous and inexpensive? And what of Free's future—will Free recede, persist in its current form, or (as some predict) expand offline?

A. *Whence Free? A Revisionist History*

With Free's orthodox history dismantled, a revisionist history is needed. Free products did not explode in popularity due to the elimination of marginal costs or the presence of perfect competition. Rather, four distinct, though interrelated, phenomena are the prime movers behind Free's rise. First is what has been memorably described as "the Internet's original sin."²⁶⁸ Second is the rampant copyright infringement that marked the early days of widespread internet adoption and usage. Third, the Zero-Price Effect has amplified the attractiveness of Free business models. Fourth, consumers' difficulty assessing nonprice costs has added to Free's long-term staying power.

1. *The Internet's Original Sin*

As internet adoption rates began their steep ascent during the early 1990s, firms hoping to turn a profit via the new medium faced a problem. Until the mid-1990s,²⁶⁹ no online payment systems were available to the general public.²⁷⁰ As an alternative, sites could opt directly into the traditional credit-card-platform structure by signing up as merchants. But, although doing so allowed a firm to accept credit payments online, the underlying architecture continued to exhibit flaws, including a days-long lag in verification-request response time.²⁷¹

Some businesses—most notably e-commerce retailers²⁷² Amazon and eBay—were successful early adopters of online payments.²⁷³ But

²⁶⁸ Zuckerman, *supra* note 253.

²⁶⁹ CompuServe's "Electronic Mall" was launched in the mid-1980s, but it was not available to the general public. Dave Roos, *The History of E-commerce*, HOWSTUFFWORKS (Apr. 15, 2008), <http://money.howstuffworks.com/history-e-commerce.htm> [<https://perma.cc/X9MY-9ZVA>].

²⁷⁰ See Zuckerman, *supra* note 253.

²⁷¹ See Claire Tsosie, *Mobile Payments Take a Click, but Processing Takes Days*, NERDWALLET (Dec. 10, 2014), <https://www.nerdwallet.com/blog/banking-news/slow-mobile-payments/> [<https://perma.cc/2WT7-R76Z>].

²⁷² Strandburg, *supra* note 164, at 98 (identifying the e-commerce approach as a distinct business model).

²⁷³ Sandeep Krishnamurthy, *A Comparative Analysis of eBay and Amazon*, in INTELLIGENT ENTERPRISES OF THE 21ST CENTURY 29, 29–30 (Jatinder N.D. Gupta & Sushil K. Sharma eds., 2004) (discussing the innovation and success of Amazon and eBay); Christopher Matthews,

many others either remained primarily focused on growing user bases rather than revenues²⁷⁴ or experienced substantial difficulty attracting sustainable cash flow via online payments.²⁷⁵ Zuckerman, a former designer at early internet startup Tripod.com, aptly describes the scramble for a workable business model that ensued during the mid- to late 1990s:

Over the course of five years, we tried dozens of revenue models We'd run as a subscription service! Take a share of revenue when our users bought mutual funds after reading our investment advice! Get paid to bundle a magazine with textbook publishers! Sell T-shirts . . . !²⁷⁶

The hunt was on for an alternative to traditional payments. In 1984, online service Prodigy was launched with the financial backing of CBS, IBM, and Sears Roebuck.²⁷⁷ In exchange for funding, Prodigy displayed “at the bottom of every Prodigy page” advertisements featuring its backers.²⁷⁸ Prodigy's advertisements functioned much like print advertisements; users could not “click through” the advertisement to reach the featured firm's website. In September 1993, a now-defunct firm called Global Network Navigator sold the first-ever “clickable” online advertisement to a Silicon Valley law firm.²⁷⁹ In October 1994, AT&T is said to have bought the first-ever “banner ad,” which appeared on *WIRED*'s website.²⁸⁰ Shortly thereafter, website-hosting service Tripod.com developed and deployed the first “pop-up”

Will Amazon Take Over the World?, TIME (July 16, 2012), <http://business.time.com/2012/07/16/will-amazon-take-over-the-world/> [https://perma.cc/G44T-8M5F] (discussing success of Amazon); see also Megan Garber, *Here Is the First Book Ever Ordered on Amazon*, ATLANTIC (Oct. 31, 2012), <http://www.theatlantic.com/technology/archive/2012/10/here-is-the-first-book-ever-ordered-on-amazon/264344/> [https://perma.cc/TJ7F-KMZZ] (characterizing Amazon as an early adopter of new technology and services and noting that Amazon sold its first book in 1995).

²⁷⁴ See Zuckerman, *supra* note 253.

²⁷⁵ *Id.*

²⁷⁶ *Id.*

²⁷⁷ Karen W. Arenson, *CBS, I.B.M., Sears Join in Videotex Venture*, N.Y. TIMES (Feb. 15, 1984), <http://www.nytimes.com/1984/02/15/business/cbs-ibm-sears-join-in-videotex-venture.html> [https://perma.cc/HCF9-4DXS]; Benj Edwards, *Where Online Services Go When They Die*, ATLANTIC (July 12, 2014), <https://www.theatlantic.com/technology/archive/2014/07/where-online-services-go-when-they-die/374099/> [https://perma.cc/9M3J-6VWQ]; Tom Shea, *Big Firms Team Up on Videotex Project*, INFOWORLD, Mar. 12, 1984, at 13.

²⁷⁸ Srobona Basu, *History of Online Advertising*, OWNER'S MAG (Nov. 11, 2016), <https://ownersmagazine.com/history-of-online-advertising/> [https://perma.cc/A5V3-8BN6].

²⁷⁹ Ankit Oberoi, *The History of Online Advertising*, ADPUSHUP BLOG (July 3, 2013), <https://www.adpushup.com/blog/the-history-of-online-advertising/> [https://perma.cc/9PSA-FT4A].

²⁸⁰ Ryan Singel, *Oct. 27, 1994: Web Gives Birth to Banner Ads*, WIRED (Oct. 27, 2010, 7:00 AM), <http://www.wired.com/2010/10/1027hotwired-banner-ads/> [https://perma.cc/65U8-NUSD].

online advertisements.²⁸¹ By 2015, annual global digital-advertising revenues had risen to more than \$150 billion, and forecasters were predicting that internet advertising would soon overtake television advertising.²⁸²

And even these figures fail to include freemium or zero-price complementary-goods strategies. These alternative Free business models can also be viewed as dependent on a form of advertising. Freemium offerings generate revenue by exposing a wide base of users to the product, essentially using the Free version of the product as advertising for the paid version. And Free-based complementary-goods models—which date at least as far back as Gillette’s famous “free razors, paid blades” strategy²⁸³—similarly function via their promotional value.

Online advertising, adopted in part because traditional payment systems failed to map well onto the internet, became the lifeblood of Free.²⁸⁴ As Maciej Ceglowski puts it, “Advertising, or the promise of advertising, is the economic foundation of the world wide web.”²⁸⁵ Users quite literally pay attention in exchange for the products at the core of Free’s orthodox origin story.

As advertising increasingly became the internet’s “default business model,”²⁸⁶ competition drove technology firms to develop increasingly profitable forms of advertising. One of the primary—and most profitable²⁸⁷—means of doing so was to facilitate “behavioral,” or “targeted,” advertising.²⁸⁸ Behavioral advertising is advertising that

²⁸¹ Zuckerman, *supra* note 253.

²⁸² Press Release, Magna Global, Magna Global Forecasts Global Advertising Revenues to Grow by +4.6% to \$526 Billion in 2016 (Dec. 7, 2015), <http://www.magnaglobal.com/magna-global-forecasts-global-advertising-revenues-to-grow-by-4-6-to-526-billion-in-2016/> [<https://perma.cc/27CJ-KBWD>].

²⁸³ Chris Henson, “Razors and Blades”—Why the Father of the World’s Most Successful Business Model Is Taking It on the Chin, ACCESS (Apr. 17, 2014), <http://visitaccess.com/razors-and-blades-why-the-father-of-the-worlds-most-successful-business-model-is-taking-it-on-the-chin/> [<https://perma.cc/ZC9X-LEF6>].

²⁸⁴ The similar difficulty of using traditional payment systems in broadcast radio and television markets helps to explain why those markets (like online-content markets) were structured such that consumers paid with attention, rather than money.

²⁸⁵ Ceglowski, *supra* note 252.

²⁸⁶ Zuckerman, *supra* note 253.

²⁸⁷ See Strandburg, *supra* note 164, at 101 (estimating that “rates charged for behavioral advertising [are] about 2.7 times the rates for run-of-network advertising”).

²⁸⁸ Alternative advertising strategies include “undirected” (or “run-of-network”) and “contextual” advertisements. See *id.* at 99. These two have ready offline analogues. Undirected advertisements are somewhat akin to a billboard advertisement posted next to a busy street: all passersby view the advertisement regardless of personal taste or history. Contextual advertisements, however, appear only in venues (or at times) likely to attract a certain type of viewer, one

targets a particular viewer based on actual data about that viewer's past actions. For example, a 2012 *New York Times* report revealed that Target had been using its consumers' purchase data to predict with a high degree of accuracy whether a given customer was pregnant, then targeting (as it were) those individuals with advertisements for infant clothing, strollers, and the like.²⁸⁹

With the rise of behavioral advertising, firms acquired a new thirst for personal information about their users. Once behavioral advertisements became the "default model" supporting Free, firms naturally began to "promise investors that advertising will be more invasive, ubiquitous, and targeted and . . . collect more data about . . . users and their behavior."²⁹⁰ Competition drove a "tracking arms race"—firms attempting to outdo one another by gathering more and more personal information.²⁹¹ As one scholar observes, "For years, [internet] sites . . . have systematically improved their 'product' by reducing user privacy."²⁹² Simultaneously, the rise of online advertising networks facilitated the aggregation of data about a given user's behavior across the entire internet.²⁹³

This is the "internet's original sin."²⁹⁴ Demand for personal data is largely "derived demand"²⁹⁵—it is incidental to demand for targeted advertising.²⁹⁶ With advertising—and increasingly, targeted advertis-

that may be predisposed to consuming the advertised product. Thus, for example, a firm marketing "Team Canada" hockey jerseys during the Sochi Olympics successively altered its online advertisement to disparage each of Canada's various opponents. Jeff Quipp, *Three Examples of Contextual Advertising Done Right*, HUFFPOST (May 19, 2014, 5:59 AM), http://www.huffingtonpost.ca/jeff-quipp/contextual-advertising_b_4992296.html [<https://perma.cc/Y975-VLHV>].

²⁸⁹ Charles Duhigg, *How Companies Learn Your Secrets*, N.Y. TIMES MAG. (Feb. 16, 2012), http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?_r=0 [<https://perma.cc/MN8K-MH3D>].

²⁹⁰ Zuckerman, *supra* note 253.

²⁹¹ Ryan Tate, *Amid NSA Outrage, Big Tech Companies Plan to Track You Even More Aggressively*, WIRED (Oct. 11, 2013, 6:30 AM), <http://www.wired.com/2013/10/private-tracking-arms-race> [<https://perma.cc/9R4M-BCZ9>].

²⁹² Bruce Schneier, *Surveillance as a Business Model*, SCHNEIER ON SECURITY (Nov. 25, 2013, 6:53 AM), https://www.schneier.com/blog/archives/2013/11/surveillance_as_1.html [<https://perma.cc/MXP3-M2ZD>].

²⁹³ See Ben Thompson, *Why Web Pages Suck*, STRATECHERY (July 15, 2015), <https://stratichery.com/2015/why-web-pages-suck/> [<https://perma.cc/8UVS-XA65>].

²⁹⁴ Zuckerman, *supra* note 253 ("I have come to believe that advertising is the original sin of the web.").

²⁹⁵ Ehrlich & Fisher, *supra* note 259, at 366. Ehrlich and Fisher posit that suppliers' demand for (nontargeted) advertising is derived from buyers' "implicit demand for cost-saving information" about the relevant products. *Id.*

²⁹⁶ To be sure, firms can also use such data to improve their products. See Cooper, *supra* note 256, at 1130, 1135–36.

ing—as the dominant business model, consumers of Free products pay with their attention to advertisements and their personal information.

2. Copyright Infringement: The Zero-Price Competitor

The internet has been called “a giant copyright-infringement machine.”²⁹⁷ For a variety of reasons—expense, scalability, lack of anonymity—physical copyright infringement has remained relatively minimal over time.²⁹⁸ But with digitization, the storage and reproduction costs of copying certain types of creative works fell substantially.²⁹⁹ Personal computers (“PCs”) continued to increase in capability and decrease in cost.³⁰⁰ Once connected via the internet, PCs provided the backbone for widespread distribution of copyrighted materials.³⁰¹ All that was needed was a platform.

In 1999, peer-to-peer (“P2P”) file-sharing service Napster launched, turning many end users into both consumers and suppliers of infringing materials.³⁰² Napster was not the first online avenue for copyright infringement, but it was an overnight sensation: at its peak, 25 million Napster users were sharing 80 million digital files.³⁰³ Copyright holders reacted swiftly, obtaining an injunction against the service just one year after its launch.³⁰⁴

But even before Napster’s demise, second-generation P2P file-sharing services rose up in its stead. Innovations like decentralized structures and BitTorrent technology made these new platforms more difficult to target via traditional legal means and more attractive to end users.³⁰⁵ Alternative infringement models (e.g., remote file hosting) also emerged.³⁰⁶ Copyright holders found themselves on the losing end of “a giant game of Whac-a-Mole.”³⁰⁷ Massive litigation

²⁹⁷ Mathew Ingram, *The Internet Isn’t Just Pipes; It’s a Belief System*, BLOOMBERG (Nov. 16, 2011, 4:32 PM), <https://www.bloomberg.com/news/articles/2011-11-16/the-internet-isn-t-just-pipes-it-s-a-belief-system> [<https://perma.cc/9M5Z-5Z8S>].

²⁹⁸ Newman, *supra* note 70, at 1420–21.

²⁹⁹ *Id.* at 1423–25.

³⁰⁰ *Id.* at 1421–23.

³⁰¹ *Id.* at 1425.

³⁰² *What Is Napster?*, TECHOPEDIA, <https://www.techopedia.com/definition/2520/napster> [<https://perma.cc/34Q4-DGEA>].

³⁰³ *Id.*

³⁰⁴ *A&M Records, Inc. v. Napster, Inc.*, 114 F. Supp. 2d 896, 900–01 (N.D. Cal. 2000).

³⁰⁵ Newman, *supra* note 70, at 1427.

³⁰⁶ *Id.* at 1425.

³⁰⁷ Todd R. Weiss, *Google Search Algorithm Update Means Better Copyright Protection*, EWEK (Aug. 14, 2012), <http://www.eweek.com/c/a/Search-Engines/Google-Search-Algorithm-Update-Means-Better-Copyright-Protection-184969> [<https://perma.cc/64WZ-3N3N>] (quoting copyright and patent attorney Anderson Duff).

campaigns launched against both facilitators and end users triggered a societal backlash and were abandoned.³⁰⁸

Online infringement represented a viable competitor to legitimate rivals like Apple's iTunes Store, launched in 2001.³⁰⁹ While legitimate firms often charged positive prices, the prevailing price for infringing content was zero.³¹⁰ A core of users who shared copyrighted content—for ideological reasons or as part of a rough quid pro quo—supported the free-riding fringe.³¹¹

This zero-price (albeit infringing) alternative exerted powerful competitive pressure on copyright holders. The question became: “[H]ow do you compete with free?”³¹² The content available via infringement facilitators like Napster—if not the platforms themselves³¹³—was truly free, at least in the sense that suppliers exacted no direct payment from customers.³¹⁴ Copyright holders needed to offer a competitive alternative.

The rise of Free was, in part, a reaction to the persistent presence of infringement as a zero-price competitor in the marketplace.³¹⁵ Consider, for example, Spotify, an online music-streaming service launched in 2011.³¹⁶ One of Spotify's cofounders explicitly identified competition with infringing alternatives as its *raison d'être*: “[W]e

³⁰⁸ See Ben Depoorter, Alain Van Hiel & Sven Vanneste, *Copyright Backlash*, 84 S. CAL. L. REV. 1251, 1264–65, 1268–69 (2011) (arguing that industry litigation efforts were perceived as heavy handed and may have triggered increased infringement by those who began to perceive copyright law as illegitimate).

³⁰⁹ Press Release, Apple Inc., Apple Introduces iTunes—World's Best and Easiest to Use Jukebox Software (Jan. 9, 2001), <https://www.apple.com/newsroom/2001/01/09Apple-Introduces-iTunes-Worlds-Best-and-Easiest-To-Use-Jukebox-Software/> [<https://perma.cc/U4FA-KVYP>].

³¹⁰ Lemley, *supra* note 17, at 482–83. Lemley points to a zero-cost explanation for infringement. *Id.* at 482 (“[A]s the cost of reproduction and distribution dropped to zero, piracy became rampant on the Internet.”).

³¹¹ See Newman, *supra* note 70, at 1442–43.

³¹² Mary Madden, *The State of Music Online: Ten Years After Napster*, PEW RES. CTR. (June 15, 2009), <http://www.pewinternet.org/2009/06/15/the-state-of-music-online-ten-years-after-napster/> [<https://perma.cc/49QC-BD3W>].

³¹³ Napster adopted an advertising-supported business model. Kate Kaye, *Napster Aims to Compete Through Ad-Supported Free Music Streams*, CLICKZ (May 2, 2006), <https://www.clickz.com/napster-aims-to-compete-through-ad-supported-free-music-streams/59809/> [<https://perma.cc/XW3J-PECH>].

³¹⁴ The risk of a copyright-infringement lawsuit did impose some cost, but even at the height of the industry litigation campaigns that cost remained negligible relative to the benefits. Newman, *supra* note 70, at 1434–35.

³¹⁵ Kate Darling, *IP Without IP? A Study of the Online Adult Entertainment Industry*, 17 STAN. TECH. L. REV. 709, 740 (2014) (relating qualitative survey evidence from the adult film industry to the effect that, in response to rampant copyright infringement, “many producers [began] giving away content for free”).

³¹⁶ See Adrian Covert, *Why Did It Take So Long for Spotify to Come to the US?*, GIZMODO

started thinking about how we could create a product that was better than piracy.”³¹⁷ Free, in other words, “compete[s] with free.”³¹⁸

3. *The Zero-Price Effect*

The Zero-Price Effect (“ZPE”) not only helps to explain the persistence of Free; it also informs the preceding analysis of the birth of Free. Consumers’ outsized preference for zero-price products contributed to both (1) the explosion of infringement-facilitating services like P2P file-sharing platforms and (2) the adoption of advertising-supported platforms as the default online business model. As to the former, the zero-price files available via file-sharing service Napster were a primary driver in its rapid growth.³¹⁹ In short, “users like free things.”³²⁰ Today, “[t]he experience of the vast majority of [online] publishers is that readers will not pay for content.”³²¹ Indeed, “in most cases, just a penny—a seemingly inconsequential price—can stop the vast majority of consumers in their tracks.”³²² The ZPE yields a powerful competitive advantage to suppliers who take advantage of it. Advertising emerged as the primary means for doing so.³²³

The ZPE thus presents, in place of the Myth of Free, a partially behavioral account of Free’s persistence. The Myth, though sometimes offered as a refutation of or replacement for neoclassical economics, is (or at least strives to be) fundamentally neoclassical—it adopts the language and assumptions of price theory and marginalism. But, despite cloaking itself in that venerable mantle, the orthodox account ultimately reveals itself to be a flawed application of neoclassical thought. The ZPE, though a deviation from the standard assumption of perfect rationality, here offers a greater degree of explanatory power vis-à-vis core Free products.

4. *Difficulty Assessing Costs*

Individuals also appear to experience a great deal of difficulty when assessing attention or information costs. To complete the quote

(July 13, 2011, 10:02 PM), <http://gizmodo.com/5821056/why-did-it-take-so-long-for-spotify-to-come-to-the-us?tag=spotify> [<https://perma.cc/W52X-DYC5>].

³¹⁷ *Id.*

³¹⁸ Peter Brody, *Competing with Free*, PUB. KNOWLEDGE (Nov. 28, 2011), <https://www.publicknowledge.org/news-blog/blogs/competing-with-free> [<https://perma.cc/QQ4W-SDEW>].

³¹⁹ See Newman, *supra* note 70, at 1426.

³²⁰ Schneier, *supra* note 292.

³²¹ Thompson, *supra* note 293.

³²² ANDERSON, *supra* note 3, at 59.

³²³ See Zuckerman, *supra* note 253.

from Schneier, “[U]sers like free things, and don’t realize how much value they’re giving away to get it.”³²⁴ Whether framed as irrational consumer behavior or as the result of effectively insurmountable information asymmetries, this dynamic presents substantial market opportunities—and for-profit firms should be expected to respond accordingly.

Research indicates that consumers systematically underestimate attention costs. According to one study, internet users believe online advertisements to be “almost completely ineffective,”³²⁵ with almost half of users reporting that advertisements have “no effect whatsoever.”³²⁶ Yet follow-on experiments demonstrated that advertisements “had substantial persuasive and subtle distracting effects.”³²⁷

Consumers also systematically underestimate the amount of information costs they are willing to incur in exchange for a given product. This effect is so pronounced that researchers termed it the “privacy paradox.”³²⁸ In one study, for example, individuals stated their willingness to disclose, on average, a maximum of 8.7 items of personal information—but then went on to disclose nearly twice that number.³²⁹

Consumers are relatively well able to weigh and respond to price-based costs. Nonprice costs present substantially greater difficulties. The problems that inhere in calculating, monitoring, and responding to information and attention costs led Katherine Strandburg to conclude that “[t]here is no functioning market based on exchanges of personal information for access to online products and services.”³³⁰ That conclusion is arguable.³³¹ But, at the very least, such problems do help to explain the status quo. Firms, having replaced positive prices with difficult-to-assess costs, unsurprisingly continued to impose such costs even after the technological impediments to positive price setting were alleviated.

³²⁴ Schneier, *supra* note 292.

³²⁵ Brad J. Sagarin et al., *Bartering Our Attention: The Distraction and Persuasion Effects of On-Line Advertisements*, COGNITIVE TECH., Fall 2003, at 4, 5.

³²⁶ *Id.*

³²⁷ *Id.* at 14.

³²⁸ See Patricia A. Norberg, Daniel R. Horne & David A. Horne, *The Privacy Paradox: Personal Information Disclosure Intentions Versus Behaviors*, 41 J. CONSUMER AFF. 100 (2007).

³²⁹ *Id.* at 110–13. These results were observed in twenty-three individuals, a fairly small sample size. *Id.* at 110.

³³⁰ Strandburg, *supra* note 164, at 95.

³³¹ Newman, *supra* note 111, at 54 n.19 (contending that while Free markets may be very imperfect, they do exhibit competition—in other words, that market failures do not of necessity equate to failed markets).

B. *Whither Free?*

With Free's past and present reconceived, what of its future? That question breaks down into three parts, the first dealing with actual, advertising-supported Free products, the latter two dealing with the mythical, zero-cost-based version of Free. First, going forward, will the digital products at the core of the Free phenomenon continue to employ zero-price business models? Second, will the mythical version of "Free" become reality, at least as to core, pure-information products? Third, will the mythical Free expand, as some argue, into traditionally offline industries like healthcare, food production, and manufacturing? These questions (and their answers) carry critical implications for the design and implementation of politico-legal systems.³³²

1. *The (Continuing) Zero-Price Advantage*

Nearly all of the same factors that led to the birth of Free remain in force, and will likely do so for the foreseeable future. The sole countervailing development is the rise of readily available, inexpensive, and near-instantaneous online payment systems. Payment technology now makes feasible (though perhaps still cost-prohibitive) "micropayments"—small payments, often fractions of a cent, in exchange for access to a website or online application.³³³ And alternative currencies (e.g., Bitcoin) may lower transaction costs so as to make micropayments not only feasible, but practical.³³⁴ Such innovations make direct payments a more attractive—or at least less unattractive—alternative to Free.

But copyright infringement continues to act as a check on some core Free markets involving information-centric products.³³⁵ Despite the rise of noninfringing Free products, file sharing grew in magnitude by more than forty percent from 2008 to 2014.³³⁶ And even if the rate

³³² See *infra* Part IV.

³³³ See Sandy Ressler, *Bitcoin Micropayments, a New Enabling Technology*, BITCOIN MAG. (Apr. 30, 2014, 2:00 PM), <https://bitcoinmagazine.com/articles/bitcoin-micropayments-new-enabling-technology-1398880834> [<https://perma.cc/M2KN-8TQB>].

³³⁴ *Id.*

³³⁵ It may be less relevant to some Free products like online search, where the product itself (search results) is generally not copyright protected. See, e.g., *Perfect 10, Inc. v. Amazon.com, Inc.*, 508 F.3d 1146, 1155, 1168 (9th Cir. 2007).

³³⁶ Robert Steele, *If You Think Piracy Is Decreasing, You Haven't Looked at the Data*, . . ., DIGITAL MUSIC NEWS (July 16, 2015), <http://www.digitalmusicnews.com/2015/07/16/if-you-think-piracy-is-decreasing-you-havent-looked-at-the-data-2/> [<https://perma.cc/TFD3-8HNT>]. These data do not appear to distinguish between noninfringing and infringing instances of file sharing. But, if the Napster and Grokster cases are any indication, much of the use likely constituted infringement.

of copyright infringement were to level off or decline, infringement remains a potential substitute for legitimate content. Thus, the specter of infringement alone may be enough to render Free markets relatively contestable³³⁷ and act as a check on the pricing behavior of non-infringing firms.

Moreover, the ZPE and the difficulty of assessing nonprice costs—both fundamentally human responses to the absence of positive prices—will likely remain in force for the foreseeable future. The inverse of the positive affect (i.e., pleasure) generated by zero-price transactions is the negative affect (i.e., pain) generated by positive-price transactions. This negative affect, referred to by researchers as the “pain of paying,”³³⁸ suggests that Free will remain the dominant business model in markets where it already prevails.

In fact, to the extent that a current general trend can be identified, it appears to be away from overt and toward invisible payments. Thus, for example, “[m]ore high-end boutiques and department stores are moving the [cash register] out of sight or eliminating it entirely.”³³⁹ Private-taxicab service Uber explains that “[b]ecause there’s no exchange of cash, the Uber experience is seamless for riders.”³⁴⁰ Broadly speaking, the vanguard of payments innovation centers on delivering such seamless customer experiences. As Anderson observes, “If you charge a price, any price, we are forced to ask ourselves if we really want to open our wallets. But if the price is zero, that flag never goes up and the decision just got easier.”³⁴¹

³³⁷ For a brief summary of contestability theory, see STEPHEN MARTIN, *INDUSTRIAL ORGANIZATION IN CONTEXT* 79–80 (2010).

³³⁸ Kam Leung Yeung, *Exploring the Origin of Pain of Payment in Cash and Its Relevance to Computer Payment Interface* 14, 38 (2014) (unpublished Ph.D dissertation, Iowa State University), <http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=5025&context=etd> [<https://perma.cc/FB35-NXY4>].

³³⁹ Ray A. Smith, *Find the Missing Cash Register*, WALL ST. J. (Mar. 8, 2016, 4:31 PM), <http://www.wsj.com/articles/find-the-missing-cash-register-1457472672> [<https://perma.cc/7272-7UXJ>].

³⁴⁰ Zara, *Greater Accessibility for Riders and Drivers*, UBER NEWSROOM (July 25, 2015), <https://newsroom.uber.com/greater-accessibility/> [<https://perma.cc/PE5F-MLKA>]; see also Meghan McCarty Carino, *Uber Tips Policy Causing Confusion, Possibly Lower Passenger Scores*, S. CAL. PUB. RADIO (Oct. 21, 2015), <http://www.scpr.org/news/2015/10/21/55137/uber-tips-policy-causing-confusion-possibly-lower/> [<https://perma.cc/9WFY-MJLU>] (quoting Dan Ariely) (users of popular private taxicab service Uber may be misled in part by the seamless nature of transactions—“[t]he value proposition of Uber is basically not thinking about money’ . . . Uber eliminates . . . the ‘pain of paying,’ thus making cost less of a factor in using the service.”).

³⁴¹ ANDERSON, *supra* note 3, at 59.

Given all of this, there is no principled reason to think that Free—the exchange of sought-after products for valuable attention and information—will recede. It may well expand, even offline. So long as the value of the attention or information extracted exceeds the cost of the relevant product, Free strategies are rational.

The only real limiting factor at play is the upper bound on attention supply: society possesses a fixed amount of attention, making it a scarce good.³⁴² Standard economic theory suggests that this upper bound constrains suppliers' ability to profitably engage in Free transactions.³⁴³ Land, a similarly scarce resource, offers a ready analogue. There is an absolute upper bound on how much land can ever be employed productively. As demand for land increases, closer-to-marginal (i.e., more costly, less productive, etc.) parcels must be developed and farmed.³⁴⁴ Similarly, the spread of Free would require suppliers to extract closer-to-marginal units of attention. To do so, suppliers would need to exchange increasingly valuable products. At some point, Free becomes an irrational strategy.³⁴⁵ Thus, while Free may expand from its current state, it will not do so ad infinitum.

2. *Abundance: The Exception, Not the Rule*

I may see the world more darkly than somebody who lives in sunny Silicon Valley.

—James Comey³⁴⁶

Techno-optimists contend that mythical, zero-cost Free has not only already dominated information-goods markets, but will also soon expand offline, making the leap to industries like healthcare, energy, food production, and manufacturing.³⁴⁷ This metastatic spread is posited as the inevitable end result of market competition.³⁴⁸ Subject to a few exceptions, everything will become Free. Late-stage capitalism

³⁴² See Masnick, *supra* note 252 (observing that a single person's attention is a "scarce commodity"). It appears to be an open question as to whether information is similarly scarce—is there an upper limit on how much information about a given individual can exist?

³⁴³ See *supra* note 18 and accompanying text.

³⁴⁴ See KENYON A. KNOPF, A LEXICON OF ECONOMICS 191 (1991) ("More fertile land will be put in use first because of its greater productivity. Less and less fertile land will be put to use until that unit of land is reached that no one will bid for . . .").

³⁴⁵ Cf. *id.*

³⁴⁶ James Comey, Dir., FBI, Keynote Address at Symantec Government Symposium (Aug. 30, 2016), <https://www.fbi.gov/audio-repository/inside-podcast-comey-cyber-speech-090216.mp3/view> [<https://perma.cc/UV3X-DLKN>].

³⁴⁷ See *supra* Section I.B.

³⁴⁸ RIFKIN, *supra* note 11, at 308.

will (we are told) hang itself by its own rope: the profit motive will drive the price of everything to zero, leaving no profits to be had.³⁴⁹

But even as to pure (or as close to pure as is realistically possible) information goods, the friction of the real prevents true abundance. Startup costs remain, even for a single programmer or musician who must purchase a computer or guitar. It may be easy to trivialize such costs in a developed economy, but such costs present a serious obstacle to vast populations. And income and wealth disparities in even developed economies dictate that such costs remain prohibitively expensive to many.³⁵⁰

Just as importantly, digital distribution still occurs in the real world via physical infrastructure. Such infrastructure entails—and will always entail—real costs. Costs must be recouped somehow; from providers' point of view, they are never “too cheap to matter.”³⁵¹ Recoupment may occur via direct prices, attention or information costs, taxation (for publicly funded infrastructure), or donations (for charitably funded projects), etc. Some of these means of recoupment may appear at first glance to yield Free products, but they do not herald a coming Age of Abundance.

To the extent that costs fall far enough to allow socially motivated production—here, some point to areas like “fan fiction and remix culture”³⁵²—infrastructure costs yet remain. Platforms like YouTube, Blogger, and the like have allowed a flood of user-generated content, but the platforms themselves are not Free, dooming hopes that the content is, or can become, Free. Rifkin predicts that user-generated content delivered via “sites like YouTube, Flickr, Facebook, etc.,” spell the end of advertising: “When consumers become prosumers and exchange content for free with one another in a sharable economy, what added value is corporate advertising bringing to the table?”³⁵³ The value, of course, lies in allowing intermediaries (like YouTube, Flickr, and Facebook) to recoup their infrastructure costs.

Open-source projects, often lauded by proponents of Free as the future of software production, often depend on the viability of posi-

³⁴⁹ *Id.* at 3–4.

³⁵⁰ In Memphis, Tennessee, for example, the poverty rate hovers around 30%, with child poverty at a staggering 46.9%. Elena Delavega, *2015 Memphis Poverty Fact Sheet*, UNIV. MEMPHIS: MID-SOUTH FAM. & COMMUNITY EMPOWERMENT INST. (2015), <http://www.memphis.edu/socialwork/pdfs/20153povertyfactsheetwebversion.pdf> [<https://perma.cc/CT3W-XETZ>].

³⁵¹ See ANDERSON, *supra* note 3, at 75.

³⁵² For a discussion of fan fiction and remix culture, see Steven A. Hetcher, *Using Social Norms to Regulate Fan Fiction and Remix Culture*, 157 U. PA. L. REV. 1869 (2009).

³⁵³ RIFKIN, *supra* note 11, at 250.

tive-price service contracts—and in that sense are not Free at all. And the economics at play are unique.³⁵⁴ Open-source development tends to depend on robust aftermarkets for services and support and low capital costs.³⁵⁵ While computers have grown relatively inexpensive, such aftermarkets are not present even for many information-centric products, let alone other types of products. This limitation imposes a severe (and underappreciated) upper bound on the viability of open source.

Even as to information-centric products, Free will remain a myth. Free cannot be the exception, let alone the rule. Yet some predict an entire post-scarcity society based on Free healthcare, energy, manufactured products, etc.³⁵⁶ The further such predictions stray away from information-centric products, the further into the realm of impossibility they venture.

The necessary physicality of infrastructure limits how far close-to-zero costs can spread through society. (And, of course, even close to zero is not close enough for Free to occur.)³⁵⁷ Consider, for example, Rifkin's claim that advances in solar and wind energy production, harnessed by a "smart grid," will soon yield "Free Energy"³⁵⁸ (or at least energy that is "nearly free").³⁵⁹ Nonprofit electric cooperatives will supposedly emerge to fund the necessary infrastructure buildout and maintenance.³⁶⁰ This narrative points to the success of rural electric cooperatives as presaging this widespread replacement of vertically integrated, for-profit utilities.³⁶¹ What remains unclear in this account is how such cooperatives (should they emerge) will pay for infrastructure costs. Rural electric cooperatives do so via billing their customers.³⁶² Calling such cooperatives a "commons" does not change the fact that their electricity is not delivered for Free. Though increased use of renewable energy sources may be a long-term societal boon, society cannot expect the output of such sources to be Free. Again, costs must be recouped.

³⁵⁴ Raymond, *supra* note 157.

³⁵⁵ See, e.g., Joel Spolsky, *Strategy Letter V*, JOEL ON SOFTWARE (June 12, 2002), <https://www.joelonsoftware.com/2002/06/12/strategy-letter-v/> [<https://perma.cc/NT6Y-RZTW>] ("Smart companies try to commoditize their products' complements.").

³⁵⁶ See, e.g., RIFKIN, *supra* note 11.

³⁵⁷ See *supra* Section II.A.2.

³⁵⁸ See RIFKIN, *supra* note 11, at 81–84, 205–06.

³⁵⁹ See *id.* at 84–85 (predicting that electricity will become "almost free").

³⁶⁰ *Id.* at 103–04.

³⁶¹ See *id.*

³⁶² See, e.g., *Kay Elec. Coop. v. City of Newkirk*, 647 F.3d 1039 (10th Cir. 2011) (Gorsuch, J.) (analyzing an antitrust complaint brought by a rural electric cooperative).

As the Myth of Free ventures offline, it runs further aground on the costs of physical inputs. Some point to 3D printing as the key to a Free revolution in manufacturing,³⁶³ but “[b]ecause 3-D printers require feedstock, the marginal cost of producing goods with them has a floor well above zero.”³⁶⁴ This is so because producing and transporting physical inputs entails substantial costs. Rifkin attempts to evade this problem by conjuring an “Energy Internet” and a “Logistics Internet”³⁶⁵—but such solutions run into the infrastructure-cost problem, as discussed above. As one critic pointedly asks, “What about the fixed costs? Who is going to supply the infrastructures necessary for the various near zero marginal cost systems to function?”³⁶⁶ 3D printing may increase efficiency, but it cannot eliminate costs. Even Lemley, who proposes a “world without scarcity,” admits that the new technologies driving the shift to abundance “require[] physical inputs that will in turn be subject to the laws of scarcity.”³⁶⁷ But that very fact undercuts predictions that such technologies will bring about a post-scarcity world. The friction of the real only increases as the amount of requisite physical inputs increases.

These difficulties are magnified further still as to physical inputs other than ABS plastic, the dominant component of early 3D-printed objects. Plastic is uniquely inexpensive to produce and (because of its light weight) transport; it also melts at very low (and therefore relatively safe) temperatures. These qualities make plastic the offline analogue of information-centric products. But other common manufacturing components exhibit inherent attributes that render them much less practical for 3D-printing applications. The costs of producing and transporting steel, glass, and the like are—and will necessarily remain—quite high relative to those entailed by plastic. Such materials also melt at temperatures well above plastic’s melting point—3200°F for glass, 2500°F for steel, etc.—increasing both the energy required for, and the relative danger involved in, production.³⁶⁸

³⁶³ See, e.g., Raymond, *supra* note 157.

³⁶⁴ *Id.*

³⁶⁵ See RIFKIN, *supra* note 11, at 15 (“[T]he core of the [Internet of Things] . . . is the coming together of the Communications Internet, Energy Internet, and Logistics Internet in a cohesive operating platform.”).

³⁶⁶ Frischmann, *supra* note 160.

³⁶⁷ Lemley, *supra* note 17, at 502.

³⁶⁸ Eric Bank, *Temperature Needed to Turn Silicon into Glass*, SEATTLE PI, <http://education.seattlepi.com/temperature-needed-turn-silicon-glass-3715.html> [<https://perma.cc/ZBK5-TSW8>]; Brian Kross, *What’s the Melting Point of Steel*, JEFFERSON LAB, https://education.jlab.org/qa/meltingpoint_01.html [<https://perma.cc/Z9W8-7N9U>]. More exotic materials demand equally exotic temperatures—tungsten, for example, melts at 6177°F. *Periodic Table: Tungsten*, ROYAL

Unsurprisingly, then, Rifkin's references to the world's first "3D-printed automobile" minimized the importance of the vehicle's engine and frame, which were manufactured using traditional processes.³⁶⁹ Plastic is uniquely well suited to 3D-printing applications, but the friction of the real increases as other inputs are used.

Some proponents of the Myth of Free point to the rise of the so-called "sharing economy" as a vital component of real-world Free. We are told that services like Airbnb, Uber, and Zipcar will give rise to a "new collaborative economy"³⁷⁰ that will replace "conventional capitalist market[s]" in ten to thirty percent of the global marketplace³⁷¹—or even bring about "the end of capitalism as we know it."³⁷² This vision is, at best, misguided.³⁷³ In fact, such services are, at their core, capitalistic: they function by allowing owners to convert consumer goods into capital goods—in other words, to become capitalists.³⁷⁴ The usage of such capital goods entails depreciation costs, which owners must recoup, at present via charging positive prices.³⁷⁵ Efficient though sharing-economy services may be,³⁷⁶ the friction of the real prevents their being or becoming Free.

All of this suggests that the Myth of Free grows ever more tenuous as it spreads to offline markets. Abundance will remain the exception, rather than the rule, even in developed economies. This is the scarcity of abundance.

SOC'Y CHEMISTRY, <http://www.rsc.org/periodic-table/element/74/tungsten> [https://perma.cc/3GDF-APGG].

³⁶⁹ RIFKIN, *supra* note 11, at 98–99; *see also* Joe Bargmann, *Urbee 2, the 3D-Printed Car that Will Drive Across the Country*, POPULAR MECHANICS (Nov. 4, 2013), <http://www.popularmechanics.com/cars/a9645/urbee-2-the-3d-printed-car-that-will-drive-across-the-country-16119485/> [https://perma.cc/D2NJ-PLPL].

³⁷⁰ Chase, *supra* note 57.

³⁷¹ SOLANGE LE JEUNE, *THE SHARING ECONOMY* 5 (2016), <http://www.schroders.com/en/sysglobalassets/digital/insights/2016/pdfs/responsible-investment/the-sharing-economy/the-sharing-economy-report-final.pdf> [https://perma.cc/9XT5-EMC5]; RIFKIN, *supra* note 11, at 310–11; *see also id.* at 16 (predicting "the shrinking of capitalism in the next half-century and the rise of a Collaborative Commons as the dominant model for organizing economic life").

³⁷² Chase, *supra* note 57.

³⁷³ *See* Rampell, *supra* note 56 (suggesting the sharing economy is "no different from traditional commerce").

³⁷⁴ *See* SLEE, *supra* note 55, at 10.

³⁷⁵ *See supra* Section III.B.2. The "sharing economy" may well continue to place some downward pressure on the price of hotel rooms, ground transportation, etc. *See* SLEE, *supra* note 55, at 10. But it does not represent a Free—or even zero-price—alternative.

³⁷⁶ *E.g.*, Arun Sundararajan, *From Zipcar to the Sharing Economy*, HARV. BUS. REV. (Jan. 3, 2013), <https://hbr.org/2013/01/from-zipcar-to-the-sharing-eco> [https://perma.cc/KL76-Y445].

3. *Completing the Dynamic View: Demand as a Moving Target*

The proponents of the Myth of Free frame their position as dynamic and forward looking, in opposition to the static and regressive views held by Free's detractors. Lemley heralds "a raft of new technologies" that will "challenge . . . the basis for our economy as a whole," while noting that "[t]he prospect of that reshaping has caused many to worry."³⁷⁷ Another commentator depicts those experiencing such worry as motivated by a futile retrograde impulse: "1990 isn't going to come back. . . . Trying to protect a system that's now fundamentally broken is like trying to reroute a raincloud to go and thunderstorm over a different town."³⁷⁸ In *Free*, Anderson describes, "[a]t risk of ageist generalization," a generation of "older critics, who ha[ve] grown up with twentieth-century Free" and are wrongly "suspicious" of Free products.³⁷⁹ These "older critics" stand in sharp contrast to the younger "Google Generation," which has "grown up online simply assuming that everything digital is free."³⁸⁰

But those who foresee a coming age of abundance tend to miss—or misunderstand—a crucial element of the dynamic, long-run view: demand is a moving target.³⁸¹ With that element in place, such techno-optimism is revealed as misguided. It is, as those who espouse the Myth of Free rightly recognize, a mistake to view technological innovation solely through the lens of short-run employment effects.³⁸² Gutenberg's invention of the printing press increased unemployment among the trained scribes whose livelihoods depended on demand for handwritten copies.³⁸³ From the static, short-run viewpoint of a scribe,

³⁷⁷ Lemley, *supra* note 17, at 515.

³⁷⁸ Palmer, *supra* note 27, at xvii.

³⁷⁹ ANDERSON, *supra* note 3, at 5.

³⁸⁰ *Id.* This claim is also somewhat at odds with research indicating that "younger consumers . . . [a]re as concerned about privacy as older consumers." STUCKE & GRUNES, *supra* note 39, § 5.14 (citing CHRIS HOOFNAGLE ET AL., HOW DIFFERENT ARE YOUNG ADULTS FROM OLDER ADULTS WHEN IT COMES TO INFORMATION PRIVACY ATTITUDES & POLICIES? (2010), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1589864 [<https://perma.cc/4Z84-KJ6U>]).

³⁸¹ Even a more moderate claim would suffice here—if demand *can be* a moving target, then analysts who ignore that possibility still proceed in error. It may not be the case that innovation (or shifting taste, etc.) causes demand to change in every product market; for present purposes, however, it is enough that innovation et al. *may* do so.

³⁸² See, e.g., James Surowiecki, *Gross Domestic Freebie*, NEW YORKER (Nov. 25, 2013), <http://www.newyorker.com/magazine/2013/11/25/gross-domestic-freebie> [<https://perma.cc/756Q-4DY2>] ("The G.P.S. company Garmin was once one of the fastest-growing companies in the U.S. Thanks to Google and Apple Maps, Garmin's sales have taken a severe hit, but consumers, who now have access to good directions at no cost, are certainly better off.").

³⁸³ See Mike Masnick, *A Fifteenth Century Technopanic About the Horrors of the Printing Press*, TECHDIRT (Feb. 25, 2011, 7:39 PM), <https://www.techdirt.com/articles/20110119/050229127>

Gutenberg's innovation was harmful. From a broader, dynamic perspective, however, overall societal welfare greatly increased, and new types of employment were created to replace the old.

But it is also mistaken to extrapolate a post-scarcity world based on current levels of demand for products as those products are currently configured and delivered.³⁸⁴ To illustrate, consider corn, which Anderson points to as an example of a presently abundant product.³⁸⁵ Beginning in the 1920s, agricultural innovations began to sharply increase annual yield rates of corn.³⁸⁶ With the growth of corn yield rates outstripping population growth—and assuming only then-existing uses for the crop—the end of food scarcity may have seemed in sight.³⁸⁷

Such an approach to forward-looking economic analysis exhibits a fatal flaw: it takes a dynamic view of supply, but a static stance toward demand.³⁸⁸ Increases in corn production have not ended hunger. Instead, an unforeseen innovation—ethanol—dramatically increased demand,³⁸⁹ such that conversion to fuel in 2015–2016 accounted for 38.1% (5.2 billion bushels) of domestic U.S. corn usage.³⁹⁰ Beyond ethanol, corn is now also used to produce plastics, cosmetics, infant

25/fifteenth-century-technopanic-about-horrors-printing-press.shtml [https://perma.cc/KR7X-A9RG].

³⁸⁴ Cf. Jose Cuesta, *Resource Scarcity from an Applied Economic Perspective*, 42 GA. J. INT'L & COMP. L. 11, 18 (2013) (“[T]he critical connection between physical scarcity and marginal returns has been dominated by supply considerations alone. But an economic analysis of scarcity naturally requires a demand angle as well. . . . Scarcity or shortage thus becomes fundamentally an economic circumstance not only determined by physical availability, but also by factors as disparate as logistics and preferences.”).

³⁸⁵ ANDERSON, *supra* note 3, at 47. For another example, consider sand. Christensen and van Bever posit that sand is an “abundant and cheap” resource, and that “[w]e don’t need to account for such inputs and can waste them.” Christensen & van Bever, *supra* note 21, at 64. This viewpoint is likely not shared by those from whose land sand is extracted—in fact, the scarcity of sand has led to widespread ecological damage, government bans on mining, and even murder. Vince Beiser, *The Deadly Global War for Sand*, WIRED (Mar. 26, 2015, 7:00 AM), <http://www.wired.com/2015/03/illegal-sand-mining/> [https://perma.cc/4KJL-BK4H].

³⁸⁶ Brad Plumer, *A Brief History of U.S. Corn, in One Chart*, WASH. POST (Aug 16, 2012), <https://www.washingtonpost.com/news/wonk/wp/2012/08/16/a-brief-history-of-u-s-corn-in-one-chart/> [https://perma.cc/5K3S-2GD5].

³⁸⁷ Perhaps coincidentally, it was in 1930 that Keynes declared the end of scarcity to be within humankind’s reach. JOHN MAYNARD KEYNES, *Economic Possibilities for Our Grandchildren* (1930), in *ESSAYS IN PERSUASION* 358 (Norton Library 1963) (1932).

³⁸⁸ Or perhaps as to supply-side innovation—the two are inextricably intertwined.

³⁸⁹ That demand was increased in part by government subsidies. See *Background*, U.S. DEP’T AGRIC.: ECON. RES. SERV., <http://www.ers.usda.gov/topics/crops/corn/background.aspx> [https://perma.cc/6XK3-LH67] (“Government programs have been instrumental in the development of the . . . fuel alcohol market[.]”).

³⁹⁰ U.S. *Bioenergy Statistics*, U.S. DEP’T AGRIC.: ECON. RES. SERV., <https://www.ers.usda>

diapers, binders in medications, textiles, adhesives, etc.³⁹¹ A holistic dynamic view contemplates demand as a moving target.³⁹²

Digital streaming video has followed a similar trajectory. Rapidly declining bandwidth costs are an integral part of Free's mythology.³⁹³ And Free's mythologists often point to digital streaming video as an example of abundance.³⁹⁴ In 2005, when popular video-sharing service YouTube was launched, the age of bandwidth abundance likely seemed imminent—at least assuming that then-prevailing video resolution and size remained constant over time.

That assumption would have been incorrect. Bandwidth costs have declined, and continue to decline, rapidly over time.³⁹⁵ “[B]ut, importantly, these cost declines are often offset by increases in average video file size, as resolution increases.”³⁹⁶ This dynamic helps to explain why YouTube, despite years of growth, remained unprofitable.³⁹⁷ Much like the development of ethanol increased the demand for corn, the advent of high-definition video increased the demand for bandwidth. The development and diffusion of innovations—3D television, holographic audiovisual content, etc.—will continue this trend.³⁹⁸ Like demand for corn, bandwidth demand is a moving target.

.gov/data-products/us-bioenergy-statistics/us-bioenergy-statistics/ [https://perma.cc/7VLA-ELNH] (last updated Apr. 5, 2018) (Table 5).

³⁹¹ Jared Cummins, *What Is Corn Used for? 13 Surprising Uses of Corn*, COMMODITYHQ (June 24, 2015), <http://commodityhq.com/investing-ideas/13-ways-corn-is-used-in-our-everyday-lives/> [https://perma.cc/DR5C-54P3].

³⁹² Anderson depicts the price effects of ethanol as a temporary impediment to corn's abundance, one that will soon be eliminated by innovation in producing ethanol from other plant matters. ANDERSON, *supra* note 3, at 48. Overlooked in the analysis are the long-run costs imposed by corn production, including the erosion of topsoil and nutrients, pollution, and destruction of native habitats. See MARY HARRIS & GEETHA IYER, *SMALL CHANGES, BIG IMPACTS: PRAIRIE CONSERVATION STRIPS* (2014), <https://www.extension.iastate.edu/alternativeag/info/Small%20Changes%20Big%20Impacts.pdf> [https://perma.cc/W2M7-C5GC] (“[O]ver half of the prairie-built topsoil of Iowa has been lost in the past 50 years, along with nutrient runoff and pollution of waterways.”).

³⁹³ E.g., ANDERSON, *supra* note 3, at 13; RIFKIN, *supra* note 11, at 206.

³⁹⁴ ANDERSON, *supra* note 3, at 195; JEREMY RIFKIN, *THE ZERO MARGINAL COST SOCIETY: THE INTERNET OF THINGS, THE COLLABORATIVE COMMONS, AND THE ECLIPSE OF CAPITALISM* 205–06, 213 (paperback ed. 2015) (calling YouTube an “open Commons”); Lemley, *supra* note 17, at 485–86 (“The rise of sites like YouTube has led to an astonishing outpouring of videos from outside Hollywood . . .”).

³⁹⁵ Blodget, *supra* note 97.

³⁹⁶ *Id.* (emphasis omitted).

³⁹⁷ See *supra* Section II.A.1.a.

³⁹⁸ See Miles O'Brien, *Forget HD—Hologram Television May Be Closer than You Think*, BUS. INSIDER (Oct. 29, 2015, 11:06 AM), <http://www.businessinsider.com/hologram-television-technology-is-near-2015-10> [https://perma.cc/G9H6-EQNZ] (“[T]ransmitting a hologram . . . takes a huge amount of bandwidth and power.”).

In 1930, Keynes published *Economic Possibilities for Our Grandchildren*.³⁹⁹ This short essay predicted that the end of scarcity would arrive within one hundred years; all that was required was a sevenfold increase in the size of the global economy.⁴⁰⁰ Since 1930, though, gross domestic product has risen sixteenfold—and still, scarcity prevails.⁴⁰¹ Keynes turns out to have been pessimistic on growth rates, yet optimistic on the prospect of a post-scarcity society. The culprit is a forecast that was only half dynamic: Keynes failed to account for demand as a moving target. Perhaps it is the case that “[a]fter an initial period of excitement, the average consumer grows accustomed to what he has purchased, and . . . rapidly aspires to own the next product in line.”⁴⁰² At any rate, it is a mistake to view supply and demand separately. Supply-side innovation often triggers increased demand. As a result, a truly dynamic view must account for demand as a moving target, rather than a static constant. Failure to do so results in misguided forecasts of a zero-marginal-cost, post-scarcity society.

IV. THE DANGERS OF MYTHOLOGIZING FREE

Myths matter. Apologist and critic C.S. Lewis describes the human experience of receiving myth: “It is as if something of great moment had been communicated to us.”⁴⁰³ In the same vein, Laura Miller argues that the unique attraction to mythology exists at least in part because myths are “stories that transform the world—and ourselves.”⁴⁰⁴ Myths do not exist in a vacuum. On the contrary, the capacity of myth to change thought and, ultimately, motivate action makes mythology a potent, dynamic part of the social sphere. But the power of myth portends danger as well as delight. As to policy advocacy, where mythos is substituted for logos, the resulting prescriptions will be unsound. And, when implemented, myth-based policies present both serious deontological concerns and the strong likelihood of pernicious (if unintended) consequences.

³⁹⁹ KEYNES, *supra* note 387.

⁴⁰⁰ *Id.* at 363–65.

⁴⁰¹ Elizabeth Kolbert, *No Time*, NEW YORKER (May 26, 2014), <http://www.newyorker.com/magazine/2014/05/26/no-time> [<https://perma.cc/Y63Y-G7CJ>].

⁴⁰² Gary S. Becker & Luis Rayo, *Why Keynes Underestimated Consumption and Overestimated Leisure for the Long Run*, in *REVISITING KEYNES Economic Possibilities for Our Grandchildren* 179, 182 (Lorenzo Pecchi & Gustavo Piga eds., 2008).

⁴⁰³ C.S. LEWIS, *AN EXPERIMENT IN CRITICISM* 44 (1961).

⁴⁰⁴ Laura Miller, *Why Myths Still Matter*, SALON (Nov. 16, 2005, 8:00 AM), http://www.salon.com/2005/11/16/myths_4/ [<https://perma.cc/H9YX-V8XY>].

The Myth of Free poses at least three such dangers. First, and most concretely, judicial and regulatory institutions have already granted a unique protected (i.e., either immunized or advantaged) status to suppliers of Free products. But that protected status, based in myth instead of reality, is undeserved. As such, it constitutes an unwarranted deviation from the relevant rules, thereby undercutting fundamental tenets of modern legal traditions and the rule of law. It also inefficiently distorts natural market competition, thereby reducing societal welfare.

Second, prominent economists have argued that the market paradigm is inappropriate in the face of Free products. But even if markets are not an optimal distributive mechanism, arguments attempting to discredit them should be based in fact, rather than myth. Third, leading legal scholars have urged the explicit reshaping—or even elimination—of entire legal regimes in response to the Myth of Free. Yet, at least assuming those regimes currently yield some net value to society, their alteration or elimination would decrease societal welfare. Fourth, governments responding to the Myth of Free may more broadly shape national or international policies in anticipation of an age of abundance that is (supposedly) either already upon us or soon to arrive—despite the impossibility of “Free” ever becoming true Free. That misguided focus, particularly when coupled with the techno-deterministic sense of inevitability that often accompanies the Myth of Free,⁴⁰⁵ would almost certainly cause institutional actors to neglect the persistent scarcity faced by vast populations.

A. *Granting an Undeserved “Protected Status”*

In a variety of contexts, U.S. legal institutions have impliedly or expressly granted a unique protected status to suppliers of Free products. The following discussion comprises two parts. The first is purely descriptive; it identifies several areas of law wherein a Free-based protected status has been granted. The second is normative; it evaluates whether that protected status is justified as a policy matter.⁴⁰⁶

The common law of contracts yields multiple examples of Free-based protected status. Courts adjudicating breach of contract claims

⁴⁰⁵ See, e.g., Palmer, *supra* note 27, at xvii; cf. MATTHEW B. CRAWFORD, *THE WORLD BEYOND YOUR HEAD: ON BECOMING AN INDIVIDUAL IN AN AGE OF DISTRACTION* 221 (2015) (referring to “techno-inevitability” as “a readiness to regard technology as a force with its own magical imperatives, rather than as an instrument of human intentions”).

⁴⁰⁶ This Article takes the position that “judges, like their counterparts in the legislative branch, are political agents embodying social policy in law.” Paul v. Nat’l Life, 352 S.E.2d 550, 551 (W. Va. 1986).

have repeatedly placed a thumb on the scales in favor of Free suppliers. This favorable treatment, granted by sole virtue of the fact that those firms were supplying Free products, has comprised both rejecting unconscionability defenses and enforcing exculpatory clauses.

In *Darnaa, LLC v. Google, Inc.*,⁴⁰⁷ for example, a district court placed great weight on the fact that the defendant offered a Free service.⁴⁰⁸ *Darnaa* involved a breach of contract claim against YouTube. The plaintiff, an independent record label, alleged that it had uploaded a music video to YouTube's platform after agreeing to YouTube's terms of service, and that YouTube breached that agreement by later removing the video.⁴⁰⁹ In response to Google's motion to dismiss, the plaintiff raised the defense of unconscionability.⁴¹⁰ The district court granted Google's motion, holding that "[b]ecause YouTube offers its hosting services *at no charge*, it is reasonable for YouTube to retain broad discretion over those services and to minimize its exposure to monetary damages."⁴¹¹

In *Song Fi, Inc. v. Google Inc.*,⁴¹² which involved a similar factual background, the court likewise rejected a plaintiff's unconscionability defense.⁴¹³ The court, quoting the defendant's brief, stated that "[t]he provisions . . . in the Terms of Service 'make it possible for YouTube to provide video hosting services for free to hundreds of millions of users around the world.'"⁴¹⁴ Thus, the court concluded, "[h]aving taken advantage of YouTube's free services, Plaintiffs cannot complain that the terms allowing them to do so are unenforceable."⁴¹⁵

Turning to the enforceability of exculpatory clauses, *Lewis v. YouTube, LLC*⁴¹⁶ provides another instance of favorable treatment for a Free supplier.⁴¹⁷ There, the defendant's contract contained a blanket limitation of liability for "loss or damage of any kind" incurred as a result of using the defendant's Free service.⁴¹⁸ Again, the

⁴⁰⁷ No. 15-cv-03221-RMW, 2015 WL 7753406 (N.D. Cal. Dec. 2, 2015).

⁴⁰⁸ *Id.* at *2–3, *5.

⁴⁰⁹ *Id.* at *1.

⁴¹⁰ *Id.* at *2 ("Specifically, plaintiff points to the terms that 1) grant defendants discretion over content and services, 2) limit defendants' liability, and 3) shorten the statutory limitations period for claims, as unconscionable.").

⁴¹¹ *Id.* at *3 (emphasis added).

⁴¹² 72 F. Supp. 3d 53 (D.D.C. 2014).

⁴¹³ *Id.* at 61.

⁴¹⁴ *Id.* at 64 (quoting Def. Mem. 11).

⁴¹⁵ *Id.*

⁴¹⁶ 197 Cal. Rptr. 3d 219 (Ct. App. 2015).

⁴¹⁷ *Id.* at 224.

⁴¹⁸ *Id.*

court granted a motion to dismiss, reasoning that “[l]imitation of liability clauses . . . are appropriate when one party *is offering a service for free* to the public.”⁴¹⁹

Consumer-protection and privacy laws are another area in which Free suppliers have received protected legal status. In *In re Facebook Privacy Litigation*,⁴²⁰ users sued the Free social-networking service Facebook, alleging that Facebook had violated state consumer protection laws by sharing users’ personal information with third-party advertisers.⁴²¹ The district court first dismissed claims based on California’s Unfair Competition Law (“UCL”) reasoning that “[b]ecause Plaintiffs allege that they received Defendant’s services *for free*, as a matter of law, Plaintiffs cannot state a UCL claim.”⁴²² The court then went on to dismiss claims based on California’s Consumers Legal Remedies Act (“CLRA”): because “[a] violation of the CLRA may only be alleged by a consumer,” it followed that “it is not possible for Plaintiffs to state a claim pursuant to the CLRA.”⁴²³

Antitrust law yields additional illustrations. In the wake of the Telecommunications Act of 1996,⁴²⁴ the U.S. Department of Justice (“DOJ”) reviewed dozens of mergers and acquisitions involving broadcast radio markets.⁴²⁵ Yet “the DOJ considered their economic impact solely with respect to advertisers and the rates they paid,” neglecting to consider the impact to listeners.⁴²⁶ More overtly, a district court dismissed a tying claim that involved online search, holding that a “tying arrangement cannot exist when the tying product is not sold to the consumer, but is provided free of charge.”⁴²⁷

These departures from rules of general applicability are unwarranted. “The principle of ‘treating like things alike’ is ‘an idea of great resonance for law (equal justice under law, equal protection of the

⁴¹⁹ *Id.* (emphasis added).

⁴²⁰ 791 F. Supp. 2d 705 (N.D. Cal. 2011).

⁴²¹ *Id.* at 714.

⁴²² *Id.* at 715 (emphasis added).

⁴²³ *Id.* at 717.

⁴²⁴ Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified as amended in scattered sections of 47 U.S.C.).

⁴²⁵ See Maurice E. Stucke & Allen P. Grunes, *Why More Antitrust Immunity for the Media Is a Bad Idea*, 105 Nw. U. L. REV. 1399, 1411 (2011).

⁴²⁶ See *id.*; see also Newman, *supra* note 184, at 191. Under one view, this neglect was due more to DOJ recognizing its institutional inability to analyze Free markets with the desired level of precision than to DOJ embracing the Myth of Free. Of course, from a consequentialist perspective, the distinction would be immaterial.

⁴²⁷ *Stephen Jay Photography, Ltd. v. Olan Mills, Inc.*, 903 F.2d 988, 991 (4th Cir. 1990), *aff’d* 713 F. Supp. 937 (E.D. Va. 1989).

laws, equality before the law, one law for rich and poor, and so forth).’”⁴²⁸ Deviations from that ideal violate a “fundamental sense of justice.”⁴²⁹ Thus, for example, Justice Scalia observed that “[t]he Equal Protection Clause epitomizes justice more than any other provision of the Constitution.”⁴³⁰

Immunity from general laws, it follows, ought to be granted only where some competing policy consideration provides overwhelming justification for doing so. It goes nearly without saying that any such justification ought to be grounded in fact, not in falsehood.⁴³¹ Yet the protected status for Free suppliers is based not in reality, but upon the Myth of Free. Contrary to the *Lewis* court’s understanding, YouTube does not, in fact, offer its services “for free to the public.”⁴³² YouTube offers its services to the public in exchange for licenses to display and distribute users’ video content⁴³³ and for viewers’ attention to advertisements.⁴³⁴ A blanket waiver of liability may well be appropriate for a charitable organization that is, in fact, offering a service “for free to the public,” because in at least some settings, such an organization will take in no direct revenues to offset its potential liability. But YouTube is subject to no such limitation; it reaps billions of dollars in annual revenues as a direct result of its exchanges with users and viewers.⁴³⁵ Likewise, there is no principled reason to grant de facto antitrust immunity to for-profit broadcast radio suppliers but not (for example) to for-profit satellite radio suppliers—a lessening of competition may harm listeners in either type of market.⁴³⁶

Moreover, such special treatment necessarily advantages certain firms over others. Legal institutions that grant an undeserved protected status to Free suppliers thus disrupt the natural functioning of

⁴²⁸ Newman, *supra* note 111, at 58 (quoting RICHARD A. POSNER, *THE PROBLEMS OF JURISPRUDENCE* 42 (1990)).

⁴²⁹ Antonin Scalia, *The Rule of Law as a Law of Rules*, 56 U. CHI. L. REV. 1175, 1178 (1989).

⁴³⁰ *Id.*

⁴³¹ It is worth noting that the argument here depends for additional force on a classically conservative attitude toward existing regulatory regimes.

⁴³² *But see* *Lewis v. YouTube, LLC*, 197 Cal. Rptr. 3d 219, 224 (Ct. App. 2015).

⁴³³ *See Terms of Service*, YOUTUBE, <https://www.youtube.com/static?template=terms> [<https://perma.cc/XXW9-KSVM>].

⁴³⁴ *See YouTube Advertising*, YOUTUBE, <https://www.youtube.com/yt/advertise/> [<https://perma.cc/6KNY-5KQ9>].

⁴³⁵ Sam Gutelle, *Report: YouTube Generated \$4 Billion in Revenue in 2014*, TUBEFILTER (Feb. 26, 2015), <http://www.tubefilter.com/2015/02/26/youtube-2014-revenue-four-billion/> [<https://perma.cc/9CVK-3AS3>].

⁴³⁶ *See* Newman, *supra* note 111, at 58–59.

the marketplace with no normative justification. As a result, that status will produce suboptimal economic outcomes.

Exceptions to general rules are sometimes justified. But where the sole justification in support of a protected status is the Myth of Free, that status is unwarranted. Granting certain suppliers favorable legal treatment based on the incorrect premises described above undercuts the rule of law and unjustifiably distorts the natural functioning of markets, thereby reducing societal welfare.⁴³⁷

B. Overlooking the Ongoing Need for Markets

Policy proposals grounded in the Myth of Free are similarly misguided. In 2001, economists Brad DeLong and Larry Summers published an article grappling with the “meaning and importance of the ‘new economy.’”⁴³⁸ The article’s tone is guardedly optimistic;⁴³⁹ the analysis begins with the fundamental proposition that “[h]igh initial fixed costs and low, even zero, marginal costs pose difficult questions but also open up enormous opportunities for economic policy.”⁴⁴⁰ That endorsement of true zero marginal costs makes the article an early exemplar of the Myth of Free informing policy discussions.⁴⁴¹

DeLong and Summers point to markets exhibiting a combination of “[h]igh initial fixed costs and low, even zero, marginal costs” as tending toward monopoly.⁴⁴² But the inherent inefficiency of monopoly, the unsustainability of long-run marginal cost pricing, and the authors’ reluctance to “[r]ely[] on government subsidies to cover fixed set-up costs” combine to force a radical conclusion: “[I]t is clear that the competitive paradigm cannot be fully appropriate.”⁴⁴³ In short, DeLong and Summers springboard from endorsing the Myth of Free to calling for the end of free markets. And, while that appeal was framed prescriptively, subsequent analysts have made the obvious

⁴³⁷ See *id.* at 58–61.

⁴³⁸ DeLong & Summers, *supra* note 4, at 29.

⁴³⁹ In at least one respect, however, it appears to have been overly optimistic: DeLong and Summers predicted annual U.S. productivity growth rates of 3%–4%, *id.* at 30–31, well above the observed rates in subsequent years. See, e.g., Roberto Cardarelli & Lusine Lusinyan, *U.S. Total Factor Productivity Slowdown: Evidence from the U.S. States* (Int’l Monetary Fund, Working Paper No. 15/116, 2015), <https://www.imf.org/external/pubs/ft/wp/2015/wp15116.pdf> [<https://perma.cc/N5TT-2UKZ>].

⁴⁴⁰ DeLong & Summers, *supra* note 4, at 48.

⁴⁴¹ See, e.g., RIFKIN, *supra* note 11, at 7–9 (discussing DeLong and Summers’s article).

⁴⁴² DeLong & Summers, *supra* note 4, at 48–49; see also *id.* at 34 (“The canonical situation is more likely to be one of natural monopoly.”).

⁴⁴³ *Id.* at 34.

leap to descriptivism: under this view, Free does not *warrant* the end of markets; Free *is* the end of markets.⁴⁴⁴

Consider the descriptive variation of this argument first. As the foregoing demonstrates, the marginal costs of the digital products that underlie the “New Economy” are not—and cannot reach—zero.⁴⁴⁵ Free products do not represent the end of markets, nor do they represent the end of capitalism. As to the prescriptive argument, the market system, subject to regulatory corrections of true failures, has become and remains the dominant means of distribution in developed economies.⁴⁴⁶ An alternative structure would represent a drastic deviation from the status quo, and would entail substantial societal costs in the form of uncertainty and upheaval. Any calls for the adoption of such a structure ought to present a clear accounting of such costs, as well as a compelling, reality-based demonstration that the benefits would outweigh those costs. To date, no such reality-based account has emerged. The Myth of Free does not—and should not—mean the end of markets.

C. *Overlooking the Ongoing Need for Market Interventions*

Contemporary technology discourse legitimizes not the intervention of the state in the economy but instead its withdrawal; not the external managing of the market, but the need of politics to let the market self-regulate.

—Eran Fisher⁴⁴⁷

The Myth of Free also underlies policy proposals that call for the relaxation—or outright elimination—of regulatory market interventions. The basic logic is straightforward: true Free eliminates the need for markets. Where resources become abundant, there is no need for a market mechanism to facilitate efficient allocation—and therefore no need for regulatory interventions into marketplace structure and functioning.

⁴⁴⁴ See RIFKIN, *supra* note 11, at 9 (arguing that capitalism will occupy a small sphere in the “Zero Marginal Cost Society”).

⁴⁴⁵ See *supra* Sections II.A, II.B.

⁴⁴⁶ See generally ELEANOR M. FOX, CASES AND MATERIALS ON U.S. ANTITRUST IN GLOBAL CONTEXT 1 (3d ed. 2012) (“In 1989 and the early 1990s came the collapse of Russian communism, the fall of the Berlin Wall, liberalization of economies from Chile to Indonesia, and the Washington Consensus (economic liberalization and free markets as the major means to economic recovery and well being).”).

⁴⁴⁷ ERAN FISHER, MEDIA AND NEW CAPITALISM IN THE DIGITAL AGE: THE SPIRIT OF NETWORKS 79 (2010).

In their analyses of a predicted (or possible) post-scarcity world, legal scholars have focused on the ramifications for particular legal fields: IP and antitrust (or “competition”) laws. As to both, calls have been made for fundamental alterations to, if not outright elimination of, these laws. Such calls are, however, misguided.

As to IP laws, Lemley foresees that “in a post-scarcity world, high-cost products will increasingly become the exception, not the norm. They will be islands of IP-driven content in a sea of content created without the need for IP.”⁴⁴⁸ Analysts previously made similar (though narrower) claims as to copyright (a subset of IP), arguing that the convergence of digitization and the internet made content “free” to reproduce and distribute.⁴⁴⁹ Lemley conceives of a raft of newer technologies making physical products similarly “free,” with correspondingly broader implications for all of IP.⁴⁵⁰

Notably, even this post-scarcity world is, in fact, only a *partially* post-scarcity world, with certain markets continuing to exhibit high costs. And the normative conclusions are similarly circumspect: as to those markets that achieve abundance (i.e., those markets that, “like search engines[,] . . . enable access . . . for free”⁴⁵¹), Lemley does not call for the abolishment of existing IP laws. Instead, practical solutions offered include “resist[ing] the tendency to expand IP reflexively to meet every new technological challenge,”⁴⁵² declining to allow IP owners to destroy or modify new technologies,⁴⁵³ and facilitating creators’ ability to opt out of IP systems if desired.⁴⁵⁴

Yet the argument could easily be co-opted by those predisposed to favor the complete abolition of IP laws. Calls for such widespread dismantling of current IP regimes increased in number and volume since the advent of digitization and the internet⁴⁵⁵—the same developments that supposedly birthed Free. Indeed, as early as 2002, one scholar drew upon the Marginalist Premise (“effectively zero” margi-

⁴⁴⁸ Lemley, *supra* note 17, at 506.

⁴⁴⁹ See, e.g., Newman, *supra* note 70.

⁴⁵⁰ See Lemley, *supra* note 17; see also Deven R. Desai & Gerard N. Magliocca, *Patents, Meet Napster: 3D Printing and the Digitization of Things*, 102 GEO. L.J. 1691, 1691 (2014).

⁴⁵¹ Lemley, *supra* note 17, at 461.

⁴⁵² *Id.* at 507.

⁴⁵³ *Id.* at 508.

⁴⁵⁴ *Id.* at 510.

⁴⁵⁵ See, e.g., MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* 6 (2005), <http://levine.sscnet.ucla.edu/general/intellectual/against.htm> [<https://perma.cc/754F-SMDQ>].

nal costs of digital distribution and reproduction)⁴⁵⁶ to conclude that “most artists may in fact be far better off in a world without copyright.”⁴⁵⁷

As to competition law, Salil Mehra proposes a vital—though implicitly temporary—role for antitrust law.⁴⁵⁸ Under this view, “we need antitrust for the transition” from the familiar “economy of scarcity to the predicted post-scarcity world.”⁴⁵⁹

Mehra carefully stakes out a position on the descriptive likelihood of a post-scarcity world that is more conservative than Lemley’s,⁴⁶⁰ but the ramifications posited for competition law are more fundamental. Noting that dominant incumbent firms (and policymakers with whom those firms share their rents) are incentivized to restrict innovation,⁴⁶¹ Mehra calls for antitrust enforcement to play a strong role—but, it appears, only in facilitating the transition to a post-scarcity society.⁴⁶² The necessary implication is that, once full abundance appears, competition law becomes unnecessary.

Others have—invoking the tropes of the Myth of Free—called explicitly for the antitrust enterprise to grant protected status to suppliers of Free products. Robert Bork, for example, argued against antitrust oversight of Free online search providers: “There is no coherent case for monopolization because a search engine, like Google, is free to consumers”⁴⁶³ Manne and Wright make a similar claim: “From the point of view of the buyers . . . , these [internet] monopolists are really pathetic at extracting profits, as most of them give away their products for free”⁴⁶⁴ Others would extend this leniency to social-networking websites.⁴⁶⁵ Such claims continue unabated.⁴⁶⁶

⁴⁵⁶ See Raymond Shih Ray Ku, *The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology*, 69 U. CHI. L. REV. 263, 274 (2002).

⁴⁵⁷ *Id.* at 311.

⁴⁵⁸ See Mehra, *supra* note 17, at 6.

⁴⁵⁹ *Id.*

⁴⁶⁰ See *id.* at 5. Predicting the actual likelihood of a post-scarcity world is beyond the scope of Mehra’s thesis, which assumes abundance and proceeds accordingly.

⁴⁶¹ *Id.* at 15–21, 32–35 (describing as examples Apple’s conduct at issue in the *eBooks* antitrust litigation and taxi monopolies’ behavior toward Uber).

⁴⁶² *Id.* at 6.

⁴⁶³ Robert H. Bork, *Antitrust and Google*, CHI. TRIB. (Apr. 6, 2012), http://articles.chicagotribune.com/2012-04-06/opinion/ct-perspec-0405-bork-20120406_1_unpaid-search-results-search-engines-search-algorithms [<https://perma.cc/Q78A-EVZB>].

⁴⁶⁴ Manne & Wright, *supra* note 229.

⁴⁶⁵ See, e.g., Catherine Tucker & Alexander Mathews, *Social Networks, Advertising, and Antitrust*, 19 GEO. MASON L. REV. 1211, 1211 (2012) (“[I]t is not clear that [such networks’] extraordinary growth has created an antitrust issue. . . . [C]onsumers do not pay for using these services on most social networking sites.”).

⁴⁶⁶ See, e.g., Tucker & Mathews, *supra* note 465.

Calls for the elimination of IP and competition law are not new. The danger here is that the Myth of Free lends greater—though unwarranted—rhetorical force to such arguments. As discussed above, true zero-cost Free is impossible.⁴⁶⁷ A fortiori, there is strong reason to doubt that even actual, advertising-supported Free will expand infinitely.⁴⁶⁸

Both competition and IP laws ought to continue to play a role in Free markets, at least to the extent such laws are justified as a broader normative matter. Put another way, the Myth of Free should not motivate the abolition of market regulations. So long as costs persist, providers must recoup them somehow. Certain types of suppliers may contribute some types of labor without direct monetary compensation, whether for social, intrinsic, or other motivations⁴⁶⁹—but the need for infrastructure, coupled with the advantages that inhere in division of labor, demand an intermediary.⁴⁷⁰ That intermediary must recoup its costs. As a result, so long as the dominant form of cost recoupment remains the marketplace, antitrust and (more arguably) IP laws⁴⁷¹ continue to have a congressionally mandated role to play vis-à-vis such intermediaries. And as to non-socially motivated suppliers, the theoretical justifications for both antitrust and (as Lemley agrees)⁴⁷² IP laws remain in place.

As the foregoing analysis indicates, idealized, zero-cost Free is impossible.⁴⁷³ Calls for the partial or total elimination of IP or anti-

⁴⁶⁶ See, e.g., Tyler Cowen, *Yesterday's Antitrust Laws Can't Solve Today's Problems*, BLOOMBERG (Oct. 5, 2016, 8:30 AM), <https://www.bloomberg.com/view/articles/2016-10-05/yesterday-s-antitrust-laws-can-t-solve-today-s-problems> [https://perma.cc/2WM3-25VX] (“The major internet companies are a new target of antitrust attention, yet most of them give their main product away for free.”).

⁴⁶⁷ See *supra* Part II; see also Mossoff, *supra* note 191, at 973 (“Of course, contrary to conventional wisdom about the Internet, digital distribution of millions of scholarly articles published year after year is not free” (footnote omitted)).

⁴⁶⁸ See *supra* Section III.B.1.

⁴⁶⁹ See Lemley, *supra* note 17, at 488–96 (positing a number explanations for creative outputs being offered at zero prices).

⁴⁷⁰ See, e.g., Frischmann, *supra* note 160; *supra* Sections III.A.2, IV.B.2.

⁴⁷¹ There is a robust scholarly debate over whether copyright law in particular does or should incentivize only the creation of expressive works, or also the dissemination of such works. Compare Wendy J. Gordon, *The Core of Copyright: Authors, Not Publishers*, 52 HOUS. L. REV. 613 (2014) (creators only), with Jonathan M. Barnett, *Copyright Without Creators*, 9 REV. L. & ECON. 389 (2013) (intermediaries and infrastructure for dissemination). Even Gordon admits, however, that the U.S. Supreme Court has repeatedly indicated that the latter is a legitimate aim. See Gordon, *supra*, at 613–18.

⁴⁷² Lemley, *supra* note 17, at 503 (“The IP laws will continue to exist, and they will provide a necessary incentive for some forms of creativity.”).

⁴⁷³ See *supra* Part II.

trust laws that are predicated on the (supposed) realistic possibility of a zero-marginal-cost society are fundamentally flawed. At least assuming that such laws carry net social benefits as currently constituted,⁴⁷⁴ the Myth of Free ought not bring about their demise.

Looking forward, the Myth of Free may also yield policy proposals that call for governments to decline to regulate nascent technologies that seem to—but do not in fact—offer Free products. Silicon Valley adopts the rhetoric of Free with verve, adopting slogans like “It’s free and always will be”⁴⁷⁵ or neologisms like “ridesharing” that imply free-as-in-*gratis* interactions.⁴⁷⁶ But the bulk of these new products are not “genuinely gratis,” despite claims to the contrary.⁴⁷⁷ Because they are delivered via exchanges that are structurally similar to those involving traditional, positive-price products, it would be a mistake—for similar reasons as noted above concerning Free’s protected status⁴⁷⁸—to adopt policies that are unduly deferential to Free suppliers.

D. Failing to Confront the Persistence of Scarcity

Paeans to the Myth of Free often neglect addressing the persistent problems of scarcity: poverty; hunger; lack of access to shelter, clean water, or healthcare; etc. DeLong and Summers provide an early exception, noting that technology-driven “remarkable opportunities” are not equally available to all individuals.⁴⁷⁹ But, after proposing widespread price discrimination as a solution to distributional con-

⁴⁷⁴ This is, to be sure, an assumption not universally shared.

⁴⁷⁵ FACEBOOK, <https://www.facebook.com> [<https://perma.cc/6DAB-KEVQ>] (“Sign Up: It’s free and always will be.”).

⁴⁷⁶ Rampell castigates this rhetorical ploy:

At its most benign, calling things “sharing” that are actually no different from traditional commerce is just empty marketing. It might also crowd out other activities that used to be done for altruistic purposes (like donating your old clothes to Goodwill rather than selling them on the Internet, or offering a friend a ride to the airport instead of charging for the service).

But more perniciously, this semantic sleight of hand has been used to justify tax evasion and other kinds of law-skirting. Of course you shouldn’t have to pay hotel taxes if you’re just “sharing” your home! And of course you shouldn’t have to submit to health-department restaurant inspections if you’re just “sharing” your kitchen with paying customers every night! Or get a taxi medallion or commercial insurance if you’re just “sharing” your car!

Rampell, *supra* note 56.

⁴⁷⁷ See ANDERSON, *supra* note 3, at 3.

⁴⁷⁸ See *supra* Section IV.A.

⁴⁷⁹ DeLong & Summers, *supra* note 4, at 49.

cerns,⁴⁸⁰ the discussion turns quickly to “[t]he most critical issues”: “those that revolve around intellectual property.”⁴⁸¹ Others decline even this passing nod to scarcity and attendant distributional issues.⁴⁸²

Yet, “[a]s most of us know, many Americans live with poverty or financial scarcity.”⁴⁸³ Children and groups that have experienced systemic discrimination are particularly likely to experience poverty.⁴⁸⁴ Among the fifty largest U.S. cities, five exhibited child-poverty rates in 2013 that exceeded forty percent; none exhibited rates below twelve percent.⁴⁸⁵ These figures obtain in the United States, despite its status as one of the world’s wealthiest nations.⁴⁸⁶

Poverty is a wickedly complex issue. In response, the Myth of Free posits a simple cause (scarcity) and a simple solution (abundance). Indeed, the solution has supposedly arrived already, or is at least soon to arrive, in the form of the “Zero Marginal Cost Society.”⁴⁸⁷ Here, the proponents of the Myth of Free fall into the trap of what some call “solutionism”⁴⁸⁸: the tendency to extol technology—and the internet in particular—as the simple answer to “all the world’s problems.”⁴⁸⁹

As a result, Free-based policy decisions will almost certainly cause policymakers to allocate scarce resources in ways that fail to address the persistence of scarcity. Such misdirected policies will cause particular harm, either directly or indirectly, to disadvantaged populations. More broadly, the resulting allocative inefficiency harms

⁴⁸⁰ *Id.* at 50–51.

⁴⁸¹ *Id.* at 51.

⁴⁸² See, e.g., ANDERSON, *supra* note 3, at 189 (positing “a world where food, shelter, and the rest of Maslow’s subsistence needs are met without having to labor in the fields from dawn to dusk”).

⁴⁸³ Nathalie Martin, *Survival in the Face of Scarcity: The Undocumented Immigrant Experience*, 58 ARIZ. L. REV. 103, 104 (2016).

⁴⁸⁴ *Id.* at 104–05.

⁴⁸⁵ *Thirty-Five Largest U.S. Cities Saw Increase in Child Poverty Rate Between 2005 and 2013*, ANNIE E. CASEY FOUND. (Sept. 22, 2014), <http://www.aecf.org/blog/thirty-five-largest-us-cities-saw-increase-in-child-poverty-rate-between/> [<https://perma.cc/F4V9-D2DK>].

⁴⁸⁶ Rani Singh, Opinion, *The World’s Richest Countries*, FORBES (Nov. 8, 2015, 8:50 PM), <http://www.forbes.com/sites/ranisingh/2015/11/08/new-study-finds-a-better-way-to-measure-the-worlds-richest-countries/#317710fb6b82> [<https://perma.cc/6LQR-2X3T>].

⁴⁸⁷ See, e.g., RIFKIN, *supra* note 11, at 9.

⁴⁸⁸ E.g., Evgeny Morozov, Opinion, *The Perils of Perfection*, N.Y. TIMES (Mar. 2, 2013), <http://www.nytimes.com/2013/03/03/opinion/sunday/the-perils-of-perfection.html> [<https://perma.cc/39ED-LB7D>].

⁴⁸⁹ Eric Schmidt, Address at Zeitgeist Americas 2012: The World Around Us (October 2012), <http://transcriptvids.com/v/kUHF43xjMJM.html> [<https://perma.cc/P79L-4RD7>] (speculating that, for example, Google’s language-translation service may end the prospect of “wars, conflicts, prejudices, and so forth”).

societal welfare. The allocation of scarce resources—“[a] crucial task for any community”⁴⁹⁰—is optimally guided not by myth, but by reality. In light of the very real problems of scarcity, devoting resources to the predicted transition to an age of abundance is indefensible.⁴⁹¹

CONCLUSION

Myths can offer value to society.⁴⁹² And, in a vacuum, the Myth of Free would give little cause for concern. Yet when it becomes the basis for political and legal decisions, its premises take a pernicious turn. The Myth of Free may offer an optimistic, even utopian vision of the future, but that vision remains nothing more than a mirage. What is needed going forward are not systems designed for an illusory age of abundance, but realistic prescriptions designed to confront head on the persistent problems attendant to scarcity.

⁴⁹⁰ Ofer Grosskopf, *Protection of Competition Rules via the Law of Restitution*, 79 TEX. L. REV. 1981, 1983 (2001).

⁴⁹¹ Again, the present normative argument is consequentialist, *see supra* Introduction, and rests upon a fairly standard economic conception of societal welfare. That is not to say, however, that misdirecting resources in this manner is suboptimal only from a welfarist perspective—it may well also be morally wrong. *See generally* Maurice E. Stucke, *Morality and Antitrust*, 2006 COLUM. BUS. L. REV. 443, 489 (“At her noblest level, a virtuous individual exercises [rational choice and moral deliberation] for its own sake, for spiritual reasons, or to attain true happiness.”).

⁴⁹² David Crump, *Ten Necessary Myths of Law School*, 10 J.L. SOC'Y 33, 33 (2009) (“Myths are important to a society. They produce cohesion, as well as tolerance of dysfunction.”).