Addictive Technology and its Implications for Antitrust Enforcement

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1 Introduction

In recent years many lawmakers, researchers, public health officials, and policy experts have expressed concern about the impact of digital interactive technology on individual and societal welfare. This technology, which includes both hardware (fixed and mobile devices), and software (most notably social media platforms) has captured an ever-increasing level of human engagement in the United States, in part by leveraging human attentional and affective systems in a manner designed to maximize profit according to their business models. This precipitous rise in technological engagement in the United States and abroad has been hypothesized to broadly negatively impact human wellbeing in terms of mental health and impaired cognition. This occurs through disruption of neural systems regulating, among other things, attention and affect.

While digital platforms such as social media websites are, on the surface, somewhat different from addictive products such as tobacco and opiate-derived pain medications, they meet the core criteria needed to justify regulation. The stimuli produced by digital platforms are not physical substances consumed by the body such as recreational and prescribed drugs, however, their effects on the brain follow the same common pathway of reward through the nucleus accumbens, which in turn regulates pathways of addiction. This commonality is clearly evident in the way by which platforms seek to utilize principles of variable rewards schedules and content filtering to maximize the disutility of non-use (aka craving) that leads to further use. Furthermore, these platforms have been shown to be harmful when consumed in excess, particularly by vulnerable populations. Finally, while the negative effects of these platforms are at the moment measured as smaller than those of cigarettes or opiates when consumed in excess, we do not yet have the benefit of decades of observation and research, particularly on products which are, in many instances, consumed at a rate of up to 20-30 percent of an adolescent's waking hours, a scale scarcely encountered in human history. Given the enormous quantity of social media being consumed by today's consumers, it would not take a very large 'per unit' effect to create substantial harm to users.

Because the evidence that these technologies are harmful is recent (the

last 15 years) US lawmakers regulators have not yet limited the actions of digital providers. Firms that make other products that can harm human health such as prescription drugs and tobacco have existed for so long that even late-arriving regulation has been in place for decades. Firms that sell products that can damage consumers economically such as gambling and credit cards have also been regulated, though more recently. We develop the analogy between current digital businesses and the way they exploit consumers' behavioral biases - in particular their addictive qualities - to the reasons why prescription drugs and credit cards were regulated in years past. In the absence of regulation of these substances, it is likely that oxycontin, tobacco and other similar substances would be abused and more generally overused by many consumers, as both are addictive and harmful to health. Likewise, in the absence of regulation, more consumers would enter bankruptcy due to accumulated credit card and gambling debt. In a world with no regulation of those addictive products, an action by a company that caused more consumption of oxycontin or credit cards by the addicted consumers would often harm, rather than benefit, those consumers. Importantly, the products we consider can both increase or decrease consumer welfare. An oxycontin consumer can be an otherwise healthy 70-year-old who is post-operative and is using the medication briefly under the direction of a physician. Alternatively, a consumer could be addicted to oxycontin and consume it at harmful levels. Without regulation, consumers of oxycontin and other addictive drugs would not be protected from harm by the FDA, a physician, or limited access to the product at retail. This, we argue, is the situation with a number of popular digital media services in the US today.

The lack of digital regulation in the US has a profound consequence for antitrust enforcement of digital platforms because the law must evaluate the impact of conduct on consumer welfare. When products are addictive, platform strategies may be purposefully designed to take advantage of that weakness, and the behavioral biases of consumers more generally.[1] Addiction is one such strong behavioral bias that has been studied in the eco-

1. The UK Competition and Markets Authority has found evidence that "platforms' choice architecture, something designed by the company, may exacerbate natural consumer biases." See Competition and Markets Authority, *Online Platforms and Digital Advertising* (2020), `https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study`, Final Report pages 194-210, in addition to Appendix Y which focuses on choice architecture (i.e. content presentation) and consumer behavior.

nomics literature for decades, as least since the pioneering work of Gary Becker.[2] A correct antitrust analysis of consumer welfare when consumer actions are driven by behavioral biases cannot use only old neoclassical tools, but rather requires incorporating insights from behavioral economics. Accurately assessing consumer welfare is foundational for antitrust policy and enforcement. Many scholars believe that the goal of antitrust should be to protect consumers from higher prices, lower quality, and less innovation that comes from anticompetitive conduct.[3] And courts in the US have generally adopted this perspective. While a standard concept in antitrust, consumer welfare becomes a much more complex and nuanced object when the market in question includes addictive products. That literature explains why a consumer may be able to forecast that she will receive net harm from the product and consume it nonetheless. In this construct, welfare is tied to the "long run self," whereas choices are often made by the "short run self" that later the consumer regrets, as in settings like addiction. We will return to these concepts below.

US antitrust laws prohibit mergers that tend to lessen competition and "monopolization," which is unilateral conduct that harms competition and does not represent competition on the merits. These types of conduct are illegal when and because they harm competition and consumers. At a technical level, we evaluate harm to consumers by its impact on consumer welfare. This value is measured conceptually as the area under the demand curve (which incorporates quality and innovation) and above price. Because calculating consumer welfare can be difficult, a common shortcut, or summary statistic, that is often used in antitrust enforcement and litigation is the change in output. If output in a market rises because of the conduct at issue, then consumer welfare is considered to have risen also.[4] This is because, if nothing else changed, then an increase in quantity consumed must occur because either the price of the good fell, so consumers wanted more, or the quality

2. Gary Becker and Kevin Murphy, "A Theory of Rational Addiction," *Journal of Political Economy* 96, no. 4 (1988): 675–700, doi:10.1086/261558.

3. Though recently there is dispute about this point. See Lina Khan, "The New Brandeis Movement: America's Antimonopoly Debate," *Journal of European Competition Law & Practice* 9, no. 3 (2018): 131–2, doi:10.1093/jeclap/lpy020

4. The first part of the premise is critical: the allegedly anticompetitive conduct must *cause* output to increase. For example, the SCOTUS American Express opinion relied on the increasing using of credit cards over time - a long standing trend away from cash - to claim an output increase without establishing any relationship to the challenged conduct.

of the good increased, so consumers wanted more. Proxying for welfare with output is a commonly-used shortcut in antitrust. This assumption about the relationship between output and consumer welfare is very powerful, but it requires assumptions that are not met in the context of addictive products.

This Article argues that any evidence based on quantity (often minutes) consumed that defendants might raise as an efficiency defense cannot be applied in digital markets given the strong possibility that more output causes harm, not benefit. Indeed, arguing that more consumption of oxycontin on the part of consumers who have become addicted to oxycontin is a demonstration of an increase in consumer welfare violates common sense; but it does not violate standard antitrust arguments. We argue here that standard antitrust arguments must be adjusted and updated to correctly handle addictive products, including social media platforms. A digital business asserting that its conduct is procompetitive would need to either have a business model that does not rely on addictive or exploitative content, or show that consumer welfare gains, rather than exploitation, are the consequence of the behavior.

Another way to see how the harms created by unregulated digital content affect policy decisions is to think about them as an aspect of the quality of digital services. In the parlance of antitrust economics, the harms that digital businesses impose on unwitting consumers essentially lower the quality of the product. The consumer may not be able to see the lower quality due to obfuscation by the platform, lack of regulation in the marketplace, or a simple setting of asymmetric information, and is therefore exposed to addictive services. Of course, when a service declines in quality that is a harm to consumer welfare. When a free service declines in quality due to anticompetitive conduct by a digital business, that is equivalent to an increase in quality-adjusted price, a traditional antitrust harm. Thus, increased "engagement" on a platform with addictive or exploitative content may result in lower quality (or higher quality-adjusted price) services for some consumers. This is obviously not an efficiency.

After a brief description of the setting we study, we explore the medical evidence for our thesis as well as the behavioral economics underpinnings of the analysis in the following two sections.

1.1 Adoption of Technology

Grouped together, mobile devices and social media services have been the largest shock to cognition in human history. Over a 20-year period, Americans went from spending essentially no time on their mobile devices, to 90 minutes a day in 2008, to well over 3 hours daily as of 2018. Furthermore, the increase in mobile device use was driven primarily by the exponential growth of engagement in social networking websites such as Facebook, Twitter, Instagram, and Weibo. As such, individual and collective cognition has, in under 20 years (or 25 if one wishes to include the rise of the internet through desktop computers) gone from a primarily cartesian form of engagement and connectedness where humans engaged with their immediate spatial environment or single individuals through telephones, to a Euclidean form of engagement, where instantaneous access to networks of usually like-minded individuals, friends, and family are ubiquitous not only in the United States but globally.

As with any shock, the welfare implications of such rapid change are not entirely clear, nor are they easily measured in terms of their long-term impact on human well-being. The impact of condensed calorie delivery in food products in the mid-20th century was first found to reduce certain measures of hunger prevalence in the United States. Only later were some of those changes to human diets found to lead to increased rates of obesity and the various co-morbid health conditions closely linked to obesity. Additionally, any estimation of impact on cognition from technology we may make today is further complicated by the fact that the biological and behavioral pathways impacted by the hardware and software of today's technology are far more complex than those linked with medical conditions like obesity and cancer.

A further unique aspect of the policy debate around technology is the relative short period of time between its onset and the potential for significant regulatory frameworks being imposed on it. While the potential harms of cigarettes were known to many physicians as early as the 19th century, significant legislation seeking to limit their use was only considered close to half a century after mass consumption of cigarettes had started. This delay was certainly caused, in part, by tobacco companies hiding their intentions

of addicting customers to nicotine.[5] Because of that delay - and a hundred years of harm, deaths and illness it caused - policy makers had decades of epidemiological data to pair with sophisticated biological models that explained both the pathways of addiction and pathology that led to lung cancer and other ailments. In the case of technology, the medical literature has grown exponentially over the last decade, with an emerging consensus that overuse of social media and other platforms can be dangerous to mental health, especially among at-risk groups. In our view there is already a political movement in the US for significant limitations on technology usage in (for example) children. This is so even though the medical model is very different; the nature of usage cannot be classified as addictive on the molecular level, nor can the potential harms to cognition be easily modeled using current knowledge of human neurobiology.

Nevertheless, a combination of numerous factors, including concerns over anticompetitive corporate behavior, the breakdown of civil society through foreign interference and disinformation across many platforms, the way platforms can amplify particular speech, and the perceived concerns over algorithmic discrimination by these and other technologies, have led to a perfect storm where technology regulation is arguably a major policy issue that engenders (albeit for different reasons) broad bipartisan support in society.[6]

The rest of the paper proceeds as follows: Part 2 describes the current evidence on the psychological harms from digital businesses and social media platforms. Part 3 gives an economic background to regulation and considers broadly why we regulate certain products and markets. The focus of this section is the advances in behavioral economics and how they have impacted the design of regulation. We argue that credit cards and cigarettes are useful

5. David Kessler, *A Question of Intent: A Great American Battle with a Deadly Industry*, Revised (New York City: PublicAffairs, 2002).

6. Senator Josh Hawley (R-Mo) has proposed several bills to regulate tech, including the Social Media Addiction Reduction Technology Act. On July 30, 2019, Sen. Hawley tweeted: "Big Tech has embraced addiction as a business model. Their 'innovation' isn't designed to create better products, but to capture attention by using psychological tricks that make it impossible to look away. Time to expect more & better from Silicon Valley." On the left, Senator Elizabeth Warren (D-Ma) announced a plan to "break up big tech" during her 2020 presidential campaign. See Elizabeth Warren, "Here's How We Can Break Up Big Tech," *Medium*, March 8, 2019, `https://medium.com/@teamwarren/heres-how-we-can-break-up-big-tech-9ad9e0da324c`

product parallels. In Part 4 we explain how these two elements, harms and lack of regulation, interact with measurement of consumer welfare. Lastly, we explain how all of these elements impact antitrust enforcement of digital businesses. We conclude in Part 5.

2 The Medical Evidence on Consumer Cognitive and Psychiatric Harms from Digital Businesses

2.1 Overview

This section focuses on the harmful impact of digital technology platforms, particularly those in the social media space, on the mental health of youth and adolescents. We argue that the weight of the evidence suggests that material consumed through digital platforms can be "harmfully addictive."[7] We further explain that the literature particularly indicates these platforms are harmfully addictive in youth and adolescents, particularly in girls. Finally, we argue that the negative mental health consequences currently observed in youth and adolescents likely underestimate the entirety of the harms to consumers for several reasons. First, there may be economic harms that flow from the mental health harms described here. Second, there could be mental health harms to adults that the literature has not yet addressed. Third, the time period under study is relatively short due to the recent adoption of the technology. Therefore there is a long future in which further harmful consequences can occur and these, of course, cannot be measured today. Lastly, and not the subject of this paper, a full accounting of the other potential disutilities of technologies would be decidedly large and unwieldy, considering the sheer number of areas (democracy, privacy, etc) that have been identified as areas of regulatory concern.[8]

7. Faruk Gul and Wolfgang Pesendorfer, "Harmful Addiction," *The Review of Economic Studies* 74, no. 1 (2007): 147–72, doi:10.1111/j.1467-937X.2007.00417.x.

8. Stigler Committee on Digital Platforms, *Final Report* (2019), https://research.chicagobooth.edu/stigler/media/news/committee-on-digital-platforms-final-report.

Specifically, we frame this evidence using the following criteria.

1) The harm we are describing is defined as encountered in the context of harmful addiction. Harmful addiction is a concept from the economics literature. It is defined as a product that is linked with compulsive use by the user and for which past usage is predictive of more compulsive use in the future, conditional upon such compulsive use being harmful in a measurable way.[9]

2) Harms are limited to those experienced by the individual consumers only and exclude externalities on other people and society more generally.

3) Harms are not considered for which there are already robust regulatory structures. There are a variety of bodily harms that have been linked with digital technologies, particularly related to the operation of mobile devices. In this paper we do not discuss physical harms that result from the usage/operation of the devices themselves such as accidents caused by distracted driving or potential neoplasms induced by cell phone emissions. There are clear regulatory solutions that have either been implemented at the state level,[10] or are part of ongoing epidemiological studies that can lead to clear remedies.[11]

4) In this Article, we focus specifically on harms caused by social media. Our reasoning for limiting our focus is manifold. First, social media consumption has driven much of the rise in technology usage, particularly in at risk groups such as adolescents.[12] Secondly, the business model of social media - selling advertising - is directly linked to (over) usage by consumers. Social media platforms have engaged in well-documented attempts to manipulate users to increase usage of the platform.[13] And lastly, social media

9. Gul and Pesendorfer, "Harmful Addiction."

10. Michael R. Flaherty et al., "Distracted Driving Laws and Motor Vehicle Crash Fatalities," *Pediatrics* 145, no. 6 (2020), doi:10.1542/peds.2019-3621.

11. "Cell Phones and Cancer Risk," Cancer.gov, 2019, https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet.

12. Victoria Rideout and Michael B. Robb, *The Common Sense Census: Media Use by Teens and Tweens* (San Francisco, CA, 2019).

13. Adam Alter, *Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked* (New York, NY: Penguin Press, 2017). See also Competition and Markets Authority, *Online Platforms and Digital Advertising* (2020), Final Report pages 43-48.

is the source of much of the malicious content that is hypothesized to be a key cause of mental health harm.[14]

5) The harms we consider are limited to those that negatively affect the mood and/or thought process of consumers. As many of the potential harms from social media are similar to other stressors that lead to cognitive and affective impairment over long periods of time, we also include findings that are sub-clinical. The long term effects of technology are a particular concern, especially in young children and adolescents.[15]

These constraints should not be interpreted as necessarily exculpatory to other business models, or other potential harms to consumers or society. Rather, we are concerned that this Article be a readable length.

subsectionAddiction and digital technologies

First, baseline conditions are conducive to addiction and patterns in the data are consistent with addiction. There has been a large, secular trend in time spent on social media platforms since their introduction in the latter half of last decade.[16] Such an increase in usage does not, by itself, show that the technology is addictive, but it is an outcome one would expect to see from an addictive technology. Increases in time spent online are consistent with a market in which consumers are using technology at a greater and greater rate, one that is predicted in part by past usage.[17] Secondly, we should not be surprised by this fact because platforms whose business model is selling advertising are financially incentivized to get users to spend more time on their platform. User environments that are addictive are profitable because more time on the platform allows the platform to display another ad to the user – which it sells. Put differently, because a typical social media site

14. "Association between Mobile Technology Use and Child Adjustment in Early Elementary School Age," *PLoS ONE* 13, no. 7 (2018), doi:10.1371/journal.pone.0199959.

15. Paul Lewis, "'Our Minds Can Be Hijacked': The Tech Insiders Who Fear a Smartphone Dystopia," *The Guardian*, October 6, 2017, https://www.theguardian.com/technology/2017/oct/05/smartphone-addiction-silicon-valley-dystopia.

16. Vicky Rideout, "Measuring Time Spent with Media: The Common Sense Census of Media Use by US 8- to 18-Year-Olds," *Journal of Children and Media* 10, no. 1 (2016): 138–44, doi:10.1080/17482798.2016.1129808.

17. Yolanda (Linda) Reid Chassiakos et al., "Children and Adolescents and Digital Media," *Pediatrics* 138, no. 5 (2016), doi:10.1542/peds.2016-2593.

today does not collect revenue directly from users, and the fact that platform valuations are evaluated on user growth and engagement, profit maximizing firms with monopoly power would be expected to drive usage beyond the user's value of that time. There is also early evidence that users of social media platforms report positive net value to quitting or reducing usage,[18] a finding that is again consistent with users of other addictive substances who will pay to check themselves into rehab and other costly interventions.[19]

One common criticism of the idea of digital technologies as being addictive is that, as opposed to other products that are defined as addictive such as cigarettes and alcohol, digital platforms do not introduce a physical substrate to the human body. The latter examples, through modulation of neuro-chemistry and function, result in what is classically known as a physical addiction.[20] Compulsive behaviors that do not have such a substrate such as gambling, are referred to as "behavioral addictions" and have traditionally, until the recent addition of gambling disorder to the DSM-V,[21] been excluded from formal psychiatric diagnoses. In reality, however, the neural pathways by which behavioral addictions are developed are quite similar to those experienced by users with addictive substances.[22] This leads to an important point we want to make: *In a meaningful sense, visual and/or auditory stimuli, when optimized for human arousal, can be thought of as no different than a substance that is physically consumed.*

Further evidence for this shared pathway can be seen in the way psychological mechanisms of reward are manipulated by technology companies to maximize consumption. Platforms design variable interval reward schedules to decrease the latency to (and magnitude of in that time frame) "negative"

18. Hunt Allcott et al., "The Welfare Effects of Social Media," *American Economic Review* 110, no. 3 (2020): 629–76, doi:10.1257/aer.20190658.

19. Becker and Murphy, "A Theory of Rational Addiction."

20. Yvonne H. C. Yau and Marc N. Potenza, "Gambling Disorder and Other Behavioral Addictions: Recognition and Treatment," *Harvard Review of Psychiatry* 23, no. 2 (2015): 134–46, doi:10.1097/HRP.0000000000000051.

21. American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*, 5th ed. (Arlington, VA: American Psychiatric Association, 2013).

22. Yau and Potenza, "Gambling Disorder and Other Behavioral Addictions: Recognition and Treatment"; Luke Clark, Isabelle Boileau, and Martin Zack, "Neuroimaging of Reward Mechanisms in Gambling Disorder: An Integrative Review," *Molecular Psychiatry* 24 (2019): 674–93, doi:10.1038/s41380-018-0230-2.

utility, or withdrawal. This means that non-use in period t+1 generates negative utility that requires use, swiping, or whatever the stimulus is for the user to just to break even. Varying the reward interval (think about checking Instagram constantly to see if anyone liked the picture of your cat because you are not sure when someone will) magnifies the intensity of the cravings compared to knowing that you won't hear anything until some distinct, future point.

Another harm from social media relates to the impact of the distraction(s) imposed upon users of social media. These distractions have two distinct, yet overlapping, components. First, there is the distraction that comes from the withdrawal from use that makes consumers wish to access, or "swipe" their smartphone to access content from these platforms. Platforms leverage the psychological response to variable reward schedules that comes from actions such checking for "likes." The design of platforms such as Facebook or Instagram exploit these innate psychological tendencies which distracts individuals from what they would otherwise be doing.[23] Second, the nature of the content of these platforms is optimized to increase "engagement" and addiction. While a cigarette provides a very specific biological reward, content on social media, which is highly interactive and often quite personal in nature, can distract the user from other tasks of the moment, with such distractions leading to decreased mood states across the board.[24]

Tobacco companies were able to drive rapid growth in smoking behavior from concentration of nicotine and manipulation of the delivery device; these product choices increased usage enormously both in terms of number of smokers and amount consumed.[25] The tobacco companies' product design choice of the level of nicotine is analogous to social media design choices. By increasing nicotine content, the seller of cigarettes increases addiction and increases its sales. "Swiping" and analogous actions that give small amounts of immediate gratification are pleasurable online activities for users for the

23. David Golumbia, "Social Media Has Hijacked Our Brains and Threatens Global Democracy," *Vice*, January 8, 2018, `www.vice.com/en_asia/article/xw44yj/social-media-has-hijacked-our-brains-and-threatens-global-democracy`.

24. Lotte F. Van Dillen and Sander L. Koole, "Clearing the Mind: A Working Memory Model of Distraction from Negative Mood," *Emotion* 7, no. 4 (2007): 715–23, doi:`10.1037/1528-3542.7.4.715`.

25. Kessler, *A Question of Intent: A Great American Battle with a Deadly Industry.*

reasons described above. Social media platforms such as YouTube and Facebook can optimize content presentation to maximize this stimulation, which increases overall time spent on the platform.[26] Any given user almost surely experiences declining marginal utility from platform use and even reaches some point after which increasing time on the platform generates disutility (e.g. the user needs to go to school); the platform does not experience this decline since it is unlikely to run out of profitable ads to show the user.

Advertising revenue drives a platform's incentive to make sponsored content popular on websites and search results. Algorithms set to maximize ad revenue will learn what users click on and how to frame and steer them to click on material that is profitable for the platform. YouTube's algorithmic recommendations steer users towards extreme content; the study does not explain why steering occurs, but the extreme content may be entertaining and may cause a user to spend more time on the platform – where she can see another ad.[27] This selection mechanism represents an economic source of harm - low quality - that interacts with the psychiatric harm of distraction because such content is more able to claim the user's attention away from what her long-run self would prefer to be doing.

Eye-tracking studies that measure attention capture at speeds that are often non-volitional (i.e. the consumer is not making a conscious choice to attend to a specific item),[28] have shown the success of common methods of capturing web attention such as clickbait and validation of views.[29]. Studies

26. At an interview with Axios, Sean Parker, the founding president of Facebook, said: "The thought process that went into building these applications, Facebook being the first of them,...was all about: 'How do we consume as much of your time and conscious attention as possible?'" See Erica Pandey, "Sean Parker: Facebook Was Designed to Exploit Human "Vulnerability"," *Axios*, November 9, 2017, `https://www.axios.com/sean-parker-facebook-was-designed-to-exploit-human-vulnerability-1513306782-6d18fa32-5438-4e60-af71-13d126b58e41.html`

27. Manoel Horta Ribeiro et al., "Auditing Radicalization Pathways on YouTube," in *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency* (2020), 131–41, doi:`10.1145/3351095.3372879`.

28. Andy J. King et al., "Improving Visual Behavior Research in Communication Science: An Overview, Review, and Reporting Recommendations for Using Eye-Tracking Methods," *Communication Methods and Measures* 13, no. 3 (2019): 149–77, doi:`10.1080/19312458.2018.1558194`.

29. Supavich (Fone) Pengnate, "Shocking Secret You Won't Believe! Emotional Arousal in Clickbait Headlines: An Eye-Tracking Analysis," *Online Information Review* 43, no. 7

like these have shown that our selective attention is not only drawn to content that is more arousing, it can drive usage to levels that have been linked with harmful mental health outcomes. This kind of cue-conditioning to capture attention and drive consumption is similar to cue-conditioning for off-line addictive substances, where people become unable to stop consuming.[30] Interestingly, in a well-powered study of Facebook users that measured eye movements in those who scored highly on an established internet addiction scale,[31] users were found to have improved mood within the first few minutes of logging on to Facebook.com but showed increasingly negative mood over time.[32] This first increasing, then decreasing, picture matches the measured utility of addicted consumers any number of psychoactive substances that includes but is not limited to: alcohol, opiates, nicotine, and stimulants and supports the idea that while modest social media usage could be beneficial heavy usage may be harmful.

2.2 Evidence that overuse of technology causes psychiatric harms

The past decade has shown a rise in studies looking at the impact of digital social media on mental health, particularly in children and adolescents.[33] First, children and adolescents have been shown to be particularly vulnerable towards the development of addiction and are more likely to have long term negative consequences from usage at a young age due to the plasticity of

(2019): 1136–50, doi:10.1108/OIR-05-2018-0172; Michael Sülflow, Svenja Schäfer, and Stephan Winter, "Selective Attention in the News Feed: An Eye-tracking Study on the Perception and Selection of Political News Posts on Facebook," *New Media & Society* 21, no. 1 (2019): 168–90, doi:10.1177/1461444818791520.

30. B. Douglas Bernheim and Antonio Rangel, "Addiction and Cue-Triggered Decision Processes," *American Economic Review* 94, no. 5 (2004): 1558–90, doi:10.1257/0002828043052222.

31. Cecilie Schou Andreassen et al., "Development of a Facebook Addiction Scale," *Psychological Reports* 110, no. 2 (2012): 501–17, doi:10.2466/02.09.18.PR0.110.2.501-517.

32. Zaheer Hussain et al., "Using Eye Tracking to Explore Facebook Use and Associations with Facebook Addiction, Mental Well-being, and Personality," *Behavioral Sciences* 9, no. 2 (2019), doi:10.3390/bs9020019.

33. Elia Abi-Jaoude, Karline Treurnicht Naylor, and Antonio Pignatiello, "Smartphones, Social Media Use and Youth Mental Health," *Canadian Medical Association Journal* 192, no. 6 (2020): E136–41, doi:10.1503/cmaj.190434.

their still-developing minds.[34] Second, there has been a well-documented rise in multiple symptoms of mood disorders in children, especially girls, with a general secular trend over the last decade and a particular jump from 2012-2013 which coincided with a commensurate rise in social media usage by that population.[35]

A large body of evidence has further shown links between social media use and mental health symptoms and illness. Large cohort studies (JAMA general correlation 2019) and large-scale reviews have found good evidence suggesting a link between heavy usage of social media platforms (usually defined as over 3 hours per day) and increased depressed mood and anxiety across multiple cohorts of children and adolescents.[36] More specifically, additional studies have linked social media with outcomes such as social isolation and sleep interruption.[37] Other studies have identified further negative effects from using multiple social media platforms and network-based negative effects on mood.[38] Finally, a consistent finding across numerous studies that were able to control for gender found a significant and strong effect of gender

34. James Niels Rosenquist and Casey Rothschild, "Adolescent Addiction with Affinity Preferences" (Working Paper, 2010).

35. Ramin Mojtabai, Mark Olfson, and Beth Han, "National Trends in the Prevalence and Treatment of Depression in Adolescents and Young Adults," *Pediatrics* 138, no. 6 (2016), doi:10.1542/peds.2016-1878; Jonathan Haidt and Jean M. Twenge, "Is There an Increase in Adolescent Mood Disorders, Self-Harm, and Suicide Since 2010 in the USA and UK? A Review" (Unpublished Manuscript, New York University, 2019).

36. Abi-Jaoude, Naylor, and Pignatiello, "Smartphones, Social Media Use and Youth Mental Health"; Jean M. Twenge, "Why Increases in Adolescent Depression May Be Linked to the Technological Environment," *Current Opinion in Psychology* 32 (2020): 89–94, doi:10.1016/j.copsyc.2019.06.036; Elroy Boers et al., "Association of Screen Time and Depression in Adolescence," *JAMA Pediatrics* 173, no. 9 (2019): 853–9, doi:10.1001/jamapediatrics.2019.1759.

37. Brian A. Primack et al., "Social Media Use and Perceived Social Isolation Among Young Adults in the U.S.," *American Journal of Preventative Medicine* 53, no. 1 (2017): 1–8, doi:10.1016/j.amepre.2017.01.010; Garrett Hisler, Jean M. Twenge, and Zlatan Krizana, "Associations between Screen Time and Short Sleep Duration among Adolescents Varies by Media Type: Evidence from a Cohort Study," *American Journal of Preventative Medicine* 66 (2020): 92–102, doi:10.1016/j.sleep.2019.08.007.

38. Lien Faelens et al., "Negative Influences of Facebook Use through the Lens of Network Analysis," *Computers in Human Behavior* 96 (2019): 13–22, doi:10.1016/j.chb.2019.02.002; Brian A. Primack et al., "Social Media Use and Perceived Social Isolation Among Young Adults in the U.S.," *American Journal of Preventive Medicine* 53, no. 1 (2017): 1–8, doi:10.1016/j.amepre.2017.01.010.

showing girls being particularly negatively affected by heavy use of social media.[39]

Finally, there are a number of studies that have shown a strong correlation between ADHD symptoms and heavy digital social media platform use.[40] While not a mood disorder, ADHD can lead to anxiety and depression later in life and also has a major impact on school performance and human capital production in general.

2.3 Future Evidence

What is striking about these findings is that they have been detected in relatively small sample sizes within only the first few years of mass use among children and adolescents. While these findings are not universal across all studies, and some cannot cleanly separate correlation from causality, the sheer volume and effect sizes seen in a myriad of studies have generated a consensus that an effect is there for heavy users, particularly girls.[41] Even studies that have not shown significant effects have been acknowledged by their authors to be potentially inconclusive due to current limitations in measurement variables and lack of enough longitudinal data to obtain statistical power.[42] As further time series data is collected on cohorts and further anal-

39. Jean M. Twenge and Gabrielle N. Martin, "Gender Differences in Associations between Digital Media Use and Psychological Well-Being: Evidence from Three Large Datasets," *Journal of Adolescence* 79 (2020): 91–102, doi:10.1016/j.adolescence.2019.12.018; Yvonne Kelly et al., "Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study," *EClinicalMedicine* 6 (2018): 59–68, doi:10.1016/j.eclinm.2018.12.005.

40. Chaelin K. Ra et al., "Association of Digital Media Use With Subsequent Symptoms of Attention-Deficit/Hyperactivity Disorder Among Adolescents," *Journal of the American Medical Association* 320, no. 3 (2018): 255–63, doi:10.1001/jama.2018.8931.

41. Abi-Jaoude, Naylor, and Pignatiello, "Smartphones, Social Media Use and Youth Mental Health"; Haidt and Twenge, "Is There an Increase in Adolescent Mood Disorders, Self-Harm, and Suicide Since 2010 in the USA and UK? A Review."

42. Amy Orben and Andrew K. Przybylski, "The Association between Adolescent Well-Being and Digital Technology Use," *Nature Human Behaviour* 3 (2019): 173–82, doi:10.1038/s41562-018-0506-1; Jean M. Twenge et al., "Underestimating Digital Media Harm," *Nature Human Behaviour* 4 (2020): 346–8, doi:10.1038/s41562-020-0839-4; Jean M. Twenge and W. Keith Campbell, "Media Use Is Linked to Lower Psychological Well-Being: Evidence from Three Datasets," *Psychiatric Quarterly* 90 (2019): 311–31,

yses are performed on heavy users using approaches like birth cohort models controlling for genetics and other risk factors,[43] main effects for at risk groups are likely to be larger.

In conclusion, though we are now only 10 years after the introduction and rapid adoption of social media technologies on portable technologies, there has already been substantial evidence of significant, negative, mental health consequences in traditionally higher risk groups such as young girls. These effects appear to be strongest in those who utilize these tech/social media platforms at levels much higher than average users, a usage level that is not only the expected result from product design, but is in fact the logical commercial goal of these platforms.

We consider these effects, even when they are modest in magnitude, to be especially concerning and worthy of significant further research in conjunction with near term regulatory oversight. In terms of research, the sheer level of consumption, particularly among children and adolescents whose brains have not fully developed,[44] along with the current weight of evidence, makes the issue of a deeper understanding of these effects critical in the near term. In the long term, the need for inclusion of data on technology and social media use in cohort studies is important for getting a better picture of effects of heavy technology use over the lifespan.

It is also the issue of long term effects of technology use that makes governmental intervention an important, and possibly critical, option in the near term. The impact of mass produced (and enhanced) tobacco products in the early part of the 20th century on lung cancer and cardiac disease was not fully recognized until decades after their introduction.[45] This delay was, in significant part, due to the relative lag between mass uptake by the

doi:10.1007/s11126-019-09630-7.

43. James Niels Rosenquist et al., "Cohort of Birth Modifies the Association Between FTO Genotype and BMI," *Proceedings of the National Association of Sciences* 112, no. 2 (2015): 354–9, doi:10.1073/pnas.1411893111.

44. B.J. Casey, Rebecca M. Jones, and Todd A. Hare, "The Adolescent Brain," *Annals of the New York Academy of Sciences* 1124, no. 1 (2008): 111–26, doi:10.1196/annals.1440.010.

45. Otis W. Brawley et al., "The First Surgeon General's Report on Smoking and Health: The 50th Anniversary," *CA: A Cancer Journal for Clinicians* 64, no. 1 (2014): 5–8, doi:10.3322/caac.21210.

population and the long term sequelae of heavy usage.[46] If there is anything that the COVID-19 pandemic has reminded public policy makers of, it is the fact that policy based on modeling of future outcomes can be critical to maximizing public health, be it in the corporeal or mental health arena. Digital technology is one such place where analysis, and regulatory response to that analysis, is necessary.

3 Economic Setting

3.1 Regulation

The field of regulation has been heavily influenced by principles pioneered by economists. Most, notably, the discipline teaches that social welfare is maximized when the individual makes her own choices and maximizes expected utility, a setting that does not need any regulation. But of course, the underlying assumptions of that setting are perfectly competitive markets and the absence of externalities. For standard goods in a standard neoclassical model, more choice is (weakly) better and more consumption is (weakly) better, reflecting the reality that many households would indeed consume more of many goods, e.g. shoes or ice cream, if their budgets increased, prices fell, or choices expanded.

Regulation can improve outcomes in a setting where a consumer creates what is known as an externality. An externality is a harm or benefit accruing to someone else who did not purchase or use the good. For example, pollution from a car harms others in the neighborhood, region, and globe, while the benefit of transportation services is enjoyed by the car owner. One goal of optimal regulation is to create a market system such that the car owner internalizes the total cost of the pollution they generate. Such regulation causes the car to be used in a way that accounts for everyone's utility, not just the owner's. For example, an optimal carbon tax would lead to a cost of gas that reflected all the harms from pollution. An optimal carbon tax would cause many car owners to drive less, thereby harming others less, but

46. Brawley et al., "The First Surgeon General's Report on Smoking and Health: The 50th Anniversary."

at the same time, would continue to create an incentive for driving when the value of the trip was above its total cost.

While we will focus in this article on governments that attempt to regulate dangerous products for the benefit of society and consumers, we recognize that US democracy is vulnerable to capture by profit-seeking corporations that work against this outcome. If companies can earn more profit without regulation, e.g. by advertising cigarettes on television to increase consumption by all ages, then they will use a portion of those incremental profits to pay politicians - whether directly or indirectly - to attempt to prevent that regulation. This interplay of politics, corporate interests, and harm to voters explains the long delay in regulating cigarettes and the current lack of regulation of pollutants that contribute to climate change, among others.[47]

Throughout our nation's history there have been cases where products or services were regulated because society did not view them as having the ordinary "more is better" characteristic. Regulation of alcohol and certain non-prescribed, pharmacologically active agents was regularly enacted throughout the 20th century, with notable movements including prohibition and the "war on drugs" imposing significant restrictions on use. These products are ones where the stylized choice and consumption assumptions above are generally viewed as incorrect. Consumption of alcohol in large amounts can be damaging, as those consumers often become violent or incapacitated and damage people and property, and alcohol can also be addictive. Illegal drugs like cocaine are addictive. Increasing consumption of addictive drugs brings with it the danger of serious health consequences, inability to work, lost relationships, overdoses, and so forth. These risks are qualitatively and quantitatively larger than the risks from increasing consumption of shoes or ice cream.

There are other products that are dangerous financially, such as mortgages, credit cards, and funeral services. Along with prescription drugs, these are products that can bring benefit in small quantities; just as an appropriate dose of steroids reduces pain, or a small mortgage (relative to the ability to repay) allows the purchase of a first house, these products can also be harmful in quantities that are too large. Some financial products

47. cite to Koch brothers

are also addictive, for example gambling and credit cards.[48] Excessive credit card debt can destroy a person's credit rating or lead to bankruptcy. Other financial products are simply dangerous if consumed in excess. Obtaining an excessively large mortgage risks foreclosure, homelessness, and other costly consequences if the borrower experiences an adverse shock. Funeral services purchased when the consumer is distraught can be more expensive than the consumer intended. All of these products are regulated more strictly than "conventional" products such as shoes.

These products are regulated in several ways. One is by access through intermediaries who have certain responsibilities established by the state, e.g. physicians, banks, bars. Another regulatory approach is to make the entire product illegal, such as the US does with cocaine. This extreme approach is utilized when even a small amount of the product may create life-threatening addiction. A third regulatory option is to limit the ages and conditions under which the product can be sold: opening hours for liquor stores and age limits for tobacco and alcohol. Credit cards likewise are restricted to those over the age of 21 (if there is no co-signer or proof of financial independence). Another regulatory tool is a cooling off period, during which consumers can cancel certain purchases. In the United States, the FTC Cooling Rule gives a consumer three days to "cool down" after agreeing to a contract or purchase from an in-person sale where she faced pressure to buy.[49] The tool we focus on in this paper is regulatory design. This encompasses a regulator's choice of defaults, salience, choice framing, and incentives for intermediaries.

A reason for regulation of these products could be that government judges that the preferences of some consumers are dangerous or unacceptable for society as a whole, either as a moral matter or because of externalities on others. In these cases, cultural norms, sometimes derived from religious movements (such as prohibition) may underlie policy formulation and implementation. Another argument is that regulations designed to limit consumption of cer-

48. Howard Tokunaga, "The Use and Abuse of Consumer Credit: Application of Psychological Theory and Research," *Journal of Economic Psychology* 14, no. 2 (1993): 285–316, doi:10.1016/0167-4870(93)90004-5; William O. Bearden and Kelly L. Haws, "How Low Spending Control Harms Consumers," *Journal of the Academy of Marketing Science* 40 (2012): 181–93, doi:10.1007/s11747-011-0282-1.

49. "Buyer's Remorse: When the FTC's Cooling-Off Rule May Help," Federal Trade Commission, 2015, https://www.consumer.ftc.gov/articles/0176-buyers-remorse-when-ftcs-cooling-rule-may-help.

tain products by children are justified because children have not yet been able to become fully informed about specific products and able to make decisions about their likely benefits and harms. Regulatory design, by contrast, is motivated by the behavioral economics insight that, left to their own devices and faced with an environment designed by a sophisticated and profit-maximizing sellers, consumers will fare poorly. They may not want to become exploited or addicted to the product *ex ante*, but find it difficult to resist. Regulation that helps the consumer resist consuming the product improves her welfare.

3.2 Behavioral Economics

Recall that in a neoclassical model with adult consumers and no externalities, no regulation is necessary because, by assumption, the consumer is capable of doing the best for herself. The regulatory design approach rejects this assumption. And, of course, if consumers do choose poorly then there is scope for the regulation to improve the well-being of consumers. Over the past 40 years, research in behavioral economics has shown that, in fact, consumers choose poorly. Guided by theory, and using evidence from the lab and many field settings, research overwhelmingly shows that in many settings consumers do not follow the neoclassical model and harm themselves by their choices. Consumer behavioral biases include present bias, misjudgment of quality and prices, sensitivity to defaults, loss aversion, and subjectively high search costs.[50]

Behavioral models reflect the underlying psychological (and beneath that, biological) factors that cause these departures. One particular emphasis is the existence of what are called "internalities." Analogous to externalities, these are benefits that make a consumer happy in the short run and drive short-run decisions, while imposing harms to the long term welfare of that same consumer. These types of mistakes are extremely common among consumers in many markets that will be familiar to the reader, e.g. exercising, diet choices, savings, and more. Consumers may be sophisticated about their

50. For an overview of how these consumer biases impact competition, see Steffen Huck, Jidong Zhou, and Charlotte Duke, *Consumer Behavioural Biases in Competition: A Survey* (United Kingdom, 2011), `http://londoneconomics.co.uk/blog/publication/consumer-behavioural-biases-in-competition-2/`

internality and correctly forecast their future short-term decision-making, which may enable them to design an environment that favors the long run. For example, they may join a nearby gym or sign up for their employer's matching savings plan. Or consumers may believe that they will act according to their long-run preferences - go running, save via their checking account - even when each day they consistently do not. This explicit framing is used to buttress policies that might otherwise be taken as paternalistic and argue that they are simply a redistribution from one of the multitudes Walt Whitman exhorted that we contain and transfer to another, distinct, self.[51]

There is evidence that firms exploit behavioral biases. For example Oster and Scott Morton show that magazines choose newsstand (impulse purchase) and subscription (commitment to read in the future) prices in a way that is consistent with taking advantage of the present bias of consumers.[52] There is also good evidence in digital platform markets such as online ticketing. Blake et al. find that consumers' responsiveness to price is very sensitive to the way in which ticket prices and fees are presented on StubHub.[53] Users who do not see full ticket prices until reaching the checkout page - where the back-end fees are added on - are more likely to buy tickets compared to those who see full prices, with fees included, up front. Though back-end fee users experience search frictions such as revisiting search pages after seeing the full price, they still buy seats located closer to the stage which are higher in quality and more expensive. Even consumers who have used StubHub more than 10 times purchase more, and higher quality, tickets when the fees are added on at the end. In turn, sellers offer more high quality tickets, which is an offsetting benefit to consumers. Interestingly, the empirical study could be carried out because StubHub moved between the two methods of disclosing fees. The company tried the upfront approach because it is what consumers said they wanted in surveys. Yet under the simpler and more transparent format, consumers bought fewer and lower quality tickets.[54] The evidence in

51. https://poets.org/poem/song-myself-51, line referenced "I am large, I contain multitudes"

52. Sharon M. Oster and Fiona M. Scott Morton, "Behavioral Biases Meet the Market: The Case of Magazine Subscription Prices," *The B.E. Journal of Economic Analysis and Policy* 5, no. 1 (2005), doi:10.2202/1538-0637.1323.

53. Thomas Blake et al., "Price Salience and Product Choice" (Working Paper, 2018).

54. Hannah Karp, "StubHub Sings the Blues After Shifting Fees," *The Wall Street Journal*, March 26, 2014, https://www.wsj.com/articles/stubhub-sings-the-blues-after-shifting-fees-1395783228.

the paper shows that StubHub gains from increased revenue and increased transactions when it tacks on fees at the very end, an example of digital platforms benefiting from consumers' behavioral limitations.

As of this writing, the literature falling under the categories of behavioral and neuroeconomics is so vast it would be impossible to adequately summarize, much less cover, here. The point we wish to make in this article is different. In our view (discussed below), this type of regulation will eventually be adopted for digital businesses because of the threat to users' mental health. Before that regulation arrives, many digital products have the characteristics of an unregulated credit card market with asymmetric information and behavioral consumers: they often do harm when consumers increase the quantity of services they consume.

3.3 Specific Examples of Behavioral Regulation

One of the simplest examples of behavioral regulation applies to funeral homes. In addition to the unique economic components of funerals (they are in many cases the largest one-time expenditure a family will ever face) they occur at a time of tremendous grief for the likely shopper. The decision about how to send off a loved one can be amongst the most emotionally trying of an economic decision-maker's life. As such, they may not be able to process information as well as they normally do, and will potentially make decisions they might otherwise not. These shoppers can be poor choosers. Additional risk comes from the possibility of an unscrupulous funeral director who purposefully exploits the emotional state of the shopper to sell more goods and services. To limit incentives for funeral homes to take advantage of customers, the FTC developed the Funeral Rule, which prohibits exploitative practices such as requiring families to purchase a casket if they request cremation.[55] These rules should make no difference to a shopper who is behaving in a standard manner; the rules do not change the price or quality of any product, nor do they restrict who can purchase. Yet they are an explicit recognition that the shopper is not in a state to make good decisions. The rules provide protection for a consumer who is not performing as the

55. "Complying with the Funeral Rule," Federal Trade Commission, 2012, `https://www.ftc.gov/tips-advice/business-center/guidance/complying-funeral-rule`.

neoclassical model would have her do.

A more complicated example is cigarettes. While regulations on tobacco sales have been in place since the early 20th century, regulation in the form of taxation and limits on sales to minors gained tremendous momentum starting with the release of the Reader's Digest and Surgeon General's reports on smoking in the 1950s and 1960s respectively.[56] In response, the tobacco industry funded symposia and created organizations such as the "Council for Tobacco Research" to generate "evidence" that smoking was not dangerous, while suppressing research that exposed the harmful effects of tobacco.[57] These efforts delayed the arrival of regulation. The reasons that regulation was eventually imposed include: the direct medical consequences of long term use, the indirect consequences of long-term exposure by non-smokers that include infants and children, and efforts on the part of tobacco companies to at once optimize the addictive potential of cigarettes through manipulation of the tobacco product as well as the delivery device (filter, etc.) itself.

In 1996, the FDA released a set of regulations to ban the sale of tobacco to minors. However, soon after, major tobacco companies sued to challenge the FDA's regulations. In *Food and Drug Administration, et al. v. Brown & Williamson Tobacco Corp., et al.* (2000), the Supreme Court ruled that the agency did not have authority to regulate tobacco. It was not until 2009, when President Obama signed the Family Smoking Prevention and Tobacco Control Act, that the FDA was granted authority to regulate a class of tobacco products including cigarettes and cigarette tobacco. In 2016, the Tobacco Control Act was amended to regulate all tobacco products, including e-cigarettes and future tobacco products.[58] The regulations proposed in 1996 and adopted in 2010 included restrictions to prohibit the sale of tobacco to minors and requirement of a photo ID; the restriction of tobacco vending or self-service machines to places where minors were not present; packaging and ingredient labeling restrictions; restrictions on the type of marketing targeted

56. Roy Norr, "Cancer by the Carton," Condensed from Christian Herald, *Reader's Digest*, December 1952, United States Public Health Service, *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service* (Washington, DC, 1964).

57. Lisa A. Bero, "Tobacco Industry Manipulation of Research," *Public Health Reports* 120, no. 2 (2005): 200–8, doi:10.1177/003335490512000215.

58. Victoria R. Green, *FDA Regulation of Tobacco Products* (Washington, DC, 2020), https://crsreports.congress.gov/product/pdf/R/R45867.

at minors (black and white, text only); and a ban on tobacco marketing using non-tobacco products (e.g. t-shirts, hats, sports team sponsorships).[59]

These regulations are directly related to the harms caused by cigarettes. Notice that many of them rely on the behavioral consumer we have described above. For example, the rules are designed to reduce asymmetric information between the company and consumers. Perhaps because companies hid the health and addiction risks from consumers for many years, regulation requires the inclusion of warnings about health risks on package labels. Furthermore, the more persuasive kinds of advertising, e.g. TV ads showing cool smokers at a fun party, are banned. Children are not judged able to make the decision about the risk-reward tradeoff of cigarettes, and are therefore barred from purchasing them. Cigarette companies are additionally barred from designing marketing campaigns that might be attractive to children, such as those using cartoon characters, and advertising through channels accessed by children. This set of regulations demonstrates an appreciation for behavioral features of consumers (especially when facing profit-maximizing firms that understand how to exploit these features) such as asymmetric information and addiction.

The case of credit cards is yet more interesting. It is easier than ever for consumers to obtain credit cards and use them, thereby accumulating debt if they do not have the funds to immediately pay the balance. While consumers gain from increased convenience, they also, on average, exhibit behavioral biases such as debt illiteracy and present-biased preferences for consumption. Consider a present-biased consumer with a poor understanding of how debt accumulates. She has a credit card from a company that processes payments and issues credit. Swiping her card is effectively taking out a short-term loan with a pleasurable immediate payoff: she borrows money that she cannot afford to pay out today. As with other types of loans, the consumer faces penalties for late payments, and more severe consequences such as bankruptcy if, later, she cannot pay off her debt.

59. Food and Drug Administration, Department of Health and Human Services, "Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents," *Federal Register* 61, no. 168 (August 28, 1996): 44396–618, `https://www.govinfo.gov/content/pkg/FR-1996-08-28/pdf/X96-10828.pdf`; Food and Drug Administration, Department of Health and Human Services, "Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco To Protect Children and Adolescents," *Federal Register* 75, no. 53 (March 19, 2010): 13225–32, `https://www.govinfo.gov/content/pkg/FR-2010-03-19/pdf/2010-6087.pdf`.

The profit-maximizing card company knows that the consumer will underestimate how much she will borrow in the future and overestimate her ability to pay in the future, and may also become addicted to the pleasure of spending. It has an incentive encourage her use the card and to to pay off just the minimum each month, allowing the card company to profit from late fees and interest payments on debt that carries over. The company has a financial incentive to design communications with the consumer to hide, or make less salient, the true cost of borrowing. For example, billing statements may not show what happens to the consumer's payoff period and interest costs if she only pays the minimum from month to month. Such a consumer is very profitable to the card company, and therefore it will advertise low introductory rates, cash-back perks, and other rewards to grow this segment of their customer base.

Consumers are capable of becoming more informed and aware of their own biases; in the terminology of this literature, they become 'sophisticated consumers,' rather than 'naive' ones. But even a sophisticated consumer has behavioral biases; she is simply aware of them and can attempt to combat them through techniques like committing her future self to a certain path of prices or actions. These commitments take the form of automatic paycheck deductions for contributions to a retirement account, regular exercise dates with friends, and the like. But this is only a partial solution even in the best case, and often requires financial literacy. Financial literacy takes effort to attain and is not universal. If consumers have a hard time learning, even after taking the trouble to learn they still have behavioral biases, and there is no regulation of company conduct, then it is very likely that profit-maximizing companies will exploit consumers.

To help consumers, the US government enacted the Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009. The CARD Act is an example of regulatory design that attempts to improve the situation for consumers by restricting who can get a credit card and how the issuer can communicate with the consumer.[60] For example, the CARD provision for "plain language in plain sight" requires issuers to be transparent in agreement and disclosure statements. After a card is activated, billing statements

60. "Fact Sheet: Reforms to Protect American Credit Card Holders," The White House, Press Release, May 22, 2009, `https://obamawhitehouse.archives.gov/the-press-office/fact-sheet-reforms-protect-american-credit-card-holders`.

should periodically display what happens to payment period and interest costs when consumers pay only the minimum. Billing statements should also disclose what happens if debt is paid off in 36 months versus paying the minimum indefinitely. This "nudge" helps consumers adopt a payment plan that will save money on interest payments in the long-term.[61]

Another element of CARD requires consumers to affirmatively opt-in to transactions that exceed monthly spending limits. The behavioral economics literature tells us that consumers are more likely to accept the default than to opt-in, so this design option discourages them from making present-biased decisions that increase their debt. Younger consumers with no experience managing finances are particularly vulnerable to exploitation. Under the CARD Act, consumers under age 21 must have a cosigner or proof of independent income to be issued a credit card, issuers may not offer tangible items (t-shirts, etc.), and universities must disclose any contracts with companies about the marketing of cards to students. The evidence indicates that behavioral regulation is effective. In the case of credit cards, implementing the CARD Act reduced consumer borrowing costs, and even more so for consumers with poor credit scores.[62] This was achieved by requiring cards to prominently display the payment needed to eliminate the debt in 36 months. There is lots of evidence that this type of "nudge" changes real outcomes.[63]

It is important for regulators to be cognizant when firms have financial incentives to avoid, or work around, regulation, which is often. Penalties for failure to comply with regulations will be critical in these settings, as without them, firms will gain financially from non-compliance. Transparency for issuers is another helpful element in a regulation when issuers profit from consumers' predictable behavioral biases. The Credit CARD Act provides some accountability by requiring issuers to publish agreement and disclosure statements online and increasing penalties for companies that do not comply.

In the examples of mortgages, cigarettes, and credit cards, regulations

61. Sumit Agarwal et al., "Regulating Consumer Financial Products: Evidence from Credit Cards," *The Quarterly Journal of Economics* 130, no. 1 (2014): 111–64, doi:10.1093/qje/qju037.

62. Ibid.

63. Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness*, Revised & Expanded Edition (London: Penguin Books, 2009).

explicitly address cognitive limitations of consumers and a consumer's tendency to exhibit present bias and accept defaults, in addition to more standard reasons for regulation such as disallowing children from harming their future selves; these mistakes are exacerbated when consumption on the part of consumers can lead to costly addiction. The gains from regulations that help protect consumers from their own behavioral limitations are even higher in that case.

3.4 Digital Platform Regulation

In the United States consumer-facing digital businesses are subject to no regulation specific to their industry. Platforms can adopt exploitative and addictive business models with no legal restriction. For example, a platform that displays video can suggest a subsequent video to the viewer without any limit on what that suggestion can be, or whether the sequencing strategy can be designed to be addictive. Platforms have no restriction on the ad load they place on their viewers. A digital platform that serves up news articles to its users faces no restriction on whether the news it chooses to present (and which consumers will read because it is the default option) is entirely false or entirely true. The business might find that it can sell more ads to the consumer if it shows news items from paid operatives of a foreign state or a group that would gain financially from the adoption of a law or election of a candidate.

Without regulation, it is clear that a profit-maximizing ad-supported digital business earns the most by attempting to attract consumers with content that activates reward pathways that, much like cigarettes and other addictive substances, are reflexive and drive usage based upon mid-brain induced reward and withdrawal effects. There are two core ways by which these effects are achieved. First, through easy access (through mobile devices amongst other mechanisms) and second, by filtering of content that provides the most reward by promoting content that is arousing and/or inflammatory. Through these mechanisms platforms generate repeat customers who can be shown ads throughout the day and (notably) often in mood states that can lead to spending behavior.[64] While consumers are being exploited, they are not

64. Matthew A. Killingsworth and Daniel T. Gilbert, "A Wandering Mind Is an Un-

aware that they are being exploited. This prevents them from reducing their attention in a way they might if they understood the mental health harms, or transferring their attention to a source of content that is safer. Competition occurs on the basis of *perceived* content quality because the consumer cannot see or measure quality and therefore cannot choose between digital businesses on the basis of true quality.

While some regulation has been proposed, no federal law has yet passed in the US that would limit the ways in which digital businesses choose to attract, entrap, and addict consumers. Proposed legislation includes Senator Hawley's bill that bans infinite scrolling and autoplay of videos on social media platforms.[65] Regarding user-specific data, Senator Thune proposes a bill to ban large internet platforms from using search history for algorithms that procure content, unless the user allows access for this specific use.[66] Several other acts aim to regulate privacy of user-specific data, such as Senator Klobuchar's bill to protect personal health data (e.g. collected on wearable fitness trackers),[67] and Senator Wicker's bill to protect the privacy of consumer health data for tracking COVID-19 cases.[68]

A digital platform that collects data about its users may use that data in any way that is consistent with the user agreement it presented to the consumer and to which the consumer agreed (abstracting from whether the consumer either read or understood the user agreement). This is not true in the EU, for example, where GDPR came into effect in 2018 and strictly limits the use of consumer data. However, it limits data use so strictly that consumers must give permission for many useful functionalities; consumers

happy Mind," *Science* 330, no. 6006 (2010): 932, doi:10.1126/science.1192439; Dena Thometz Saliagas and James J. Kellaris, "The Influence of Mood on Willingness to Spend and Unplanned Purchasing," *Proceedings of the 1986 Academy of Market Science Annual Conference*, 1986, 61–5, doi:10.1007/978-3-319-11101-8_13.

65. "Social Media Addiction Reduction Technology Act," S.2314, 116th Cong., introduced in Senate July 30, 2019, https://www.congress.gov/bill/116th-congress/senate-bill/2314.

66. "Filter Bubble Transparency Act," S.2763, 116th Cong., introduced in Senate October 31, 2019, https://www.congress.gov/bill/116th-congress/senate-bill/2763.

67. "Protecting Personal Health Data Act," S.1842, 116th Cong., introduced in Senate June 13, 2019, https://www.congress.gov/bill/116th-congress/senate-bill/1842.

68. "COVID-19 Consumer Data Protection Act of 2020," S.3663, 116th Cong., introduced in Senate May 7, 2020, https://www.congress.gov/bill/116th-congress/senate-bill/3663.

thus become inured to giving permission and this may erode the intended protection of the law to some degree. Services and products that cause harm and are subject to no regulation at all are fairly rare in the modern US economy. Over time political pressure tends to result in regulation to protect consumers from harmful or addictive products. Yet the delay can be long between the time that researchers identify and begin measuring harms and the enactment of regulation that protects consumers as we saw in the case of cigarettes. In our view, the United States is currently in that delay region when it comes to online content.

4 Implications for Competition and Antitrust Enforcement

Under these conditions, the platform's strategy that best attracts consumers and is most profitable for the platform may well be bad for the consumers themselves. But if that strategy is legal, management of digital businesses will feel pressure from their boards and shareholders to engage in it. A company that attempts to offer a higher quality product will sell fewer ads to those customers who are less "engaged" or, in other words, less addicted. A company that adopts a different business model - a subscription for example - will appear to be charging a price for the "same" product that is available for "free" from competitors. Without assistance, consumers may not be able to appreciate the design choices that make the subscription product safer for their mental health, while the barter transaction they engage in to receive "free" services is not salient to them. Consumers who do not understand their own behavioral biases cannot evaluate which model will be better for them. This situation does not represent a well-functioning market that delivers maximal surplus to consumers.

Not only are behavioral problems rife, digital businesses often operate in very concentrated market structures. Concentrated markets in this industry are a concern because they leave few choices for consumers to switch to a competing provider in the event that consumers were to learn about the risk of addiction or a regulator were to make quality more salient. Those monopoly positions may have been attained on the merits or by anticompeti-

tive conduct.[69] At the time of writing, in the United States, the Federal Trade Commission and and forty-seven state Attorneys General are investigating Facebook for violations of antitrust law, while Google is being investigated by the DOJ and many states also.[70] A competitive market would likely make more choices available to consumers. Profit-maximization would incentivize each platform to attract consumers through quality and differentiation which would include how consumers felt about the addictiveness of a platform. Perhaps the least addictive platform would compete for consumers on the basis of its relatively high quality; perhaps it would market its platform to parents of young users; perhaps a third-party rating system would spring up to evaluate platforms' content in the way Consumer Reports rates washing machines. In general, one would expect to see more options for healthy choices if there were less market power. This is one of many beneficial outcomes to expect from antitrust enforcement in technology markets.

In order to achieve accurate measures of consumer welfare, standard antitrust procedures must be updated for dangerous and addictive products, including technology platforms. The consumer welfare standard is well understood to include both current and future price, quality and innovation effects, but is not well understood to require an adjustment for addictive goods. There is no discussion in the Horizontal Merger Guidelines, for example, concerning addictive goods. Why has the practice of antitrust enforcement been

69. Since 2017, the European Commission has fined Google for violating Article 102 in three separate cases: harming competition in online search by promoting its own comparison shopping service; ensuring dominance of the Google search engine by requiring that Android manufacturers pre-install Google search apps; and preventing competition on the merits for online advertising intermediation through exclusive contracts and other anti-competitive tactics. See "Antitrust: Commission Fines Google €1.49 Billion for Abusive Practices in Online Advertising," European Commission, Press Release, March 20, 2019, `https://ec.europa.eu/commission/presscorner/detail/en/IP_19_1770`

70. John D. McKinnon and Emily Glazer, "FTC Weighs Seeking Injunction Against Facebook Over How Its Apps Interact," *The Wall Street Journal*, December 12, 2019, `https://www.wsj.com/articles/ftc-weighs-seeking-injunction-against-facebook-over-how-its-apps-interact-11576178055`; "Attorney General James Gives Update On Facebook Antitrust Investigation," New York State Office of the Attorney General, Press Release, October 22, 2019, `https://ag.ny.gov/press-release/2019/attorney-general-james-gives-update-facebook-antitrust-investigation`; Diane Bartz and Paresh Dave, "U.S. and States' Google Antitrust Probe Nears Finish Line," *Reuters*, June 26, 2020, `https://www.reuters.com/article/us-tech-antitrust-google-focus/u-s-and-states-google-antitrust-probe-nears-finish-line-idUSKBN23X1D7`.

so slow to adapt the Consumer Welfare Standard to addictive goods, especially given that many addictive products are old and have seen antitrust enforcement in past decades? Part of the answer lies in the extent of regulation. For example, if the merger of two automobile companies caused cars to become faster and more dangerous, governments could employ other tools such as speed limits and air bags to protect consumers and give them the benefit of the technology while mitigating its harms. Regulation intercedes to preserve consumer safety so the antitrust analysis does not need to account for the merger resulting in more dangerous products. Likewise, government established age limits, advertising restrictions, and taxes on cigarettes as the realization of the harm caused by smoking grew. There is no regulator in the US today that wields any such tool for social media. A second reason why this framing has not been used in the past in antitrust enforcement is that the behavioral economics analysis and framing is only a few decades old. While forty years of learning might be considered by many readers to be both long-established and ample, in antitrust, behavioral economics is coming up against a field that distrusts anything new.[71] Our view is that behavioral economics, now with 40+ years of research, three Nobel prizes, and many decades of empirical evidence, is firmly in a position to be cited and relied on by antitrust scholars, practitioners, and policy makers.[72]

In this Article we primarily focus on antitrust enforcement involving addictive goods, as addiction is the most developed in terms of the medical science as well as regulation. We take the perspective of the long-run self that prefers not to become addicted, and, like the literature, discount the welfare of the short-run self that is attracted to the addictive substance or activity.[73] This idea of protecting the welfare of the consumers' long-run self

71. See e.g., Rebecca Haw Allensworth,The Influence of the Areeda-Hovenkamp Treatise in the Lower Courts and What it Means for Institutional Reform in Antitrust, 100 Iowa L. Rev. 1919, 1938 ("The Supreme Court has been slow to adjust competition law in responses to advances in economic theory and empirical research, leaving out-of-date precedent on the books for longer than is optimal for antitrust regulation.").

72. Herbert A. Simon won the Nobel Memorial Prize in Economic Sciences in 1978, Daniel Kahneman won the prize in 2002, and Richard Thaler won in 2017.

73. While addiction is a dramatic example of the difference between consumer welfare as calculated by behavioral economics versus neoclassical economics, future antitrust research might want to take on more complex arguments and consider reforming the consumer welfare calculations for non-addictive products with strong present bias such as mortgages, funeral services, sugary drinks, and so forth. These cases are beyond the scope of the

is clearly valued by the government in the other settings described above, where some form of regulation - even if imperfect - is designed to protect it. These examples motivate us to argue that this same issue should not be overlooked in an antitrust context.

4.1 Measuring Consumer Welfare

At some point one or more of these cases may be litigated in US courts. Since so much of the conduct in question will have occurred in the environment described above – one with harms and no regulation – it requires an adjustment in the standard method of evaluating consumer welfare. The welfare of the addicted consumer who consumes more of the addictive product due to the challenged conduct has decreased, rather than increased, as in the usual case. Assessing the situation this way is different from past practice, but an improvement over it. Just because antitrust enforcement has not carried out this analysis correctly in the past is no reason to miss a chance to begin to get it right today. In particular, getting it right is easier due to the learning from 40 years of behavioral economics research and the stable and numerous empirical findings from that literature. In addition, antitrust bears a larger burden in getting it right in the context of digital harms given the lack of any other governmental body standing ready to mitigate those harms.[74]

As noted above, whether or not consumer welfare increased or decreased due to the challenged conduct is often an important element of the analysis. A common shortcut, or summary statistic, that is often used in enforcement is to proxy for consumer welfare with the change in output. *However, the foregoing analysis demonstrates that this shortcut cannot be applied in digital markets given the strong possibility that more output causes harm, not benefit.* Rather, we argue that antitrust analysis in the context of addictive products must return to the root concept of interest: consumer welfare.

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current paper.

74. *See, e.g.,* Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 411 ("Antitrust analysis must always be attuned to the particular structure and circumstances of the industry at issue. Part of that attention to economic context is an awareness of the significance of regulation.").

4.2 Net and Marginal Harm Products

Professor Daniel Crane has analyzed the challenges antitrust enforcement faces in markets for harmful products, a slightly broader category than addictive products.[75] His work focused on the tobacco industry, where there is a long history of government regulation attempting to limit consumption. In this type of market, Crane asserted that the standard antitrust enforcement paradigm — which is geared toward removing barriers to competition to increase output and lower price — is likely inconsistent with the best interests of the consumer. This conclusion requires several assumptions that we discuss below. To identify industries for which standard antitrust analysis might be counterproductive, Crane introduced the concept of "net-harm markets." These are markets where either "[t]he consumption of the good at any level of output produces greater total internal and external costs" than benefits or "[a]t the output level determined by a competitive market, consumption of the good produces greater total costs than total benefits."[76]

Crane conceded that for most products, even tobacco, it would be difficult, if not impossible, to quantitatively demonstrate net harm. With that in mind, Crane proposed relying on a proxy variable: political consensus that output of a particular product is harmful. He found plentiful evidence that there is a political consensus at both the state and federal level in the United States that tobacco use "impose[s] far greater social costs . . . than social benefits."[77] The markets for tobacco products, therefore, are net-harm markets in Crane's paradigm. This conclusion led Crane to recommend that antitrust enforcers focus their efforts on harm-reduction rather than output maximization in these markets.[78] However, precisely because the government is active in these markets, his policy conclusion does not follow. If enforcement action prevented the increase of market power and thus lowered prices

75. Daniel A. Crane, "Harmful Output in the Antitrust Domain: Lessons from the Tobacco Industry," *Georgia Law Review* 39, no. 2 (2005): 321–410.

76. Crane, "Harmful Output in the Antitrust Domain," 346.

77. Crane, 358. This evidence includes "government expenditures on antitobacco advertising, frequent government warnings on the dangers of tobacco consumption, numerous federal and state statutory schemes, federal and state regulations, and federal and state antitobacco litigation."

78. Crane, 367 (In net-harm markets, enforcers and courts "should apply the antitrust laws to pursue a goal of harm-reduction rather than one of output maximization.").

(relative to no enforcement) the price change can be counteracted by a tax. In this way the price increase that would have accrued to the manufacturer can be collected instead by the government. Alternatively the government can reduce usage through tools such as advertising restrictions or restrictions on sales locations. Thus, no consumption increase need occur from enforcement in regulated net-harm markets if they are identified this way.

Social media products are different than tobacco products in an important respect: the authors are happy to assume that there is no beneficial level of tobacco consumption (similar to illegal drugs). By contrast, there are products such as social media that, while addictive, likely have some consumption level for each user that results in net positive utility. This level will be lower than the addictive level of consumption. In this way, social media is more like Oxycontin and credit cards than it is like tobacco. Under the supervision of a physician and in limited amounts, Oxycontin can be very beneficial to a patient in pain, but its overuse will lead to addiction and severe harm. Credit cards too offer users significant utility initially, by granting consumers a convenient short-term loan and method of payment, but their use quickly becomes harmful if consumers charge more than they can afford to pay back on time. Likewise, limited exposure to social media may benefit users by connecting them to friends and family and informing them of events and content. But, as we discussed above, those benefits begin to erode the longer the user engages with a social media platform.[79]

The "conventional" paradox of antitrust enforcement for addictive products is that, because we expect a firm with market power to reduce output and raise price, acquisition of market power might lead to desirable public health outcomes (e.g. cigarettes, opioids).[80] In social media markets, however, the

79. Another distinction between social media and tobacco products is that there is not yet in the United States a political consensus of the sort Crane describes that social media is harmful. There are no federal or state regulations, agency actions, or executive orders restricting social media output. On Crane's terms, social media would not qualify as a net-harm market.

80. Peter J. Hammer, "Antitrust Beyond Competition: Market Failures, Total Welfare, and the Challenge of Intramarket Second-Best Tradeoffs," *Michigan Law Review* 98, no. 4 (2000): 862–3, arguing that a competitive market for cigarettes "would lead to the overproduction and overconsumption of cigarettes" whereas the "exercise of private market power (either through merger or cartelization) would lead to an increase in price and a reduction in consumption" that "might well increase social welfare."

almost universal business model is a free service paid for by advertising. The platform earns more revenue the longer its users stay on the platform and the more ads it can show them. Therefore, dominant firms do not have the same incentive to use their market power to reduce "output," as measured by minutes of use. Rather, the way they exercise their market power is by lowering quality. They aim to drive advertising revenues by collecting more data and showing more ads to both new users and current users who stay longer on the platform. The additional advertising lowers the quality of the product, while the platform uses its market power to create a more addictive design so that the consumer stays to watch the ads. Consumers who would prefer a higher-quality, less harmful product have few other options because of the market power of the platform. Thus in the social media setting, the paradox of antitrust enforcement is that *lack* of enforcement can both increase output and decrease consumer welfare.

4.3 Output measures are insufficient

Because social media presents a complex mixture of harms and benefits, its antitrust treatment requires a more precise approach to evaluating consumer welfare than courts typically employ. Sufficient medical evidence exists that social media is addictive and harmful to conclude that simply counting "output" will not be a reliable method of evaluating consumer welfare.[81] An output-focused method is akin to allowing the manufacturer of Oxycontin to identify the addicts it created and count the additional pills they consumed during an addicted spell as consumer surplus. Clearly this is not correct. Courts should eschew this (common) "output" analytical shortcut in favor of a more accurate approach to measuring consumer welfare, one that takes account of social media's addictive characteristics.

These characteristics lead to two conclusions about antitrust enforcement in social media markets. First, enforcers and courts evaluating anticompet-

81. Crane, 407 ("Even if the public policy of consumption reduction is less clear-cut as to other products, the harm-reduction approach may shed some light on optimal antitrust enforcement in close case industries. If an industry imposes considerable harms but also produces some positive utility, the case for an output-maximization antitrust paradigm may be weaker than the case for a harm-reduction paradigm . . . .").

itive conduct in the social media space must focus on the very real cost of reduced innovation, particularly safety innovation, and lessened product variety in determining whether to challenge or prohibit a transaction or course of conduct.[82] Innovation is key because the more innovative firms there are in a market, the more likely one or more will compete on safety, and create a less addictive and safer social media offering that increases consumer welfare. Courts therefore should prohibit mergers and conduct that would unreasonably decrease innovation and product variety in social media markets.

Second, defendants should not be able to overcome plaintiffs' prima facie case merely by offering evidence that a merger or particular conduct will increase (or not decrease) some kind of usage output measure. As we have demonstrated, output changes–where output is measured by total user engagement or total advertising volume–is unlikely to provide a reliable measure of consumer welfare when the product is addictive. Courts (and enforcers considering bringing cases) must account for the disutility of additional time on addictive social media products when evaluating defenses based on claims of enhanced output. Because output is a "shortcut," or proxy, for consumer welfare, it does not give the right answer when some consumption creates disutility. The burden should be on the defendant to show that any increased output will actually increase consumer welfare. For one, the defendant normally has the burden of showing efficiencies or procompetitive justifications in an antitrust case. Furthermore, the defendant has the data and analytical tools to measure the usage and determine the welfare of its consumers. For example, the challenged conduct may have engaged new users for short amounts or time, which a court might determine is unlikely to represent addictive behavior that harms users. Or, perhaps the conduct extended the amount of time teenagers spent on the social media platform late at night, behavior the literature indicates is more likely to be addictive and result in user harm. Merely providing evidence of more output, in the form of total minutes consumers spend using an app, does not answer the question of whether consumer welfare has increased or decreased.

82. Crane, 388 ("[T]he failure to produce a less harmful form of tobacco consumption may be a failure of antitrust more than anything else. If antitrust enforcement had focused on competition for innovation instead of output maximization, then perhaps smokers would be less harmed by tobacco consumption today.").

4.4 Specific Antitrust Settings

Technology giants, including social media platforms, have acquired and maintained their market power through a variety of means: acquisitions, exclusionary conduct, and, often, a combination of the two. Our more precise approach to consumer welfare analysis in social media markets should alter how courts evaluate such cases. We next discuss merger challenges, exclusionary conduct cases, and claims alleging a pattern of both anticompetitive acquisitions and exclusionary conduct.

We begin with mergers, which are common in the social media sector. Facebook's acquisitions of Instagram (2012) and WhatsApp (2014) are perhaps the best-known of these deals, but Facebook alone acquired 72 companies in the period 2005-2019.[83] The U.S. antitrust enforcement agencies did not challenge any of these transactions, though the FTC and state enforcers have recently opened antitrust investigations into the company.[84] The FTC's decisions not to challenge the Instagram and WhatsApp acquisitions have been widely criticized.[85] Documents recently made public showing that Mark Zuckerberg's strategic reasoning for pursuing the former deal included preventing Instagram from posing a competitive threat to Facebook have sharpened that criticism.[86] As a result of its serial acquisitions, Facebook now owns three of the top four and four of the top six social networks, measured by worldwide users.[87]

83. Ramzeen A V, "72 Facebook Acquisitions – The Complete List (2020)!," *TechWyse*, June 17, 2019, https://www.techwyse.com/blog/infographics/facebook-acquisitions-the-complete-list-infographic/.

84. Brent Kendall, John D. McKinnon, and Deepa Seetharaman, "FTC Antitrust Probe of Facebook Scrutinizes Its Acquisitions," *Wall Street Journal*, August 1, 2019, https://www.wsj.com/articles/ftc-antitrust-probe-of-facebook-scrutinizes-its-acquisitions-11564683965.

85. Fiona M. Scott Morton and David C. Dinielli, *Roadmap for an Antitrust Case Against Facebook* (2020).

86. The House Committee on the Judiciary has published email threads between Mark Zuckerberg and employees as part of its antitrust probe into online platforms. The documents are available at https://judiciary.house.gov/online-platforms-and-market-power/.

87. Statista, "Most popular social networks worldwide as of July 2020, ranked by number of active users," https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/. See also Lina M. Khan, "The Separation of Platforms and Commerce," *Columbia Law Review* 119, no. 4 (2000): 1001 ("Through having purchased Instagram and WhatsApp, Facebook now owns the top three, and four

The U.S. merger review regime is governed by section 7 of the Clayton Act, which bars transactions the effect of which "may be substantially to lessen competition, or to tend to create a monopoly."[88] This incipiency standard grants the antitrust enforcement agencies authority to sue to block a merger before it is consummated, nipping in the bud any competitive problems a proposed transaction might cause. It also allows agencies to challenge and seek to unwind consummated mergers. To establish a prima facie case in a Clayton Act section 7 action to block a merger, the enforcement agencies must define relevant product and geographic markets and demonstrate probable harm to competition in those markets based on market concentration and competitive overlap between the merging parties.[89] If the agencies establish their prima facie case, the defendants have an opportunity to rebut the presumption that the merger is likely to lessen competition by proving that the typical effects of market concentration are not applicable or that the merger's procompetitive benefits outweigh its anticompetitive effects.[90]

Social media's addictive and harmful characteristics should affect courts' analysis of both plaintiffs' prima facie case and defendants' procompetitive justifications. Mergers in the technology space, including those involving social media companies, often involve a platform purchasing an innovative, nascent competitor: Facebook's Instagram acquisition is a prime example.[91]

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of the top eight, social media apps.").

88. *Clayton Act, U.S. Code 15*, § 18

89. *F.T.C. v. Swedish Match,* 131 F. Supp. 151, 166 (D.D.C. 2000) ("The Commission can generally establish a prima facie case by showing that the merged entity will have a significant percentage of the relevant market. . . . In addition to market share, courts examine market concentration and its increase as a result of the proposed acquisition.").

90. *F.T.C. v. Swedish Match,* 167 ("To rebut" the presumption that a transaction is likely to substantially lessen competition, "defendants must show that the market-share statistics 'give an inaccurate prediction of the proposed acquisition's probable effect on competition.'"), quoting *F.T.C. v. Staples,* 970 F. Supp. 1066, 1083 (D.D.C. 1997); *F.T.C. v. CCC Holdings Inc.,* 605 F. Supp. 2d 26, 46 (D.D.C. 2009) ("Upon the showing of a prima facie case, the burden shifts to Defendants to show that traditional economic theories of the competitive effects of market concentration are not an accurate indicator of the merger's probable effect on competition in these markets or that the procompetitive effects of the merger are likely to outweigh any potential anticompetitive effects.").

91. C. Scott Hemphill and Tim Wu, "Nascent Competitors," *University of Pennsylvania Law Review*, Forthcoming, 2, `https://papers.ssrn.com/sol3/abstract_id=3624058` ("[E]nforcers face a dilemma" in "protecting nascent competition, particularly in the context of acquisitions made by leading only platforms.").

These nascent competitors will have a strategy of differentiation from the incumbent that allows them to attract consumers away from the larger competitor. In a healthy social media market, we would expect to see firms competing on a variety of dimensions, including by creating safer, less addictive products. The Supreme Court long ago recognized that in addition to higher output and lower prices, competition provides incentives to produce safer and higher quality goods.[92] The Court has observed that "all elements of a bargain—quality, service, safety, and durability—and not just the immediate cost, are favorably affected by the free opportunity to select among alternative offers."[93]

Indeed, competition based on safety innovation is a familiar aspect of many markets. For years, Volvo's competitive advantage in the automobile industry was its reputation for safety.[94] Apple trumpets its security and privacy protections, which make its products safer to use than those of rivals.[95] The Disney Channel offers more wholesome child-friendly content than many competing services. There is even a history of safety competition in the tobacco markets, with firms innovating to produce less harmful cigarettes and other, safer types of tobacco products.[96] The U.S. Food and Drug Administration in 2019 for the first time categorized eight smokeless tobacco products as presenting "modified risk."[97] This order allowed Swedish Match to market its smokeless tobacco products with the claim that using them "instead of cigarettes puts you at lower risk" of cancer, heart disease, and other serious

92. *Nat'l Soc'y of Prof'l Eng'rs v. United States,* 435 U.S. 679, 695 (1978) ("The Sherman Act reflects a legislative judgment that ultimately competition will produce not only lower prices, but also better goods and services.").

93. Ibid.

94. Volvo, "Volvo Safety Vision – Zero Accidents," `https://www.volvogroup.com/en-en/about-us/traffic-safety/safety-vision.html`.

95. Apple, Privacy ("Privacy is a fundamental human right" and "one of [Apple's] core values"), https://www.apple.com/privacy/. Apple states that it "designs its products to protect your privacy and give you control over your information. It's not always easy. But that's the kind of innovation we believe in."

96. (Crane, 390 ("All of the major tobacco companies are reportedly working [on] or test marketing products that could reduce different harms of tobacco consumption.").

97. Food and Drug Administration, "FDA grants first-ever modified risk orders to eight smokeless tobacco products," October 22, 2019, `https://www.fda.gov/news-events/press-announcements/fda-grants-first-ever-modified-risk-orders-eight-smokeless-tobacco-products`.

ailments.[98] The popularity of Consumer Reports and other product review services is fueled in part by consumer demand for comparative safety ratings.

The 2010 Horizontal Merger Guidelines recognize the importance of innovation and product variety. They explain that while enhanced market power often results in higher prices, it can also lead to non-price consumer harms, "including reduced product quality, reduced product variety, reduced service, or diminished innovation."[99] The Guidelines specifically state that the enforcement agencies "may consider" whether a proposed transaction will "diminish innovation competition."[100] Nonetheless, in many merger cases, the enforcement agencies rely primarily on claims that the transaction will result in higher prices and lower output, with reduced innovation mentioned only as a secondary effect or neglected altogether.[101] In digital markets this approach would be a mistake given the extremely important role of innovation and quality in consumer welfare.[102] Anticompetitive innovation effects will often be critical and they should play a central role in merger litigation.

These points are particularly relevant in social media markets. With the knowledge that social media is addictive and can cause significant mental health harms, especially in children, consumers are likely to want offerings that are less addictive and less harmful than current social media platforms. In a competitive market, some firms likely would vie for that demand by offering safer social media experiences. This might mean innovating by engaging in research enabling the design of a user interface that promotes mental health. More simply, a platform could offer features that limit the amount of social media a user can consume in a given session or day. Firms also might compete to make their products less harmful by eliminating "likes"

98. Food and Administration, "FDA grants first-ever modified risk orders to eight smokeless tobacco products."

99. U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines," August 19, 2010, `https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf`, page 2.

100. "Horizontal Merger Guidelines," page 23.

101. Richard J. Gilbert and Steven C. Sunshine, "Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets," *Antitrust Law Journal* 63, no. 2 (1995): 572 ("Antitrust analysis typically does not dwell on the nonprice aspects of competition.").

102. The prices paid by advertisers will often be another important focus. Quality-adjusted prices are a familiar lens through which to understand consumer harm when a product's monetary price is zero.

and content that tends to harm users' mental health. Alerts notifying users (or users' parents) of the amount of time they have spent on a platform and interfaces that eliminate infinitely scrolling pages that continually direct the user to new content are examples of safety improvements that would increase users' wellbeing.

Firms also might employ business models that change incentives to protect users' mental health. Employing a subscription model to generate revenue rather than relying on advertising would eliminate the financial incentive to keep users on the platform for more time while sharpening the incentive to provide a high-quality user experience. In general, in a market where consumers have choices, companies would expend resources to innovate in ways that attract them, one of which is likely to be platform safety.

A more interventionist merger regime in the social media markets (combined with aggressive section 2 enforcement, discussed below) should give new competitors space to develop. Competition holds out the possibility that some competitors will choose to differentiate by creating less addictive, safer offerings, as we have seen with Volvo, Apple, and the Disney Channel. We recognize that it is possible that increased competition would spark a "race to the bottom" instead. In this scenario, rivals would vie to keep users on their sites as long as possible to increase advertising revenue. Rather than competing on safety and quality, firms would compete on quantity and would lower quality (by offering a more addictive, more harmful product). Output of harmful social media would rise as the market became more competitive, while no competitor chose to differentiate into the safety segment. While this is certainly a risk of increased merger enforcement in markets for addictive products, such an outcome would be no worse than a status quo like a Facebook empire, where a dominant firm maximizes user engagement to maintain its network effects and drive advertising revenue.

The nuts and bolts of a section 7 case would change under our proposed approach, but not dramatically. Plaintiffs would still offer evidence of market shares and market concentration, and enforcement would be appropriate only if the relevant market is concentrated. But rather than focusing primarily on potential output effects, plaintiffs' theory of harm (and the court's attention) should be on potential innovation and product-variety effects as well as the potentially addictive nature of the product. Hemphill and Wu contend that

despite the uncertainty that often surrounds nascent, innovative competitors, the "risk of lost innovation strongly tips the balance in favor" of merger enforcement.[103] The potential public health consequences of social media mergers raises the stakes and strengthens the argument for intervening in transactions that might eliminate an innovative competitor. Therefore, if the enforcement agencies can demonstrate that the target is an innovator and competes on quality, one dimension of which may currently, or in the future, be the impact on mental health, that should be sufficient to establish their theory of competitive harm. Defendants should be able to overcome this showing only if they can provide compelling evidence of an increase in consumer welfare. This could arise from specific beneficial changes in usage, merger-specific safety improvements, or other like benefits. Evidence that a merger will simply increase total user engagement does not show that consumer welfare has increased - indeed perhaps the opposite - and so it is not sufficient to overcome the prima facie case in the social media space.

Should rivals emerge offering attractive (perhaps less addictive and safer) social media products, they would pose a serious threat to the dominant social media business model. If the incubment is unable to acquire the nascent competitive threat, it may protect its market power by trying to exclude its smaller competitors. Or — in a familiar scenario[104] — incumbent firms will engage in a combination of serial acquisitions and anticompetitive conduct designed to maintain their market power. Enforcers can reach this pattern of conduct under section 2 of the Sherman Act. Section 2 prohibits the unlawful acquisition or maintenance of a monopoly. While the typical section 2 case involves business conduct such as refusals to deal or exclusive dealing, section 2 also applies to individual acquisitions, serial acquisitions, and any combination of acquisitions and other conduct that leads to unlawful monopoly acquisition or maintenance. In the technology markets, dominant firms have used a variety of strategies to maintain their market power. The government's case against Microsoft in the 1990's provides a leading example of this mixture of conduct designed to protect Microsoft's operating system monopoly. Professor Lina Khan has argued that Amazon has engaged in a pattern of exclusionary conduct and strategic acquisitions to establish and then maintain its dominance in various e-commerce markets.[105] Facebook also

103. Hemphill and Wu, 13.
104. Scott Morton and Dinielli, *Roadmap for an Antitrust Case Against Facebook.*
105. Lina M. Khan, "Amazon's Antitrust Paradox," *Yale Law Review* 126, no. 3 (2000):

has employed a pattern of strategic acquisitions (Instagram, WhatsApp) and aggressive conduct (modifying its APIs to prevent Vine users from uploading videos onto Facebook).[106]

A section 2 plaintiff must prove that the defendant has monopoly power in a relevant market and has engaged in exclusionary conduct that harmed competition.[107] By successfully carrying this burden, the plaintiff establishes a prima facie case, at which point the defendant will have the opportunity to offer procompetitive justifications for its conduct.[108] If the defendant offers such justifications, plaintiff must either rebut them or show that the anticompetitive harm stemming from the defendant's conduct outweighs any procompetitive effect.[109] The two points we made above in the context of mergers apply also in the context of monopolization.

Because enhanced innovation and product variety increase the chances that consumers will be able to choose safer social media offerings, enforcers and courts should focus their attention on exclusionary conduct that would eliminate innovative firms, whether those innovators are current or potential future competitors of the dominant incumbent. A pattern of strategic acquisitions and exclusionary conduct against nascent, innovative rivals should be sufficient to establish a prima facie section 2 case.

Further, a section 2 defendant in the social media space should not be able to overcome a prima facie case of competitive harm by offering evidence of efficiencies that result only in higher output, without showing that the output change increases consumer welfare. As in the merger setting, evidence that some general measure of user engagement has increased does not prove that consumer welfare has gone up. Such increased user engagement might come from already addicted users spending even more time on a platform and be rendering them worse off. So, when weighing harm to a nascent innovator against increased output from a social media monopolist, courts

755–83.

106. Scott Morton and Dinielli, *Roadmap for an Antitrust Case Against Facebook*.

107. *U.S. v. Grinnell Corp.,* 384 U.S. 563, 570-71 (1966); *U.S. v. Microsoft Corp.,* 253 F. 3d 34, 58 (D.C. Cir. 2001) ("[T]o be condemned as exclusionary, a monopolist's act must have an 'anticompetitive effect.' That is, it must harm the competitive process and thereby harm consumers. In contrast, harm to one or more competitors will not suffice.").

108. Microsoft, 253 F. 3d at 59.

109. Id.

should find that the balance favors liability unless the defendant can show that its conduct actually increases consumer welfare.

5 Conclusion

Social media's addictive and harm-producing characteristics pose special analytical challenges for antitrust courts and enforcers. In both the merger and the section 2 settings, antitrust policy for social media that results only in an increased quantity of an addictive (low-quality) product does not increase consumer welfare. Just as more Oxycontin consumption by addicted users harms consumers, so too does addicts' increased social media consumption. We contend that this insight requires a sharpening of antitrust analysis for social media that focuses on innovation effects and more carefully defines consumer welfare to account for social media's addictive and harmful user impact.

The assumption that more consumption of addictive digital products leads to increased utility is not justifiable based on our reading of the medical and economics literature. Therefore, the common "short cut" of using a measure of output as a proxy for consumer welfare fails as a matter of economics. It is not reliable for these goods. In an antitrust enforcement context, the impact of the conduct on consumer welfare is the ultimate measure of interest. If the government has carried its prima facie case, the social media defendant must demonstrate pro-competitive efficiencies, efficiencies that increase consumer welfare. Such a platform might attempt to show that its internal processes demonstrate that its user interface is not designed to be addictive. Or, it might try to show that its business model does not create any incentive for addiction. A platform could use its own data to demonstrate the conduct's impact on users' behavior, showing changes by type of consumer in different kinds of usage, and in amounts of time spent. This type of analysis would help the court understand the impact of the conduct on consumer welfare.

For many consumers, digital engagement is addictive and their long-run selves wish to do less of it. For many consumers, digital engagement causes them to purchase products or watch content that they later regret or causes

harm. For many consumers, the online content presented to them by digital businesses causes them to experience negative emotions such as hate and anxiety that are harmful in and of themselves, but also may be carried into relationships with others. These are harms, not benefits, to increased consumption of social media. In the parlance of antitrust economics, the harms that digital businesses impose on unwitting consumers lower the quality of the product. When a service declines in quality, that is a harm to consumer welfare. When a free service declines in quality due to anticompetitive conduct by a digital business, that is equivalent to an increase in quality-adjusted price, a traditional antitrust harm. Therefore, increased engagement driven by addiction is equivalent to a higher quality-adjusted price for that consumer. Because courts and enforcers have relatively little experience with enforcement in social media markets, more research and learning about the welfare impact of increased consumption of these kinds of addictive and exploitative products is needed. But we know enough already to conclude that social media's addictive and harmful characteristics should change the way courts and enforcers analyze antitrust claims in these markets.