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The Dog That Didn't Bark: Looking for Techno-Libertarian Ideology in a Decade of Public Discourse about Big Tech Regulation

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THE DOG THAT DIDN'T BARK: LOOKING FOR TECHNO-LIBERTARIAN IDEOLOGY IN A DECADE OF PUBLIC DISCOURSE ABOUT BIG TECH REGULATION

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The internet was built on the techno-libertarian ideology that "information wants to be free," and that ideology has played a prominent role in academic and policy debates about regulating the internet and the big technology companies that dominate it.[2] Techno-libertarian ideology has generated a constellation of claims about tech and regulation—from the suggestion that regulation will stifle innovation in the complex, dynamic tech sector, to the assertion that the large platform companies are literally not regulable. In this article, we explore how much traction such claims and ideologies have in the broader public discourse about big tech and regulation. We employ an innovative methodology—topic modeling—to track public discourse on the regulation of big technology from 2010 to 2020. We find that techno-libertarian ideas about free markets and information freedom play a surprisingly small role in this discourse. Indeed, we find that the most common themes in the discourse about big tech and regulation concern: calls

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[2] R. Polk Wagner, *Information Wants to Be Free: Intellectual Property and the Mythologies of Control*, 103 COLUM. L. REV. 995, 1033 (2003).

to regulate big tech companies; growing critiques of technology's influence in society; and declining discussion of the tech sector as a driver of economic growth. Our findings should embolden legal and policy advocates to pursue regulatory initiatives aimed at addressing the social and economic harms produced by the technology sector knowing that the techno-libertarian rhetoric likely to be deployed against them may not have sufficient public traction to win the day.

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I. Introduction

The last fifty years have seen technological innovations that have dramatically transformed our society. The microcomputer, the internet, and wireless technology, for example, have changed the way we consume and communicate in ways that few could have imagined in 1970. Yet the creators of this technology did not simply develop hardware and software. They also fashioned a system of beliefs. They have propagated a libertarian ideology that has played a prominent role in academic and policy debates about regulating the internet and the big technology companies that dominate it.

Indeed, no industry has been more zealous in crafting and championing a regulatory ideology than the tech sector. Characterized variously as technological utopianism, techno-utopianism, or techno-libertarianism (the moniker we adopt here), this ideology envisions cyberspace as a domain of "perfect freedom"[3]—a space that promises "a kind of society that real space would never allow—freedom without anarchy, control without government, consensus without power."[4] Techno-libertarianism has generated a constellation of claims about tech and regulation—that government regulation will stifle innovation in the dynamic tech sector, that it is unnecessary because market forces and the tech companies' own benevolence will prevent social harms, and that, where regulation is called for, self-regulation is the only effective way to order the behavior of companies in this complex industry.[5] Ideologies about regulation shape how—and even whether—the state regulates.[6] Thus, both advocates and opponents of increased regulation of the technology sector should want to understand the ideological and rhetorical landscape upon which these political battles are occurring. Exactly how much traction do techno-libertarian claims and ideologies have in the broader public discourse?

To find out, we employ a methodology innovative in legal scholarship to track public discourse on the regulation of large

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[3] LAWRENCE LESSIG, CODE: VERSION 2.0, at 3 (2006).

[4] *Id.* at 2.

[5] David R. Johnson & David Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367, 1375 (1996) ("The rise of an electronic medium that disregards geographical boundaries throws the law into disarray by creating entirely new phenomena that need to become the subject of clear legal rules but that cannot be governed, satisfactorily, by any current territorially based sovereign."); LESSIG, *supra* note 3, at 31 (statement of Tom Steinert-Threlkeld) ("Some things never change about governing the Web. Most prominent is its innate ability to resist governance in any form."); *id.* ("If there was a meme that ruled talk about cyberspace, it was that cyberspace was a place that could not be regulated.").

[6] *See* Jodi L. Short, *The Paranoid Style in Regulatory Reform*, 63 HASTINGS L.J. 633 (2012).

technology corporations from 2010 to 2020. We use a topic modeling algorithm to systematically search for discursive trends in a large corpus of news articles. As we describe in more detail in Part II, topic modeling is a computational technique that allows for the systematic study of cultural representations. It is a digitized method for analyzing textual data to identify common themes and relationships in large bodies of text, thereby uncovering explicit and latent motifs.[7] Unlike word-based methods for quantitative content analysis,[8] topic modeling does not simply count frequencies. Instead, using both the frequency of particular words and their co-occurrence with respect to one another, the topic model accounts for the probability that certain words occur together and for the weight each word contributes to these probability distributions. The most highly weighted words provide clues about the significance of particular subjects, or "topics," which can then be explored with more conventional interpretative techniques. Because topic modeling techniques work on large bodies of text,[9] this paper illustrates how they can prove particularly useful for legal and policy analysis.

Using topic modeling, we find that techno-libertarian (or even just plain old libertarian) ideas about free markets and information freedom play a surprisingly small role in the public discourse, despite the technology corporations' relentless emphasis on them. Indeed, we find that the most common themes in the discourse about big tech and regulation concern the need to regulate big tech companies. As policy makers embark on discussions about whether and how to regulate this powerful sector, they should be aware of these broader trends. The utopian narratives that big tech companies (and their lobbyists) tell about themselves do not seem to have captured the public's imagination. This fact leaves policymakers with more room to operate as they craft regulatory responses to the social costs that have accompanied technological innovation.

The Article proceeds as follows. Part I presents a qualitative description of the techno-libertarian ideology using source material produced by or documenting the views of tech companies, their executives, and their lobbyists. It explores how the ideology developed and discusses how it shaped the architecture and ethos of internet, as well as the ideas about how computer technologies should be regulated. It also documents how techno-libertarian ideas have been deployed in recent legal and policy debates about the regulation of technology

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[7] Tim Hannigan et al., *Topic Modeling in Management Research: Rendering New Theory From Textual Data*, 13 ACAD. MGMT. ANNALS 589 (2019).
[8] *See* Yla R. Tausczik & James W. Pennebaker, *The psychological meaning of words: LIWC and computerized text analysis methods*, 29 J. LANGUAGE & SOC. PSYCH. 24-54.
[9] Hannigan et al., *supra* note 7, at 589.

companies, including state privacy legislation, municipal regulation of ride sharing platforms, and proposed Congressional legislation to ensure the accuracy of ads placed on social media. In doing so, it highlights how big tech companies have mobilized elements of techno-libertarian discourse to resist attempts to regulate them. This qualitative account motivates the empirical question we seek to address with our topic model: how much do techno-libertarian claims and ideologies contribute to the broader public discourse relating to the regulation of major technology companies?

Part II explains what topic modeling is in some detail. It then describes our empirical study of the public discourse about regulating large technology corporations and explains our methodology. Part III presents the results of our study. We find that techno-libertarian ideologies do not dominate public discourse on the regulation of big tech. Instead, this discourse is dominated by calls to regulate big tech, growing critiques of technology's influence in society, and declining discussion of the tech sector as a driver of economic growth. This article then concludes, arguing that the nature of this discourse suggests that policymakers should not assume that the public accepts the anti-regulatory premises of techno-libertarianism. Consequently, these policymakers should realize that they are operating in a more pro-regulatory political environment than they might have otherwise believed.

II. The Techno-Libertarian Ideology

The morning of March 3, 1998, was an unusual one for Bill Gates, then 42-year-old chairman of the Microsoft Corporation. Gates was in Washington, D.C., testifying before the Senate Judiciary Committee.[10] Capitol Hill was not a place where Gates felt comfortable. Unlike many of his colleagues and competitors in the technology sector, Gates had always sought to avoid political entanglements.[11] Indeed, the previous year, the company had donated less than $100,000 to federal political candidates.[12] Its lobbying operation consisted of a single

[10] Rajiv Ch & Rasekaran, *Microsoft in Senates Focus*, WASH. POST (March 3, 1998), https://www.washingtonpost.com/archive/business/1998/03/03/microsoft-in-senates-focus/2a403de5-8088-470b-8485-a40f7229cf3e/ [https://perma.cc/5JKX-3ZZK].
[11] Stephanie Simon & Erin Mershon, *Gates masters D.C. – and the world*, POLITCO (February 04, 2014, 8:01 PM), https://www.politico.com/story/2014/02/bill-gates-microsoft-policy-washington-103136 [https://perma.cc/L86V-3P7F].
[12] Joel Brinkley, *U.S. v. Microsoft: The Lobbying*, N.Y. TIMES, Sept. 7, 2001, https://www.nytimes.com/2001/09/07/business/us-vs-microsoft-the-lobbying-a-huge-4-year-crusade-gets-credit-for-a-coup.html [https://perma.cc/F9GV-4F4U].

person operating out of an office in a Chevy Chase shopping mall.[13] Gates seemed to believe that if he ignored Washington, it would ignore him.

Gates' appearance on Capitol Hill was not the only unusual thing about the hearing. Even stranger was how poorly he was received. Used to kit-gloved treatment by a public that viewed him as the self-made, boy genius fueling the PC revolution, he was not expecting the bipartisan drubbing he would receive that day. After a day of defending himself from accusations of being a greedy, disingenuous monopolist, the *New York Times* described Gates as "shellshocked."[14]

What brought Gates to Washington that day was what have become known as "The Browser Wars."[15] By the middle of the 1990s, the Internet had ceased to be merely a tool of academics and computer aficionados.[16] Through search engines and social networking platforms, a market for user-friendly software allowing people to access the World Wide Web had quickly sprung up.[17] Initially, this market was dominated by Netscape Communications, whose product, Netscape Navigator, had gobbled up 80% of the browser market by 1996.[18] That year, however, Microsoft introduced its own browser—Internet Explorer—and bundled it with its industry-dominant operating system, Windows 95.[19] As Internet Explorer quickly ate away at its market share, Netscape brought an antitrust lawsuit against Microsoft, claiming that it was using its near-monopoly in operating systems to prevent competition in the market for browsers.[20] As the lawsuit commenced, Congress invited Gates to the Capitol.[21] The facts alleged in Netscape's lawsuit, it seems, put some legislators in a regulatory mindset.

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[13] MARGARET O'MARA, THE CODE: SILICON VALLEY AND THE REMAKING OF AMERICA 350 (2019); Brinkley, *supra* note 12.

[14] Lizette Alvarez, *An 'Icon of Technology' Encounters Some Rude Political Realities*, N.Y. TIMES (March 4, 1998), https://www.nytimes.com/1998/03/04/business/an-icon-of-technology-encounters-some-rude-political-realities.html [https://perma.cc/3QRW-2ZAF].

[15] For the Browser Wars, *see* O'MARA, *supra* note 13, at 341–46.

[16] *Id.* at 287.

[17] *Id.* at 309.

[18] Henry R. Norr, *Netscape Communications Corp.*, ENCYC. BRITANNICA (August 28, 2017), https://www.britannica.com/topic/Netscape-Communications-Corp [https://perma.cc/TBB7-VBFK].

[19] Paul Thurrott, *Microsoft to release Windows 95 OSR 2.5*, ITPRO TODAY (October 19, 1997), https://www.itprotoday.com/windows-78/microsoft-release-windows-95-osr-25 [https://perma.cc/L6RA-5VHE].

[20] O'MARA, *supra* note 13, at 341–46.

[21] *Competition, Innovation, and Public Policy in the Digital Age: Hearings Before the S. Comm. on the Judiciary*, 105th Cong. 87 (1998) (statement of Bill Gates, Chairman and CEO, Microsoft Corp.).

Gates' testimony was designed to deflect such impulses. He delivered a simple message: "The PC industry," as he called it, was a goose laying golden eggs.[22] By creating innovative hardware and software, it generated high-paying jobs, and inexpensive, high-quality products.[23] Furthermore, American economic growth relied on this continued innovation, both to keep the technology sector expanding and to maintain and accelerate other economic sectors that had become increasingly dependent on technology to compete in a global marketplace.[24] Government regulation, Gates claimed, would kill the goose. "To remain competitive and to continue to provide consumers with high quality, low cost, innovative products . . . software companies must retain the ability to design their products free from government interference."[25] Such "government intervention" "hobbled" the industry, preventing it from developing "new products that meet the needs of consumers."[26]

According to Gates, politicians who attempted to regulate technology industries failed to understand how the industry worked. No matter how big an existing company was, its products could, at any moment, be rendered obsolete by individual entrepreneurs— "college room buddies" working out of "small offices," "hobbyists" holed-up in garages, or "innumerable other . . . small entrepreneurs" developing software at their "kitchen table."[27] Freedom from government interference was the key to facilitating this sort of low-capital competition and innovation. "The software industry's success has not been driven by Government regulation, but by freedom and the basic human desire to learn to innovate and to excel."[28]

Gates was not without allies at the hearings. Tech sector entrepreneurs Michael Dell and Douglas Burgum echoed his talking points.[29] The technology industry "started quite literally in the garages, kitchens, and dormitory rooms of this country. Part of the appeal of this industry is the freedom to succeed or fail based solely on one's own abilities."[30] Success was thus the product of individual initiative "free from government regulation . . . ."[31] The venture capitalist/tech journalist Stewart Alsop, II was even more explicit. "I believe that it is

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[22] *Id*. at 90.
[23] *Id*. at 91.
[24] *Id*.
[25] *Id*. at 94.
[26] *Id*. at 96.
[27] *Id*. at 89, 92.
[28] *Id*. at 89.
[29] *See id*. at 113-126 (statements of Michael Dell, Chairman and CEO, Dell Computer Corp. & Douglas J. Burgum, Chairman and CEO, Great Plains Software).
[30] *Id*. at 125 (statement of Douglas J. Burgum, Chairman and CEO, Great Plains Software).
[31] *Id*.

dangerous and potentially disastrous to invite governmental regulation of the interfaces between elements of the technology we are adopting at such a remarkable rate."[32] Dramatically, he likened the hearings to Joseph McCarthy's "destructive demagoguery."[33] He then articulated a radically antiregulatory stance based on his assessment of the state's inevitable regulatory incompetence:

> I want to be clear that I also grew up in a time when the Government proved itself incapable of judicious or expeditious regulation of the economy as a whole or even of individual industries, and I learned to distrust a centralized government's ability to regulate itself or to act in the best interests of its constituency over the long term.[34]

According to Alsop, this hostility to regulation was particularly appropriate when it came to the regulation of technology. This was because the personal computer was unlike the earlier technologies—railroads, petrochemicals, "large-scale manufacturing"—that had generated previous regulatory impulses.[35] Businesses in those industries required centralized, hierarchical power that might itself become oppressive. The tech industry, on the other hand, had no such potential. Not only did it spring from the initiative of decentralized, individual entrepreneurs, but it also promoted individual freedom by destroying hierarchies, both public and private.

> The personal computer has challenged corporations' ability to control computing resources centrally, empowering individuals, and breaking down hierarchies. Communications technologies have made it nearly impossible for centralized governments to control access to information. The Internet and the World Wide Web have suddenly removed the structural costs of gaining access to and managing information in a fashion unprecedented in human experience.[36]

In such a world, regulation was unnecessary. Not only would it stifle economic growth and technological innovation. It would also undermine the transformation of the society from a centralized one based on large, potentially oppressive, institutions to one that was

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[32] *Id.* at 128 (statement of Stewart Alsop, II).
[33] *Id.*
[34] *Id.*
[35] *Id.*
[36] *Id.*

decentralized and egalitarian, driven by networked individuals each liberated to create, innovate, and flourish.

By the time that Gates, Dell, Burgum, and Alsop appeared before Congress in early 1998, the tech utopianism that their testimony reflected was pervasive in American society. In the past three decades a host of scholars and journalists—Richard Barbrook, Andy Cameron, Fred Turner, Margaret O'Mara, Scott Galloway, John Markoff, Paulina Borsook, Alan Lui, Vincent Mosco, Tiziana Terranova, for example—have described the emergence of this ideology, and the politics that accompanied it.[37] It took libertarian beliefs—that human society was best structured by leaving individuals alone to pursue their self-interests—and linked them to decentralized digital technologies to explain precisely how this liberation would occur. Personal computers acted as agents of freedom, promoting liberty and innovation by creating a hybrid digital-actual society that was free of hierarchical restraints, be they public or private. In this environment, decentralized action would generate the best ideas, products, and forms of social organization. It was a dynamic world of constant, decentralized innovation in which monopoly was a meaningless concept. Every corporate behemoth was nothing more than a Goliath waiting to be toppled by the next David (or Steve, Mark, Jeff, or Elon) whose unanticipated innovation would soon spring from a Cupertino garage. Indeed, to the extent that new technologies created social problems, they would solve these problems themselves. If the internet made pornography easily available to seven-year-olds, then a filtering program would solve the problem.[38] If social networks became platforms for inflaming ethnic hatreds, then subtle algorithms were the

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[37] *See generally* Richard Barbrook & Andy Cameron, *The Californian Ideology*, 6 SCI. AS CULTURE 44-72 (1996), http://www.imaginaryfutures.net/2007/04/17/the-californian-ideology-2 [https://perma.cc/BCE9-VNFH]; FRED TURNER, FROM COUNTERCULTURE TO CYBERCULTURE: STEWART BRAND, THE WHOLE EARTH NETWORK, AND THE RISE OF DIGITAL UTOPIANISM (2006); O'MARA, *supra* note 13; SCOTT GALLOWAY, THE FOUR: THE HIDDEN DNA OF AMAZON, APPLE, FACEBOOK, AND GOOGLE (2017); JOHN MARKOFF, WHAT THE DOORMOUSE SAID: HOW THE SIXTIES COUNTERCULTURE SHAPED THE PERSONAL COMPUTER INDUSTRY (2005); PAULINA BORSOOK, CYBERSELFISH: A CRITICAL ROMP THROUGH THE TERRIBLY LIBERTARIAN CULTURE OF HIGH TECH (2000); ALAN LIU, THE LAWS OF COOL: KNOWLEDGE WORK AND THE CULTURE OF INFORMATION (2004); VINCENT MOSCO, THE DIGITAL SUBLIME: MYTH, POWER, AND CYBERSPACE (2004); TIZIANA TERRANOVA, NETWORK CULTURE: POLITICS FOR THE INFORMATION AGE (2004).

[38] *See generally* Marie Eneman, *Internet Filtering: A Solution to Harmful and Illegal Content?*, IEEE SMARTWORLD, UBIQUITOUS INTELLIGENCE & COMPUTING, ADVANCED & TRUSTED COMPUTING, SCALABLE COMPUTING & COMMUNICATIONS, CLOUD & BIG DATA COMPUTER, INTERNET OF PEOPLE AND SMART CITY INNOVATION (SMARTWORLD/SCALCOM/UIC/ATC/CBDCOM/IOP/SCI) 354-549 (2019), https://doi.org/10.1109/SmartWorld-UIC-ATC-SCALCOM-IOP-SCI.2019.00104 [https://perma.cc/P2VN-AM66] (canvasing and evaluating the use of Internet filtering for child abuse material).

solution.[39] Worried about on-line privacy? Implement your privacy settings just so.

The corollary to these beliefs was that decisions made by the market—the "electronic agora"[40] —were preferable to those made by the state. Technology had created a pure marketplace of ideas. Thus, governance generated by the decentralized, technology-enabled decision-making processes of a networked world would be better than the decision of any government bureaucrat, no matter how well intentioned. When Gates, Dell, Burgum, and Alsop made this argument before Congress in 1998, they were simply articulating what had become the common wisdom of the denizens of the tech sector for over thirty years. It was a strange amalgam of ideas constructed out of classical libertarianism, counterculture communalism, postwar cybernetic theory, and science fiction inflected-utopianism, but its view of the state and its role as a regulator was clear. As Esther Dyson, George Gilder, George Keyworth, and Alvin Toffler wrote in their 1994 tech manifesto, "Magna Carta for the Knowledge Age":[41] "Today we have, in effect, universal access to personal computing—which no political coalition ever subsidized or 'planned.'" Consequently, "if there is to be an 'industrial policy for the knowledge age,' it should focus on removing barriers to competition and massively deregulating the fast-growing telecommunications and computing industries."[42] Indeed, such deregulatory impulses should ultimately cast an even wider net. "[A] 'mass movement' for cyberspace is still hard to see . . . Yet there are key themes on which this constituency-to-come can agree. To start with, liberation—from . . . rules, regulations, taxes, and laws laid in place to serve the smokestack barons and bureaucrats of the past."[43]

Techno-libertarian ideology continued to dominate Silicon Valley's discourse about itself long after founding entrepreneurs moved out of their dorm rooms and garages and onto Wall Street. By 2019, the five largest technology corporations—Apple, Amazon, Facebook, Google/Alphabet, and Microsoft—had achieved market domination, their stock worth "more than the entire economy of the United Kingdom."[44] Yet the rhetoric remained the same, nurtured by

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[39] MONIKA BICKERT, FACEBOOK, CHARTING A WAY FORWARD: ONLINE CONTENT REGULATION (2020).

[40] Barbrook & Cameron, *supra* note 37.

[41] TURNER, *supra* note 37, at 228-232 (Turner describes the writing of this document and its diverse ideological and theoretical antecedents.).

[42] Esther Dyson, George Gilder, George Keyworth & Alvin Toffler, *Cyberspace and the American Dream: A Magna Carta for the Knowledge Age*, FUTURE INSIGHT (Aug. 1994) http://www.pff.org/issues-pubs/futureinsights/fi1.2magnacarta.html [https://perma.cc/Q3DW-7GGZ].

[43] *Id.*

[44] O'MARA, *supra* note 13, at 1.

iconoclastic founders and funders like Peter Thiel[45] and Elon Musk,[46] and employed strategically by tech companies to thwart attempts to regulate them. Thus, faced with the prospect of regulation, big tech companies repeated the same themes that Gates' deployed in the 1990s: their industry produced enormous benefits for the public;[47] it was able to produce these benefits because the government left it alone to innovate;[48] government regulation would kill innovation and all the public benefits attendant to it;[49] and whatever social problems novel technologies created could be solved through self-regulation.[50]

In recent years, the industry has had many opportunities to deploy these arguments as calls for regulation of the technology sector have gained momentum in response to growing recognition of the harms the technology sector has caused and the future dangers it threatens. Platform companies' relentless surveillance and expropriation of users' digital footprint to predict and manipulate user behavior has raised serious concerns about individual privacy and human dignity.[51] While social media has been an extremely powerful tool for the global exchange of information, ideas, and public discourse, misinformation and disinformation have become rampant,[52]

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[45] Noam Cohen, *The Libertarian Logic of Peter Thiel*, WIRED (Dec. 27, 2017, 7:00 AM), https://www.wired.com/story/the-libertarian-logic-of-peter-thiel [https://perma.cc/38SQ-M9BU] (Thiel, a co-founder of PayPal and the first outside investor in Facebook, has been characterized as a "public intellectual" and "a trusted advisor to a new generation of leaders."); Peter Thiel, *The Education of a Libertarian*, CATO UNBOUND (Apr. 13, 2009), https://www.cato-unbound.org/2009/04/13/peter-thiel/education-libertarian [https://perma.cc/4XC6-ML7V] (Among other things, he has asserted that internet entrepreneurs create new worlds beyond the reach of government and expressed hope that Facebook might "create the space for new modes of dissent and new ways to form communities not bounded by historical nation-states.").

[46] Nick Statt, *Elon Musk Says Shelter-in-Place Orders During COVID-19 Are "Fascist,"* THE VERGE (Apr. 29, 2020, 7:30 PM), https://www.theverge.com/2020/4/29/21242102/elon-musk-coronavirus-fascist-shelter-in-place-tesla-covid-19-safety-science [https://perma.cc/5YST-68GU] (In a recent tweetstorm that has since been removed, Musk decried the stay-at-home order imposed by the California county that hosts his Freemont assembly plant as "forcibly imprisoning people in their homes, against all their constitutional rights."); *id.* (This was, in his opinion, "breaking people's freedoms in ways that are horrible and wrong, and not why people came to America and built this country . . . .").

[47] *Competition, Innovation, and Public Policy in the Digital Age: Hearings Before the S. Comm. on the Judiciary*, *supra* note 21.

[48] *Id.* at 94.

[49] *Id.*

[50] *Id.*

[51] SHOSHANA ZUBOFF, THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER 109 (2019).

[52] *See* Meira Gebel, *Misinformation vs. Disinformation: What to Know About Each Form of False Information, and How to Spot Them Online*, BUS. INSIDER (Jan. 15, 2021, 1:02 PM), https://www.businessinsider.com/misinformation-vs-disinformation

threatening the integrity of elections, fueling populist violence, and undermining public health efforts to curtail the spread of COVID-19.[53] Across diverse platforms, the internet actively circulates a broad range of hard, soft, and child pornography; facilitates sex trafficking, and enables directly targeted personal threats.[54] The so-called "gig economy," unimaginable without the digitally-constructed workplaces of platform capitalism, has also eroded traditional protections for employees, resulting in precarious working conditions for many.[55]

Governments at every level have proposed regulation to address these harms. Several U.S. states have imposed privacy regulations on tech companies.[56] State and local governments have attempted to enact

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[https://perma.cc/H2W8-2ZZ6] (misinformation generally refers to false information presented as fact regardless of the intent to deceive, while disinformation refers to a subset of misinformation that is intentionally false and intended to deceive and mislead, hiding the interest and identity of the users).

[53] *See* VIVEK H. MURTHY, U.S. SURGEON GENERAL, CONFRONTING HEALTH MISINFORMATION (2021), https://www.hhs.gov/sites/default/files/surgeon-general-misinformation-advisory.pdf (the U.S. Surgeon General issued an advisory in July 2021 declaring health misinformation on social media an urgent threat); Zolan Kanno-Youngs & Cecilia Kang, *"They're Killing People": Biden Denounces Social Media for Virus Disinformation*, N.Y. TIMES (July 19, 2021), https://www.nytimes.com/2021/07/16/us/politics/biden-facebook-social-media-covid.html [https://perma.cc/DCD5-A8G6]**;** COLLABORATEUP, NEWS LITERACY AND MISINFORMATION/DISINFORMATION IN THE ERA OF COVID-19 (2021), https://collaborateup.com/wp-content/uploads/2021/09/Misinformation_Disinformation_Report_Spreads-2-3.pdf (disinformation has been widely used to spread inaccurate health information, resulting in ill-informed decisions about public health measures, use of unproven medical treatments and vaccine resistance); Press Release, Am. Soc'y for Reprod. Med., New Study Reveals COVID Vaccine Does Not Cause Female Sterility (June 24, 2021), https://www.asrm.org/vaccine-does-not-cause-sterility [https://perma.cc/S4CY-AJAW] (erroneous information on social media about the efficacy and safety of COVID vaccines, such as claims that the vaccine causes female infertility, has contributed to vaccine hesitancy).

[54] MICHAEL SETO, U.S. DEP'T OF JUST., SEX OFFENDER MGMT. ASSESSMENT AND PLAN. INITIATIVE, INTERNET-FACILITATED SEXUAL OFFENDING (2015), https://smart.ojp.gov/sites/g/files/xyckuh231/files/media/document/internetfacilitatedsexualoffending.pdf; Ross Benes, *How Porn has Been Secretly Behind the Rise of the Internet and Other Technologies*, BUS. INSIDER (May 7, 2017, 7:12 AM), https://www.businessinsider.com/porn-behind-internet-technologies-2017-5 [https://perma.cc/JYC2-L3HC]; Aina J. Khan, *Prominent Women Call for Tech Giants to Act Against Online Harassment*, N.Y. TIMES (July 1, 2021), https://www.nytimes.com/2021/07/01/world/women-online-harassment.html [https://perma.cc/3XEC-XDZC].

[55] Veena B. Dubal, *Economic Security & the Regulation of Gig Work in California: From AB5 to Proposition 22*, 13 EUR. LAB. L. J. 51–65 (2022).

[56] *See generally* IAPP, *US State Privacy Legislation Tracker*, IAPP (March 3, 2022), https://iapp.org/resources/article/us-state-privacy-legislation-tracker

regulation governing ridesharing platforms, like Uber and Lyft, to provide employment protections for drivers[57] or to address the safety concerns of passengers by requiring finger-printing and background checks of drivers.[58] Congress has engaged in vociferous debate about how to combat misinformation and election meddling on social media platforms since revelations of Russian interference in the 2016 election and the Cambridge Analytica scandal.[59] In each of these instances, the tech industry has responded with familiar anti-regulatory arguments.

Technology companies, the industry argues, continue to lay golden eggs. They still claim to enhance consumer choice and save consumers money,[60] but they now claim also to provide an even greater variety of benefits to the public than when Gates testified before Congress in 1998. Twitter and Facebook portray themselves as vital to the functioning of pluralist democracies. They say they are the modern "public square," supplying the public with "all the good that connecting people can bring . . . ."[61] Ridesharing companies claim to keep drunk

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[https://perma.cc/V2NP-NH4U] (a periodically updated chart showing the status of privacy legislation across the United States).

[57] Sam Harnett, *Prop. 22 Explained: Why Gig Companies Are Spending Huge Money on an Unprecedented Measure*, KQED (Oct. 26, 2020), https://www.kqed.org/news/11843123/prop-22-explained-why-gig-companies-are-spending-huge-money-on-an-unprecedented-measure [https://perma.cc/P7MG-TVD7].

[58] *See* Ben Wear, *Austin Clerk Validates Petition Seeking Election on Uber, Lyft Rules*, AUSTIN AM.-STATESMAN (Sept. 15, 2016, 12:01 AM), https://www.statesman.com/news/20160915/austin-clerk-validates-petition-seeking-election-on-uber-lyft-rules [https://perma.cc/A44F-Z3EK]; Matthew Zeitlin, *How Austin's Failed Attempt to Regulate Uber and Lyft Foreshadowed Today's Ride-Hailing Controversy*, VOX (Sept. 13, 2019, 10:52 AM), https://www.vox.com/the-highlight/2019/9/6/20851575/uber-lyft-drivers-austin-regulation-rideshare [https://perma.cc/72VJ-VXEY].

[59] *See* Maria Curi, *Court Testimony Looms for Zuckerberg in Cambridge Analytica Case*, BLOOMBERG LAW (Oct. 25, 2021, 5:00 AM), https://www.bloomberglaw.com/bloomberglawnews/privacy-and-data-security/XABESR2C000000?bna_news_filter=privacy-and-data-security#jcite [https://perma.cc/3PEE-RT37] (the scandal was over Facebook's arrangement with Cambridge Analytica, a once-obscure British consulting firm, which allowed it to access granular data on 87 million users without their consent for the purpose of targeted political advertising).

[60] ELEC. FRONTIER FOUND., OPPOSITION DOCUMENT ON A.B. 375, https://www.eff.org/document/opposition-document-ab-375 [https://perma.cc/74ZD-KCZ9] (last visited Mar. 6, 2022) (regulation would cause "many consumers [to] lose out on learning about discounts and other offers that would save them money.").

[61] *Open Hearing on Foreign Influence Operations' Use of Social Media Platforms: Hearing Before the S. Select Comm. On Intel.*, 115th Cong. 19 (Sep. 5, 2018) (statement of Jack Dorsey, Chief Executive Officer, Twitter, Inc.); Politico Staff, *Full Text: Mark Zuckerberg's Wednesday Testimony to Congress on Cambridge Analytica*, POLITICO (Apr. 9, 2018), https://www.politico.com/story/2018/04/09/transcript-mark-zuckerberg-testimony-to-congress-on-cambridge-analytica-509978 [https://perma.cc/8YM8-EJYP].

drivers off the streets and say that they provide flexible work arrangements, particularly "for people traditionally marginalized from the labor market," including women and people of color.[62]

The tech sector continues to argue that its non-stop innovation generates these public goods, and that regulation would surely stifle such innovation. As California considered privacy legislation, known as the California Consumer Privacy Act (CCPA), a lobbying organization funded by Amazon, Google, and Facebook warned that state-level privacy regulation "would . . . inhibit organizations' ability to innovate . . ." As such, the CCPA would "harm the highly competitive U.S. digital economy, particularly rapidly-evolving AI and machine learning technologies . . ." State regulation, according to the industry, would have an obvious negative consequence: "If one state's law were to prohibit an innovative new use of data, an organization might choose not to pursue that innovation, even if other states permitted it."[63] Tech lobbyists made the same argument directly to state legislators. In a briefing document entitled "Top Ten Reasons to Vote against" the

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[62] Vote For Prop 1 (@ridesharingatx), TWITTER (May 5, 2016, 6:00 PM), https://twitter.com/ridesharingatx/status/728388907167932416 [https://perma.cc/G2KG-FAV2]; Vote For Prop 1, *Austin's Bartenders and Owners Are #FORProp1 Because Ridesharing Cuts Down on Drunk Driving*, FACEBOOK (May 2, 2016), https://www.facebook.com/1521640114830416/videos/1593934660934294 [https://perma.cc/9BWS-HZ65]; Richard Whittaker, *Prop 1 Election Results: Uber and Lyft vs. Austin, the Numbers Through the Night*, AUSTIN CHRON. (May 7, 2016, 6:24 PM), https://www.austinchronicle.com/daily/news/2016-05-07/prop-1-election-results [https://perma.cc/G6TM-NLBL]; *A First Step Toward A New Model for Independent Platform Work*, UBER (Aug. 10, 2020), https://www.uber.com/newsroom/working-together-priorities [https://perma.cc/4GHF-VBBL]; Lyft, *LyftUp | Maya Angelou | Good Morning | Transportation Access | Lifting Up Communities of Color | 90*, YOUTUBE (Aug. 11, 2020), https://www.youtube.com/watch?v=yImMyOkeaKQ [https://perma.cc/66TZ-XDGX]; Sam Harnett, *Prop. 22 Explained: Why Gig Companies Are Spending Huge Money on an Unprecedented Measure*, KQED (Oct. 26, 2020), https://www.kqed.org/news/11843123/prop-22-explained-why-gig-companies-are-spending-huge-money-on-an-unprecedented-measure [https://perma.cc/YF7P-UZKS]; Dara Khosrowshahi, *I Am the C.E.O. of Uber. Gig Workers Deserve Better.*, N.Y. TIMES (Aug. 10, 2020), https://www.nytimes.com/2020/08/10/opinion/uber-ceo-dara-khosrowshahi-gig-workers-deserve-better.html [https://perma.cc/PFU7-TAY6] ("Unlike traditional jobs, drivers have total freedom to choose when and how they drive, so they can fit their work around their life, not the other way around. Anyone who's been fired after having to miss a shift, or who's been forced to choose between school and work, will tell you that this type of freedom has real value and simply does not exist with most traditional jobs."); *A First Step Toward A New Model for Independent Platform Work*, UBER (Aug. 10, 2020), https://www.uber.com/newsroom/working-together-priorities [https://perma.cc/N6ZA-232Q].

[63] CTR. FOR INFO. POL'Y LEADERSHIP, WHY WE NEED INTERSTATE PRIVACY RULES FOR THE U.S. 1 (2020), https://www.informationpolicycentre.com/uploads/5/7/1/0/57104281/cipl_concept_paper_-_why_we_need_interstate_privacy_rules_for_the_us__25_september_2020_.pdf.

CCPA, the industry mentioned "impeding innovation" no less than three times, explaining that tech companies: "would be hamstrung in their ability to use information to innovate their products and provide new services,"[64] and "many consumers would lose out on learning about discounts and other offers that would save them money."[65]

Organizations lobbying on behalf of tech companies against passage of biometric privacy legislation in Montana made similar arguments. They suggested to state legislators that passage of the legislation might jeopardize the United States' status as "the most innovative country in the world."[66] Similarly, in response to proposed federal legislation to strengthen antitrust laws, Google's Vice President of Government Affairs and Public Policy insisted that "American consumers and small businesses would be shocked at how these bills would break many of their favorite services. . . As many groups and companies have observed, the bills would require us to degrade our services and prevent us from offering important features used by hundreds of millions of Americans."[67]

Of course, in the face of the Cambridge Analytica scandal and Russian election meddling, leaders in the industry had to admit that completely unfettered tech libertarianism had created some untoward large-scale social problems. ("[W]e were way too idealistic," remarked Facebook COO Sheryl Sandberg.[68]) The solution to these problems, however, was not innovation-killing government regulation. Instead, the industry could regulate itself, using its technological know-how to limit the social costs that sometimes accompanied innovation.[69] As Apple CEO Tim Cook once, tellingly, said: "I think the best regulation is no regulation, is self-regulation."[70]

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[64] OPPOSITION DOCUMENT ON A.B. 375, *supra* note 60.
[65] *Id.*
[66] Letter from Ass'n of Nat'l Advertisers, CompTIA, Internet Coal., State Priv. & Sec. Coal., TechNet to Chair Alan Doane, H. Comm. on Judiciary, Mont. H.R. (Feb. 22, 2017), https://www.documentcloud.org/documents/3553143-SPSC-and-Assns-Letter-Montana-HB-518-Biometrics.html [https://perma.cc/595Z-EXVR].
[67] Ashley Gold, *Exclusive: Google's Salvo Against Antitrust Bills*, AXIOS (Jun. 22, 2021), https://www.axios.com/google-antitrust-bills-house-dae01e6a-2542-4903-bfc0-a570f024b5b6.html [https://perma.cc/8WNU-JNTQ].
[68] Vanessa Romo, *Facebook's Sheryl Sandberg On Data Privacy Fail: "We Were Way Too Idealistic"*, NPR (Apr. 5, 2018), https://www.npr.org/sections/thetwo-way/2018/04/05/599770568/facebooks-sheryl-sandberg-on-data-privacy-fail-we-were-way-too-idealistic [https://perma.cc/UX8J-BDNT].
[69] Peter Kafka, *Tim Cook Says Facebook Should Have Regulated Itself, but It's Too Late for That Now*, VOX (Mar. 28, 2018), https://www.vox.com/2018/3/28/17172212/apple-facebook-revolution-tim-cook-interview-privacy-data-mark-zuckerberg [https://perma.cc/FDL3-QDBV].
[70] *Id.*

Five days after the Cambridge Analytica story broke, Mark Zuckerberg issued a statement responding to the situation by providing a roadmap of steps Facebook would take to regulate itself.[71] He claimed that the company had already taken steps (in 2014) that would prevent a similar occurrence and listed additional steps Facebook would take to secure the platform.[72] He concluded his post by stating: "I'm serious about doing what it takes to protect our community. . . . We will learn from this experience to secure our platform further and make our community safer for everyone going forward."[73] As calls for regulation continued to mount, Sandberg insisted that Facebook was "already adopting the best reforms and policies available."[74]

Indeed, Facebook and other industry actors have repeatedly deployed claims of their competence at self-regulation to deflect government attempts to regulate the industry. Facebook defused an FTC investigation into its privacy practices with an agreement to create "stringent processes" and "sweeping measures" that it hoped "will be a model for the industry."[75] Similarly, in response to legislation introduced to ensure the integrity of ads posted to social media platforms,[76] the Interactive Advertising Bureau (IAB), a lobbying organization representing companies such as Facebook, Google, and Twitter,[77] made the case for industry self-regulation in lieu of the proposed bill. The "economy's fastest-growing and most dynamic sector" had "a proven track record" of creating "some of the media industry's strongest self-regulatory mechanisms . . . ." Indeed, the only truly effective way to prevent misleading advertising on the internet was self-regulation. Internet-based communication was simply too

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[71] Sheryl Sandberg, FACEBOOK (Mar. 21, 2018), https://www.facebook.com/sheryl/posts/10160055807270177?pnref=story [https://perma.cc/A5XY-28EE].

[72] *Id.* (These steps included investigating what apps had access to large amounts of data before the 2014 changes; further restricting developers' access to data "to prevent other kinds of abuse"; and making the platform more transparent to ensure that users understand which apps have access to their data).

[73] *Id.*

[74] Sheera Frenkel, Nicholas Confessore, Cecilia Kang, Matthew Rosenberg & Jack Nicas, *Delay, Deny and Deflect: How Facebook's Leaders Fought Through Crisis*, N.Y. TIMES (Nov. 14, 2018), https://www.nytimes.com/2018/11/14/technology/facebook-data-russia-election-racism.html [https://perma.cc/QGE8-7GFE].

[75] *FTC Agreement Brings Rigorous New Standards for Protecting Your Privacy*, FACEBOOK (July 24, 2019), https://about.fb.com/news/2019/07/ftc-agreement [https://perma.cc/FVS6-QCQQ].

[76] The Honest Ads Act, S. 1989, 115th Cong. (2017).

[77] Tony Romm, *Tech Titans Support More Political Ad Transparency – But Aren't Yet Embracing a New Bill by the U.S. Senate*, VOX (Oct. 31, 2017), https://www.vox.com/2017/10/31/16579880/facebook-google-twitter-honest-ads-act-political-ads-russia [https://perma.cc/2QU9-F62K].

rapid and complex to be effectively regulated by the government, particularly considering the limitations of the First Amendment. Government regulation was a fool's errand. Instead, "durable reform can only happen when the digital advertising community adopts tougher, tighter, comprehensive controls for who is putting what on its sites."[78]

The tech industry's creation and dissemination of the beliefs described in this section are not new revelations. Shoshana Zuboff has called these now-familiar tactics—lauding tech's benefits, suggesting that government regulation will kill innovation, and advocating for technology-enabled self-regulation instead—the "cry freedom strategy."[79] (Indeed, sometimes that description is literal. "FREE AMERICA NOW," tweeted Tesla CEO Elon Musk, as he reopened his Fremont, California plant in violation of county COVID-19 regulations.[80]) The fact that the tech industry leaders have deployed this strategy consistently since the 1990s suggests that they believe it is effective, presumably because they assume its underlying assumptions are shared by politicians and the public. Yet, this is an untested assumption that the rest of this paper tests and finds wanting.

In the next section, we describe topic modeling and how we use it to identify and analyze thematic patterns in news articles published between 2010 and 2020 to illustrate how big tech regulation is publicly discussed and interpreted. Then, in section III, we show that, despite the active promotion of libertarian ideology proclaiming the benefits of an unfettered internet, ideas about free markets and information freedom play a surprisingly small role in the public discourse. Instead, the most common themes in the discourse concern the need to regulate big tech companies to rein in proliferating social hazards.

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[78] *Oversight of Federal Political Advertisement Laws and Regulations: Hearing Before the Subcomm. On Info. Tech. of the H. Comm. on Oversight and Gov't Reform*, 115th Cong. 46 (1983) (statement of Randall Rothenberg, President and Chief Executive Officer, Interactive Advertising Bureau).

[79] ZUBOFF, *supra* note 51, at 103.

[80] Elon Musk (@elonmusk), *Free America Now*, TWITTER (Apr. 28, 2020), https://twitter.com/elonmusk/status/1255380013488189440 [https://perma.cc/5573-6ADM].

III. Topic Modeling

A. What is topic modeling?

In order to explore contemporary discourse on the regulation of large technology corporations, we used computer-assisted topic modeling, which has significant advantages over conventional qualitative textual analysis. Traditionally, scholars looking to identify the use of rhetoric or ideologies in a given policy area must engage in the time and labor-intensive process of content analysis. This process requires the researcher to examine a text to identify individual instances of the content they are interested in.[81] For example, a researcher interested in public opinion about regulation might read through a large batch of newspaper articles and extract passages that articulate pro and anti-regulatory arguments. Once the relevant passages are identified, the researcher must flag (or "code" or "label") the variety of pertinent information contained in them, such as the substance of the arguments made about regulation or the identity of those making them.[82] The pieces of text under a single code or label are collected to form a category or variable that can be treated quantitatively as data that is then subjected to conventional statistical techniques.[83] This process identifies the topical patterns within the overall text.[84] For example, the researcher might be able to demonstrate that particular arguments tend to be made in conjunction with one another or that certain arguments wax and wane over time.

There are, however, some obvious limitations to this approach to content analysis. First, the need for an individual researcher to read and code each article necessarily limits the number of articles that can be included in the sample. Second, even the most conscientious scholars may introduce their own biases and preconceptions as they read and code the data.[85] Third, the limitations on human perception mean that researchers may fail to discern certain patterns in the data if they have been primed to look for different themes.[86]

Computer-assisted topic modeling algorithms overcome these limitations.[87] Beginning with a corpus of text-rich documents, the

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[81] *See* Hsiu-Fang Hsieh & Sarah E. Shannon, *Three Approaches to Qualitative Content Analysis,* 15 QUAL.HEALTH RES. (2005).
[82] *Id.*
[83] *Id.*
[84] *See* Jodi L. Short, *The Paranoid Style in Regulatory Reform*, 63 HASTINGS L.J. 633 (2011).
[85] J.B. Ruhl, John Nay & Jonathan Gilligan, *Topic Modeling the President: Conventional and Computational Methods*, 86 GEO. WASH. L. REV. 1243, 1279 (2018).
[86] *Id.* at 1274.
[87] See *id.* at 1272–1280 (an excellent description of how topic modeling works in relatively plain English).

algorithm can search these documents and produce a set of "topics," or probability distributions over words that each express a single theme.[88] These models identify the distribution of topics both *within* each document (one document may contain many topics) and across the entire corpus of documents. The algorithm can reveal motifs in large collections of documents, both through repetitions of particular words and associations among words.[89] Thus, within a corpus of text, the algorithm identifies topics, which are distinguished by clusters of words that appear together with a high statistical probability.[90] Unlike

[88] For this study, we applied the popular Latent Dirichlet Allocation (LDA) topic model, commonly used in communication studies, partly based on code developed for the study of same-sex marriage and marijuana legalization discourse on Reddit in, Babak Hemmatian, Sabina J. Sloman, Uriel Cohen Priva & Steven A. Sloman, *Think of the Consequences: A Decade of Discourse about Same-sex Marriage*, 51 BEHAVIOR RESEARCH METHODS, March 11, 2019; and, Babak Hemmatian, *Taking the High Road: A Big Data Investigation of Natural Discourse in the Emerging U.S. Consensus about Marijuana Legalization*, Thesis (Ph.D.), Brown University, February 12, 2022. The original exposition of LDA can be found in: David M. Blei, Andrew Y. Ng & Michael I. Jordan, *Latent Dirichlet Allocation*, 3 J. MACH. LEARNING RSCH. 993, 993–1022 (2003). Other examples of the method's use can be found in, Ilana Heintz, Ryan Gabbard, Mahesh Srivastava, Dave Barner, Donald Black, Majorie Friedman & Ralph Weischedel, *Automatic Extraction of Linguistic Metaphors with LDA Topic Modeling*, PROC. FIRST WORKSHOP ON METAPHOR IN NLP 58 (2013); Daniel Maier, A. Waldherr, P. Miltner, G. Wiedemann, A. Niekler, A. Keinert, B. Pfetsch, G. Heyer, U. Reber, T. Häussler, H. Schmid-Petri & S. Adam, *Applying LDA Topic Modeling in Communication Research: Toward a Valid and Reliable Methodology*, 12 COMMC'N METHODS & MEASURES 93 (2018); Hamed Jelodar, Yongli Wang, Chi Yuan, Xia Feng, Xiahui Jiang, Yanchao Li & Liang Zhao, *Latent Dirichlet Allocation (LDA) and Topic Modeling: Models, Applications, a Survey*, 78 MULTIMEDIA TOOLS & APPLICATIONS 15169 (2019). We chose the LDA approach because past research has shown it can reveal semantic content of natural language beyond the level of words, allowing for the differentiation of multiple meanings of a single term. Paul DiMaggio, Manish Nag, & David Blei, *Exploiting Affinities Between Topic Modeling and the Sociological Perspective on Culture: Application to Newspaper Coverage of U.S. Government Arts Funding*, 41 POETICS 570, (2013) (LDA is basically "a statistical model of language"). This model is also appealing for its ability to identify changes over time in the topics occurring in a large corpus of natural language data. Both properties are empirically demonstrated in the published work from which our code base is derived.

[89] Ruhl, *supra* note 85.

[90] To improve the quality of our topic model, we applied common preprocessing techniques to the dataset. We changed all words in our corpus to lowercase to avoid different cases of the same word being treated as different words and changed different grammatical forms of the same words to a uniform lemma (a process called lemmatization). HTML escape codes, uninformative stop words, URLs, new line characters, punctuation, ubiquitous terms (words that appeared in 99% of the documents), rare terms (those appearing in a single document), as well as non-alphanumeric characters were removed from the dataset. We used the lemmatizer from the SpaCy python package and the set of stop words from the Natural Language Toolkit Bird, Klein, & Loper, NLTK, (2009), respectively. Our corpus contained 22,692 articles (27,797,084 words in total, comprising 23,438 unique words) with a mean document length of 1,224 words (median = 536, SD = 2168.7).

conventional word-based quantitative techniques in the social sciences,[91] the topic model does not simply count word frequencies. It accounts for the probability that certain words occur together and for the weight each word contributes to these probability distributions.[92] The most highly weighted words provide clues about the subject that the topic (cluster) represents. For instance, the high weighting of the words "market, competition, antitrust, platform, consumer" in one topic relative to other words and other topics as identified by our algorithm led us to label that theme *tech antitrust*.

Importantly, topic modeling algorithms like the one used in this work, are unsupervised, meaning that topics are not chosen *ex ante* by the researchers. Therefore, the topics ultimately identified within a collection of documents are neither known nor searched for in advance. Instead, the algorithm "learns" the topics and the words from the corpus of documents that comprise them. The unsupervised nature of the algorithm makes the coding truly inductive and responsive solely to the statistical distribution of the words in the text, rather than deductively derived from existing concepts, theoretical frames, and possible unreflective biases of a researcher.[93]

By discovering both explicit and implicit motifs in a large collections of documents, the topic modeling algorithm can yield what social scientists call "frames."[94] A frame is "a set of discursive cues (words, images, narrative) that suggests a particular interpretation of a person, event, organization, practice, condition, or situation."[95] In other words, frames convey meanings attached to or associated with social actions and circumstances—in this instance, rhetoric and ideologies of the regulation of large technology companies. Thus, by using topic modeling, we can quantitatively identify salient trends in the rhetoric that circulate through social discourse.[96] This allows us to assess whether the techno-libertarian themes so popular within the tech industry are actually part of the public discourse about tech and regulation.

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[91] *See* Y.R. Tausczik, J.W. Pennebaker, *The psychological meaning of words: LIWC and computerized text analysis methods,* JOURNAL OF LANGUAGE AND SOCIAL PSYCHOLOGY, 29 (1), 24-54.

[92] *Id.*

[93] John W. Mohr & Petko Bogdanov, *Introduction—Topic Models: What They Are and Why They Matter*, 41 POETICS 545, 549 (2013) (arguing that topic models "are methods that can provide a way to analyze texts (including Big Data' texts) that is substantively quicker, more efficient, and more objective than traditional methods of content analysis in the social and cultural sciences.").

[94] ERVING GOFFMAN, FRAME ANALYSIS: AN ESSAY ON THE ORGANIZATION OF EXPERIENCE (1974).

[95] DiMaggio et al., *supra* note 88, at 593.

[96] *Cf.* WILLIAM H. SEWELL, LOGICS OF HISTORY: SOCIAL THEORY AND SOCIAL TRANSFORMATION 152–74 (2005).

B. Methodology

While unsupervised topic modeling minimizes human involvement in identifying the topics that permeate a particular body of data, researchers must identify the appropriate sample corpus of text to analyze and specify the parameters of the model in order to structure the study and interpret the results.[97] To construct our sample, we used a corpus of news articles from the proprietary database Lexis Nexis to track the evolution of coverage surrounding big tech regulation over the past two decades. Specifically, we used a sample from the Lexis Nexis "Data as a Service" platform, which is designed and optimized for big data analytics and has a search engine dedicated to "News Data." The initial sample included any news article that included the keyword phrase "big tech" and any word in the same lexeme[98] as "regulation."[99] From this starting point, we filtered the documents to include only those articles written in English, published in the United States, and published after the year 2010. Our final corpus contained 22,692 articles, beginning in 2010 with a low of almost zero, to an increase of several hundred per year between 2014 and 2016, with an increase up to approximately 9000 in 2019 (see Figure 1 below).

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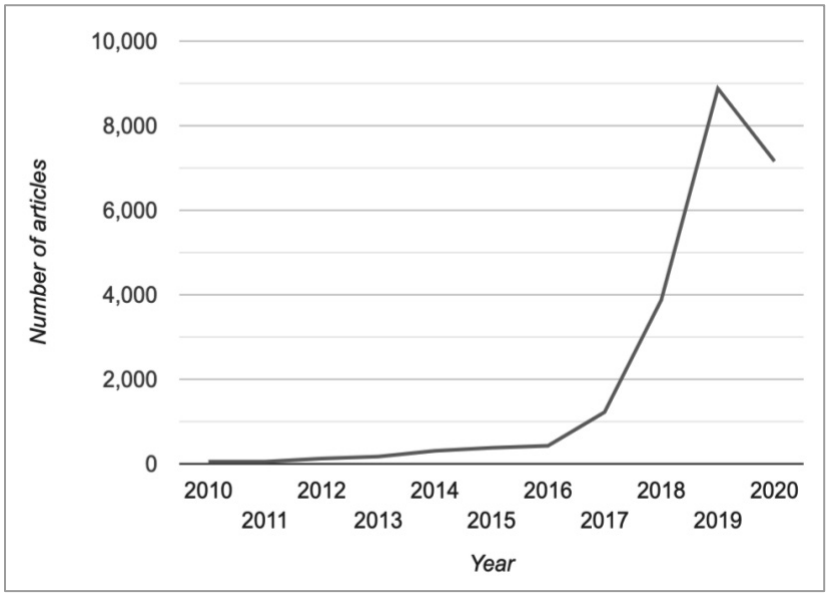
[97] Ruhl et al., *supra* note 85, at 1281.

[98] *Lexeme,* ENCYCLOPEDIA.COM (May 29, 2018), https://www.encyclopedia.com/literature-and-arts/language-linguistics-and-literary-terms/language-and-linguistics/lexeme [https://perma.cc/XK8J-WU9Y] (lexeme is a basic lexical unit of a language, consisting of one word or several words, considered as an abstract unit, and applied to a family of words related by form or meaning).

[99] We used "big tech" as a keyword to balance competing concerns about over- and under-inclusivity. We wanted to construct a corpus of documents focused on the regulation of market-dominating platform companies, such as Google (Alphabet), Apple, Facebook, and Amazon, because these companies have been the subject of the most pointed regulatory debates, and they have been actively involved in contesting regulation and framing narratives around the regulation of technology. We saw downsides to using both broader and narrower terms. For instance, we worried that using a more generic term like "technology" or "web" or "internet" might pull large numbers of irrelevant documents. At the same time, we did not want to limit our data coverage exclusively to specific named companies. The keyword "big tech" allowed us to balance these competing concerns.

Figure 1. Sample Document Corpus



We chose to explore news coverage of big tech regulation, rather than other communication mediums for two reasons. First, news coverage provides clues to what elites are thinking and doing, especially when prominent actors (executives, politicians, financiers, for example) turn their attention to the subjects reported.[100] Because large technology corporations are some of the most influential actors in our public sphere, their actions are covered regularly by journalists. In addition, journalists are well-read, knowledgeable in diverse social fields, and writing for public audiences.[101] Often using quotes from institutional actors, journalists embody within their accounts the language, arguments, and narratives these speakers use to frame, report and interpret the topic at hand.[102]

Second, news coverage of big tech regulation is important because it influences the views of the reading public.[103] As sociologist

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[100] Susanne Janssen, Giselinde Kuipers & Marc Verboord, *Culture Globalization and Arts Journalism: The International Orientation of Arts and Culture Coverage in Dutch, French, German, and U.S. Newspapers, 1955 to 2005*, 73 AM. SOCIO. REV. 719 (2008); Harvey Molotch & Marilyn Lester, *News as Purposive Behavior: On the Strategic use of Routine Events, Accidents, and Scandals*, 39 AM. SOCIO. REV. 101 (1974); Stephen D. Reese, *Setting the Media's Agenda: A Power Balance Perspective*, 14 ANNALS INT'L COMMC'N ASS'N 309 (1991).

[101] Paul DiMaggio, Manish Nag & David Blei, *Exploiting Affinities Between Topic Modeling and the Sociological Perspective on Culture: Application to Newspaper Coverage of U.S. Government Arts Funding*, 41 POETICS 570, 573 (2013).

[102] *Id.* at 593.

[103] *Id.* at 573.

Paul DiMaggio has suggested, news coverage does this in several ways. It calls readers' attention to existing interpretations of events and reinforces those interpretations. It also develops new interpretations and places them within the broader political, cultural, and social contexts that people use to interpret such information. In doing so, the nature of news coverage influences these interpretations by telling and retelling news events in a selected and directed fashion.[104] Put another way, news coverage of big tech regulation both reflects and represents one avenue of dissemination and influence in the formation of public opinion. For example, if press coverage mentions big tech regulation topics in association with positive benefits of the companies, these corporations are likely to enjoy the support of a trusting and benevolent public. On the other hand, if news coverage uses topics with negative connotation, public sentiment towards these companies might take a different path. This may not be directly causal, but the associations are strong.[105] Ultimately, given the near-instantaneous global spread of news in the digital age, reported events surrounding big tech regulation can shape both public opinion and the direction of public policy. Thus, we explore the news coverage of big tech regulation because news content holds the unique place of both reporting events and informing public opinion, which in turn shapes subsequent events.

After selecting the corpus of texts, we had to determine the number of topics to be identified by the algorithm, optimizing for predictive capacity and semantic coherence.[106] If the topic model is asked to identify too few topics, those produced will be so general and contain such disparate clusters of words that it would be difficult to make sense of the content or discern any particular frame from the data. On the other hand, if the algorithm is asked to identify too many topics, interesting trends might be split up across topics and obscure their associations and coherence. By identifying an appropriate number of topics, we can ensure that the algorithm generated topics that contained words that were clustered in a semantically coherent fashion without excluding words that logically belonged in that cluster.

To determine the appropriate number of topics for our corpus of data, we trained multiple models with up to 100 topics in increments

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[104] *Id.*

[105] *Id.*; SHANTO IYENGAR, IS ANYONE RESPONSIBLE? HOW TELEVISION FRAMES POLITICAL ISSUES (Univ. of Chi. Press) (2001); PRICE V & TEWSKBURY D, "NEWS VALUES AND PUBLIC OPINION: A THEORETICAL ACCOUNT OF MEDIA PRIMING AND FRAMING" IN BARNETT, G AND BOSTER F. J. (EDS) PROGRESS IN COMMUNICATION SCIENCE, ABLES, GREENWICH CT. (1997).

[106] The topic modeling procedures that follow closely match those set forth in *see* Hemmatian et al., *supra* note 88; Babak Hemmatian, Taking the High Road: A Big Data Investigation of Natural Discourse in the Emerging U.S. Consensus about Marijuana Legalization (Feb. 12, 2022) (Ph.D. thesis, Brown University) (on file with ResearchGate.net) (further procedural details can be found in these earlier publications).

of 25. For each of these models, we then looked at quantitative assessments that measured how certain a particular model was in its predictions of sample testing data,[107] as well as the co-occurrence of words that belong to the same topic.[108] We also subjected the results of the alternative models to a qualitative assessment in which we manually inspected the top 40 words most strongly associated with each of the topics to ensure that the topics align logically and experientially with real-world topics.[109] These trial runs suggested that asking the algorithm to identify 50 topics would yield the most coherent, analytically useful results.[110]

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[107] As a first quantitative measure, we looked at *per-word perplexity* for each model. In machine learning, perplexity is a way of measuring how well a model predicts a held-out sample, often used for model comparison. Per-word perplexity, in particular, reflects how uncertain the model is on average when predicting each word in a document, given the other words in a document. We use the rate at which this uncertainty increases with incremental additions to the number of topics as a second, more sophisticated measure of model quality. Weizhong Zhao, James J. Chen, Roger Perkins, Zhichao Liu, Weigong Ge, Yijun Ding, & Wen Zou, *A Heuristic Approach to Determine an Appropriate Number of Topics in Topic Modeling*, 16 BMC BIOINFORMATICS, Sept. 25, 2015(This measure has been shown to outperform simple per-word simplicity in evaluating model coherence).

[108] As a second quantitative test of fit, we calculated the UMass coherence values for all models. UMass coherence measures how often the words that comprise a topic actually appear together in documents. David Mimno, Hanna M. Wallach, Edmund Talley, Miriam Leenders, & Andrew McCallum, *Optimizing Semantic Coherence in Topic Models*, PROCEEDINGS OF THE CONF. ON EMPIRICAL METHODS IN NAT. LANGUAGE PROCESSING 262–72 (2011) (this is an intuitive measure of topic coherence, because if two words in a topic really belong together you would expect them to show up together frequently in documents. Like perplexity, the UMass coherence measures showed a preference for fewer topics (see Appendix 1 for values). Both measures, per-word perplexity and UMass coherence, inclined us to choose a model with fewer topics).

[109] While perplexity and UMass measures are both suitable approximations of the interpretability of topics, they sometimes do not align with humans' intuitive semantic understanding or actually circulating cultural frames (memes). While quantitative measures of fit are crucial to optimizing the model, the gold standard of coherence is aligning the topics identified by the model with human understandings of the subject matter. Jonathan Chang, Jordan Boyd-Graber, Sean Gerrish, Chong Wang, & David M. Blei, *Reading Tea Leaves: How Humans Interpret Topic Models*, 22 ADVANCES IN NEURAL INFO. PROCESSING SYS. 288 (2009); To choose the top words for qualitative analysis, an intuitive formula was used that accounts for the baseline popularity of particular words (see the source in Footnote 72). Keith Stevens, Philip Kegelmeyer, David Andrzejewski & David Buttler, *Exploring Topic Coherence Over Many Models and Many Topics*, PROC. OF THE 2012 JOINT CONF. ON EMPIRICAL METHODS IN NAT. LANGUAGE PROCESSING AND COMPUTATIONAL NAT. LANGUAGE LEARNING 952, 952–61 (2012).

[110] As a robustness check to ensure that the stability of the 50-topic model was not the idiosyncratic result of the exact number of topics used, we examined models using 45 and 55 topics. These models yielded similar quantitative and qualitative measures of stability whose similar quantitative and qualitative measures ensured the stability of the 50-topic model and not the result of the exact number of topics used. A complete list of these topics and the top words associated with them are available in a digital repository: noah14noah, *Tech_Regulation_Topic_Modeling*, GITHUB.COM, https://github.com/noah14noah/Tech_Regulation_Topic_Modeling.git [https://perma.cc/A8SF-3LXT] (last visited Nov. 19, 2022).

Having selected our data set and the optimal number of topics, we then identified and labeled the most relevant and coherent topics that the algorithm produced.[111] We identified a subset of *top topics* by calculating the average contribution a topic made to the overall corpus in each month and over the life of the sample (see Appendix 2 for explanation of calculations). We designated a specific topic as *top topic* if it met one of two criteria: (1) it was a major contributor to the discourse overall based on the algorithmic model (> 3% average monthly contribution);[112] or (2) it demonstrated significant temporal trends based on the coefficients of a polynomial regression model. After this initial filtering step, we examined the five most representative sample articles[113] from each of the top topics to obtain more linguistic and substantive content that would enable us to identify the theme and label for each topic. Table 1 presents our top topics and the set of high-probability words associated with each (referred to as "top words").[114]

[111] Even within the optimized, 50-topic parameter, not all topics were equally relevant or coherent. For instance, we determined that certain topics such *CEO Interviews* (comprised of representative articles reproducing interviews with tech company CEOs on a multitude of topics, with very little discussion of regulation) and *Earnings Reports* (reproducing companies' quarterly earnings reports) were not coherent or relevant in light of the theoretical concerns of the present study.

[112] The 3% threshold was selected because it indicates a statistical justification from the expected contribution of each topic. In a 50-topic model, if topics are uniformly distributed, each would account for 2% of the content of the corpus. Any topic with 3% or more has at least 50% higher contribution than expected from pure randomness.

[113] An article's representativeness of a specific topic was operationalized as the percentage of words in the article for which that topic was the most probable topic according to the LDA model. You can find all of the figures and representative articles in this project's Github repository; noah14noah, *supra* note 110.

[114] High-probability words are words that occur with the highest probability among a topic's complete list of associated and that were not found in similar lists for other top topics. Some words (e.g. regulation, tech) have high probability under all topics and thus do not capture the topic's focus. These words have been removed from Table 1 to more clearly represent the topic's focus. The words including '_' represent common singular phrases that were transformed into a single word for more accurate analysis during preprocessing, using a popular text analysis package; *Phrase (collection) detection*, GENSIM (May 6, 2022), https://radimrehurek.com/gensim/models/phrases.html.

Table 1. Top Topics and Top Words

Top Topics and Top Words	
Topic Title	**Top Five Most Associated Words (in Descending Order)**
Framing	know, say, get, right, well
Calls for Regulation	company, government, technology, new, need
Content Compensation	news, content, platform, advertising, publisher
Risks to Market	market, economy, economic, bank, risk
International	tiktok, canada, government, new zealand, minister
Emerging Technologies	company, tech, silicon_valley, startup, founder
Tech Antitrust	market, competition, antitrust, platform, consumer
Telecom Antitrust	internet, fcc, net_neutraility, service, telecom
Trump Administration	trump, president, house, white_house, administration
Critiques of Capitalism	public, power, social, free, right
Competing with Big Tech	business, market, new, product, client
Stock Market	stock, investor, percent, price, share
Crypto and Payments	financial, banking, payment, fintech, credit
Trump Censorship	content, platform, medium, speech, section_230
EU Regulation	european_union, europe, country, commission, rule
Earnings Reports	growth, revenue, business, quarter, million
US Privacy Regulation	privacy, information, consumer, personal_data, law
Calls for Accountability	facebook,, platform, cambridge_analytica, privacy, election
Cloud Computing	amazon, cloud_computing, software, aws, contract
Campaign Criticisms	candidate, biden, campaign, democratic, voter
Facial Recognition	facial_recognition, technology, surveillance, law, enforcement
AI	articifical_intelligence, computer, machine, algorithm, learning
Support for Regulation	federal, law, ftc, department, agency
COVID	coronavirus, pandemic, health, case, virus
Interviews	think, get, know, really, right
China Policy	china, trade, india, world, hong_kong

EU Data Privacy Law	law, case, legal, regulation, enforcement
Heath Care	health, system, research, healthcare, patient
Monitoring COVID	monitor, international, business, covid-19, source
Brexit	prime_minister, quest, Brexit, deal, can
Financial Earnings	Bartiromo, get, right, think, morning
Reporting	police, say, report, people, man
Coverage of Antitrust Hearings	google, amazon, search, apple, antitrust
Framing	one, year, say, make, get
Reporting	post, report, article, 2020, 2019
Telenor Scandal	telenor, share, year, value, average

From this analysis of topic constructions, representative articles, and high probability words, we were able to narrow our results to 9 identifiably coherent trends that contributed to the discourse either through significant changes over time or overall contribution to the discussion in the corpus: Calls for Regulation, Tech Antitrust, EU Data Privacy Law, US Privacy Regulation, Emerging Technologies, Support for Regulation, Competing with Big Tech, Stock Market, and Critiques of Capitalism. We also identified four topics associated with incidents that precipitated isolated bursts of discussion about tech regulation: Content Compensation, Trump Censorship, Calls for Accountability, and Campaign Criticisms. We report and analyze these topics in Part III below.

C. The Limitations of Algorithmic Topic Modeling

The quality of an algorithm is largely a function of its inputs (in this case, the corpus of news articles used). As seen in Figure 1, most of the articles appeared in more recent years. Therefore, the model was biased in favor of the statistical properties of discourse in those years. Relatedly, the estimates of topic prominence are noisier for early years in ways that are not reflected in our regression modeling. Temporal patterns associated with those years should therefore be considered with greater caution. This may be a consequence of the keyword query— "big tech" and "regulation" and its lexemes—we used to generate our data from the LexisNexis database, which was narrow in its scope. As the use of "Big Tech" has been paired with the growth of prominent technology companies, the news coverage we collected pertains to regulation of these larger companies, rather than these same companies in their infancy or their smaller counterparts today. That said, discussions around regulation of technology companies associated with "big tech" increased as these companies have acquired

greater control of digital infrastructures and market power. Consequently, the content analysis of this discussion, as it emerged in the 20-teens, is revealing.

With respect to the topic modeling algorithm, the distributions representative of top topics partly reflects our parameter choices, such as the number of topics. Although we based our choice of parameters on careful analysis of the corpus, better values might exist. We also note that, due to our choice about what to include in the data set and the nature of discourse in the news articles that comprise our sample, our analysis may have excluded some topics relevant to the public discussion about regulating big technology companies. We therefore recommend that future research repeat this analysis with a different set of search terms.

More generally, the inherent shortcomings of topic modeling may have affected our results. The algorithm treats the text of articles in our corpus as a "bag-of-words," and it identifies statistical correlations among those words. The model cannot assess important aspects of language, including meanings associated with punctuation, grammar, and sequential dependencies between words. Accordingly, we urge readers to treat the empirical and epistemological claims we make about the top topics with a prudent degree of caution.[115]

IV. Public Discourse on Big Tech Regulation: Findings

The most significant result of our topic modeling study was the discovery of a dog that didn't bark. Despite assessing tens of thousands of pages of news reports concerning the regulation of large technology corporations, our model did not identify any topics associated with the techno-libertarian ideology. That is, the topic modeling algorithm failed to find clusters of words suggesting that a significant theme in discussions of the regulation of big tech was a techno-libertarian one. As prevalent as this narrative is in big tech's discourse about itself and in its lobbying strategy, it does not appear to have much traction in the media discourse about big tech and regulation.[116] To the contrary, the most prevalent topics identified in our modeling study demonstrate that there has been significant discussion in the media about regulating big tech.[117] That is, topics that made up the largest percentage of the corpus of materials we examined related to calls for increased regulation of technology companies, not techno-libertarian defenses of their autonomy. Indeed, our results suggest that there have been

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[115] Blei et al., *supra* note 88.

[116] Because our model did not identify topics associated with the tech-utopian libertarian narrative, we are unable to make direct comparisons between this discourse and the topics we analyze. Future research should be designed to enable such direct comparisons.

[117] *See infra*

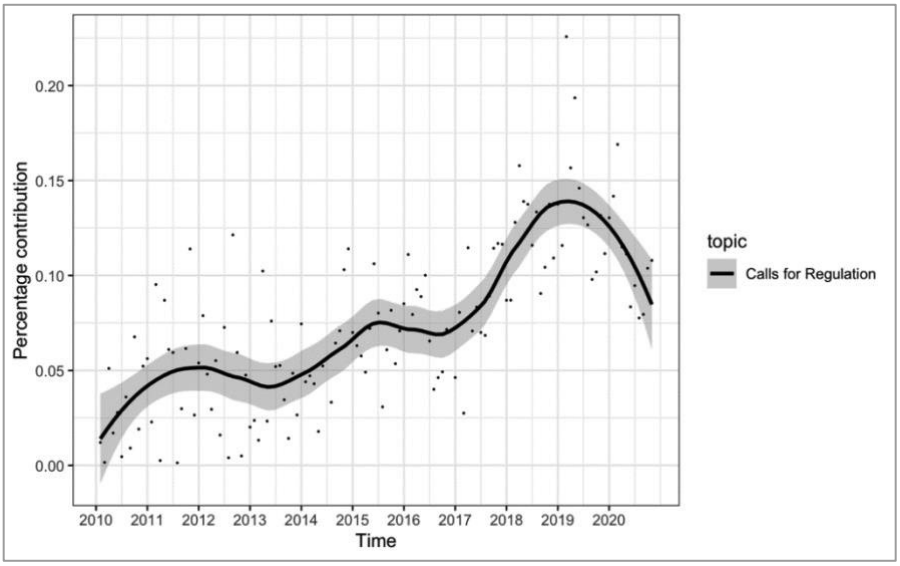
substantial and growing calls for regulation since 2010. These trends are reflected in the subject matter of several of the *top topics* that our study identified.

For example, the topic that saw the greatest increase over the period of our study was one that we labeled "Calls for Regulation" (see Figure 2).[118] Representative articles comprising this topic include reporting about legislators and others calling for more regulation of large platform companies.[119] Such calls comprise less than 2% of the corpus in 2010 but rise to encompass nearly 15% of the corpus by its peak in 2019. This means that during this time, coverage calling for more tech company regulation increased seven-fold.

[118] The analysis of temporal trends using locally smoothed polynomial regressions follows the guidelines set forth in *see* Hemmatian et al., *supra* note 88; itself adapted from Uriel Cohen Priva & Joseph L. Austerweil, *Analyzing the history of Cognition using topic models*, 135 COGNITION 4, 4-9 (2015). The local smoothing allows us to see the impact of punctual events on discourse, while the polynomial constraints help minimize the effect of noise. The gray areas around the resulting regression lines show the 95% confidence intervals for a topic's estimated contribution to discourse, calculated at the level of monthly proportions rather than individual documents.

[119] Sam Clark, *More Digital Regulation on the Way, Study Finds*, HOGAN LOVELLS (Nov. 4, 2019), https://www.hoganlovells.com/en/publications/more-digital-regulation-on-the-way-study-finds [https://perma.cc/47GN-E28T]; Press Release, Targeted News Serv., Sen. Cruz: Latest Twitter Bias Underscores Need for Big Tech Transparency (Aug. 16, 2019), https://www.cruz.senate.gov/newsroom/press-releases/sen-cruz-latest-twitter-bias-underscores-need-for-big-tech-transparency [https://perma.cc/6MVM-MJBL]; Macer Hall, *"New Code" to Crack Down on Net Giants*, DAILY EXPRESS (Feb. 18, 2019), https://www.pressreader.com/uk/daily-express/20190218/page/9/textview [https://perma.cc/AUX5-MX87]; Adam Sherwin, *Wright Tells Zuckerberg: Make Facebook Safe*, I-INDEP. PRINT LTD., Feb. 21, 2019, at 21; David Manners, *Big Tech Needs Regulation Says House of Lords*, ELECS. WKLY. (Mar. 11, 2019), https://www.electronicsweekly.com/news/business/big-tech-needs-regulation-says-hol-2019-03 [https://perma.cc/U7CS-6EQ4].

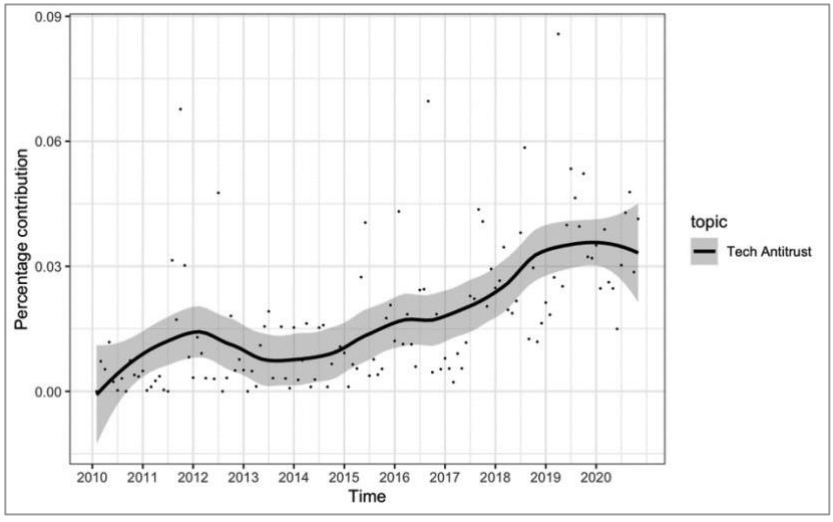
Figure 2. Topic: Calls for Regulation



The model also demonstrates growing calls for regulation specifically in the areas of antitrust and privacy. The "Tech Antitrust" topic (see Figure 3) shows a significant positive trend in calls for antitrust regulation, rising from almost no discussion in 2010 to over 3.5% in 2020. The most representative articles that comprise this topic include articles raising concerns about the monopoly power of large platform companies and discussing plans for stricter enforcement of antitrust laws against them.[120]

[120] Lauren Almeida, *Is Amazon Good for the Market or the Consumer?*, INVS. CHRON., July 31, 2020, at 61 (discussing Lina Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 710 (2017)); Greg Ip, *UK Panel Plans Code of Conduct for Tech Giants*, THE AUSTRALIAN, Mar. 15, 2019, at 27 (discussing how codes of conduct can be used to combat monopoly power); Amanda Lotz, *Amazon, Google, and Facebook Warrant Antitrust Scrutiny for Many Reasons—Not Just Because They're Large*, THE CONVERSATION (June 24, 2019, 8:47 AM), https://theconversation.com/amazon-google-and-facebook-warrant-antitrust-scrutiny-for-many-reasons-not-just-because-theyre-large-118370 [https://perma.cc/GJ69-XJPG] (describing the growing chorus of politicians, antitrust scholars, and consumer watchdogs calling for stricter antitrust treatment of big tech companies); David Hatch, *Europe to Rein in Big Tech with U.K. Powers*, THE DEAL (Apr. 24, 2020) (discussing antitrust concerns of the European Commissioner for Competition); Noah Smith, *Antitrust Scrutiny Should be Broader*, BLOOMBERG (July 31, 2020).

Figure 3. Topic: Tech Antitrust



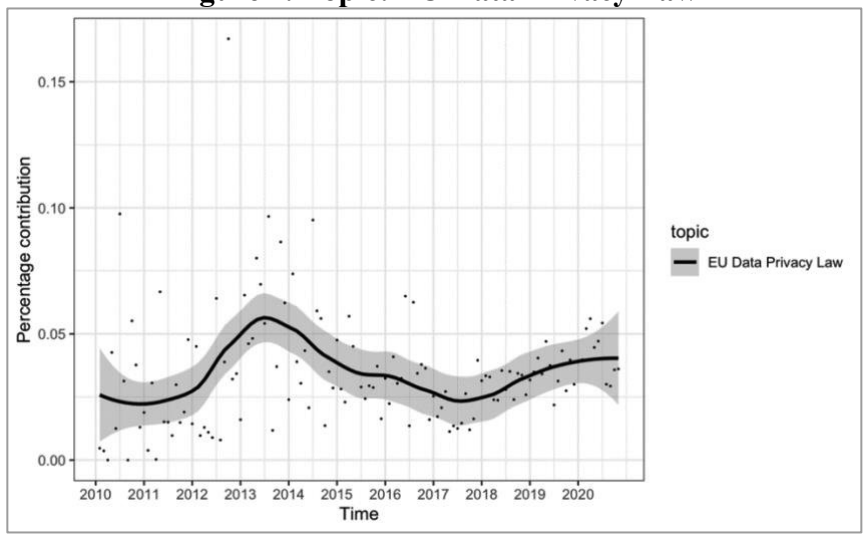
Other top topics focused on the need for specific forms of tech regulation. The topic "EU Data Privacy Law" (see Figure 4) included articles reporting about privacy regulation on both sides of the Atlantic.[121] This topic peaks at over 5% of corpus contribution just before 2014, in the lead-up to the European Commission's adoption of the landmark General Data Protection Regulation ("GDPR"). Coverage of privacy regulation in the United States lags coverage of privacy regulation in the EU in terms of percent contribution, but the topic "US Privacy Regulation"[122] (see Figure 5) trends upward significantly

[121] Press Release, Mishcon de Reyes, Is "Big Tech" Facing Multiple Showdowns with the EDPB [European Data Protection Board]?, Impact Fin. News (Aug. 26, 2020); Press Release, UK Government, Data Protection Bill [Lords] Next Share this Debate 09 May 2018 Volume 640 (May 14, 2018); Press Release, N.Y. State Bar Ass'n, America's Tech Giants: It's Back to the Drawing Board on European Data(Sept. 10, 2020); James R. Carroll, Brian W. Duwe, David C. Eisman, Patrick Fitzgerald, Todd E. Freed, Marc S. Gerber, Richard J. Grossman, Michael E. Leiter, Stuart D. Levi, Amy S. Park, William Ridgway, Jason D. Russell, Ivan A. Schlager, David E. Schwartz, Jennifer L. Spaziano, Ingrid Vandenborre, Donald L. Vieira, Helena J. Derbyshire, Jessica N. Choen, Peter Luneau, James S. Talbot & Eve-Christie Vermynck, Skadden, *European Union: The GDPR At The One Year Mark: A Work In Progress*, MONDAQ (July 11, 2019), https://www.mondaq.com/uk/security/824126/the-gdpr-at-the-one-year-mark-a-work-in-progress [https://perma.cc/ZR42-ZJVY].

[122] Representative articles and media coverage of press releases include: *Senators Markey and Hawley Introduce Bipartisan Legislation to Update Children's Online Privacy Rules*, TARGETED NEWS SERV. (Mar. 12, 2019); *Sen. Markey: Senate Democrats Unveil Strong Online Privacy Rights*, TARGETED NEWS SERV. (Nov. 26, 2019); Shiva Stella, *34 Civil*

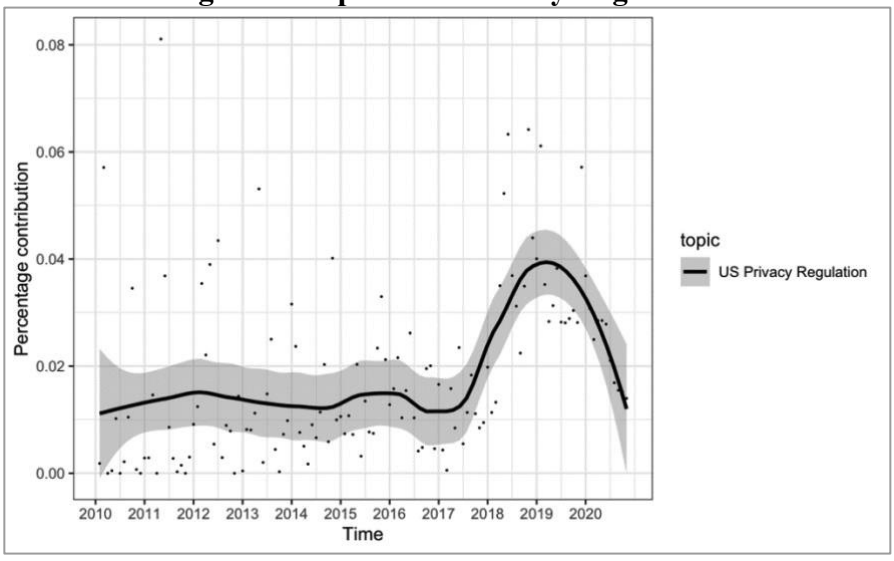
starting in mid-2017, peaking at 4% in 2019, the year Senators Edward J. Markey (D-Mass.) and Josh Hawley (R-Mo.) introduced bipartisan legislation to update children's online privacy rules.

Figure 4. Topic: EU Data Privacy Law



Rights, Consumer, and Privacy Organizations Unite to Release Principles for Privacy Legislation, Pub. Knowledge (Nov. 13, 2018), https://publicknowledge.org/34-civil-rights-consumer-and-privacy-organizations-unite-to-release-principles-for-privacy-legislation [https://perma.cc/7V3P-4WFB].

Figure 5. Topic: U.S. Privacy Regulation



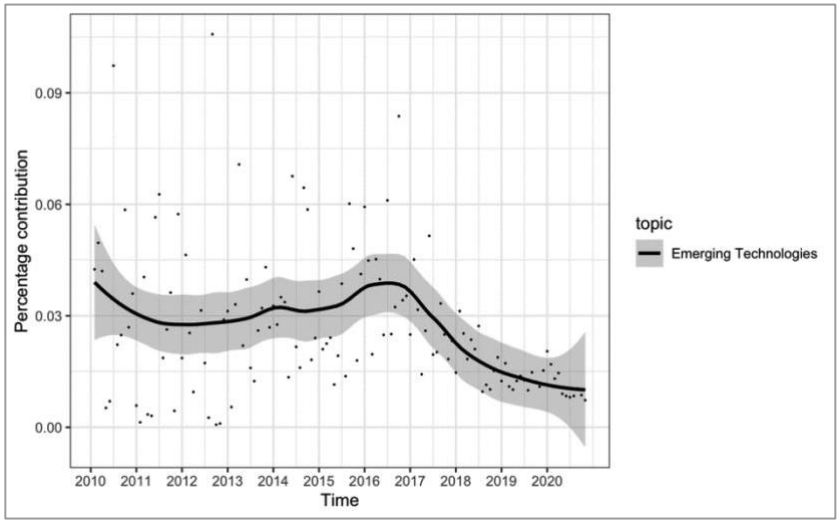
The "Emerging Technologies" (see Figure 6) topic, which includes articles on the regulation of emerging technologies such as self-driving cars, also accounted for a significantly larger-than-average contribution to the corpus than a uniform model's predicted contribution during the years 2010 to 2017 (approximately 3.2% contribution), and then declined after 2017.[123] The most representative articles comprising this topic reflect a range of views on the regulation of emerging technologies. While there was some evidence of techno-libertarian ideas in an interview with tech entrepreneur Marc Andreessen, who commented that some emerging tech fields (e.g., biotech, stem cell research, 3-D printing, drones) face "huge regulatory hurdles [,]"[124] other articles reflected an openness to regulation in this area. Another article quotes a *Medium* post by Dan Ammann, CEO of self-driving car company Cruise, saying: "When you're working on the large-scale deployment of mission critical safety systems, the mindset

[123] If the model was uniform, that is, if each topic contributed the same amount to the corpus, 50 topics would predict a predicted 2% contribution from each topic.

[124] Nick Bilton, *Forecasting the Next Big Moves in Tech*, N.Y. TIMES, May 19, 2014, at B8; *see also* Rob Thubron, *Uber Partners with University of Arizona as It Looks to Advance Its Self-driving Car Project*, TECHSPOT (Aug. 26, 2015, 1:30 PM), https://www.techspot.com/news/61898-uber-partners-university-arizona-looks-advance-self-driving.html [https://perma.cc/K9HQ-JG8J] (reporting that Arizona Governor, Doug Ducey, "told state regulators they couldn't enforce rules that require Uber drivers to have commercial insurances and licenses, saying the policy was hampering job creation and stifling innovation").

of 'move fast and break things' certainly doesn't cut it."[125] The article goes on to discuss cooperation between tech companies and regulators to develop benchmarks for assessing the safety of self-driving cars.[126] Other articles in this topic discuss the myriad challenges facing developers of emerging technologies. Regulation is among the challenges discussed, but the articles tend to highlight fierce market competition as a barrier to the success of emerging technologies. This is reflected in the topic's top words (company, tech, valley, silicon valley, say, uber, startup, founder, ceo), which all reference key features of tech company competitors.[127]

Figure 6. Topic: Emerging Technologies



In addition to coverage of regulation in specific subject matter areas, the "Bipartisan Support for Regulation" topic (see Figure 7) captures sustained coverage of partnerships between state and federal

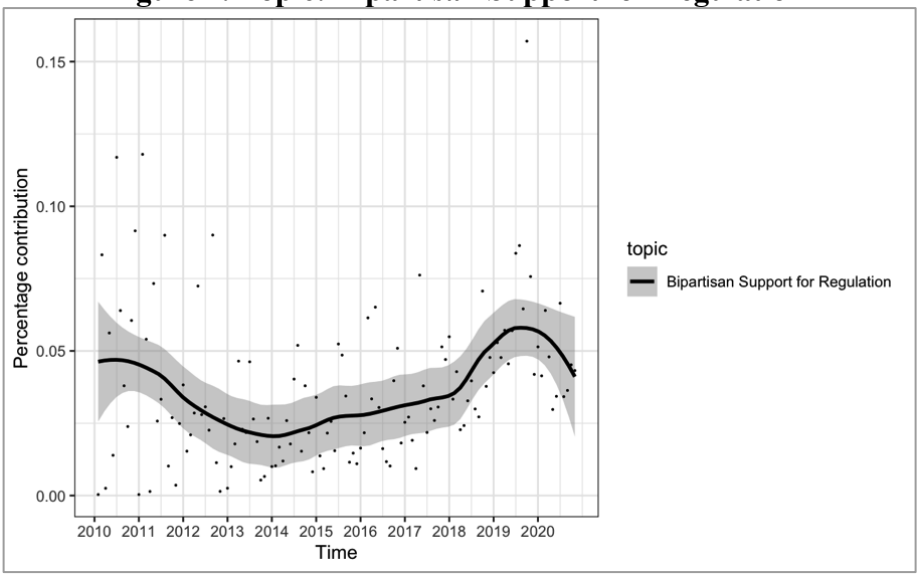
[125] Joseph White, *GM Cruise to Delay Commercial Launch of Self-driving Cars to Beyond 2019*, REUTERS (July 24, 2019, 5:56 AM), https://www.reuters.com/article/us-gm-cruise/gm-cruise-to-delay-commercial-launch-of-self-driving-cars-to-beyond-2019-idUSKCN1UJ1NA [https://perma.cc/69YK-Y82F].

[126] *Id.*

[127] Mark Matousek, *Apple, Waymo, and Even Amazon Will Have a Huge Advantage Against Tesla in the Race to Launch Self-driving Taxis, One Wall Street Analyst Says (TSLA)*, BUS. INSIDER (Oct. 9, 2018, 6:50 PM), https://www.businessinsider.com/tesla-may-lose-to-apple-amazon-and-waymo-in-self-driving-taxis-2018-10 [https://perma.cc/TR2Y-Y93B]; *Apple "Rethinking" Self-driving Car Plans*, SCI. WORLD REP. (Sept. 12, 2016, 6:09 AM), http://www.scienceworldreport.com/articles/47314/20160912/apple-rethinking-self-driving-car-plans.htm [https://perma.cc/HC3G-DWX4].

regulators across party lines to regulate big tech companies. For example, representative articles comprising this topic report on cooperation between federal and state regulators of different party affiliations to investigate antitrust violations by large platform companies such as Facebook and Google.[128] This topic was a high contributor to the corpus throughout the selected years, with relative peaks around 2010 and 2019.

Figure 7. Topic: Bipartisan Support for Regulation



The model also reveals widespread discussion of big tech regulation in the context of competition with incumbent, non-platform competitors such as banks. While no significant change in contribution to the corpus was observed in the "Competing with Big Tech" topic (see Figure 8), its inclusion is based on its average contribution of approximately 4.7% of the corpus across all sample years, a 135% greater contribution than a uniform distribution's 2% predicted

[128] Margaret Harding McGill, *NY Attorney General Talks Facebook with DOJ*, AXIOS (Oct. 7, 2019), https://www.axios.com/ny-attorney-general-doj-facebook-letitia-james-518a9be4-91ad-4c96-a157-aa0d0007309b.html [https://perma.cc/5NZV-AV9P]; Steve Lohr, *Regulating Big Tech is a Bipartisan Issue*, BOS. GLOBE, Sept. 7, 2019, at A9; Casey Egan, *Report: Majority of State Attorneys General Prepping Antitrust Probe into Google*, SNL KAGAN MEDIA & COMMC'NS REP. (Sept. 4, 2019); *47 Attorneys General Back Antitrust Probe into Facebook*, A.P. NEWS (Oct. 22, 2019), https://apnews.com/article/technology-business-us-news-media-district-of-columbia-88df3224fe794cf099d6a5b212b7ddf4 [https://perma.cc/9YXL-VPJN]; *US Justice Department Teams Up with States on Probe of Big Tech Firms*, REUTERS (Aug. 20, 2019, 8:49 AM), https://www.reuters.com/article/us-tech-antitrust-delrahim/u-s-justice-department-teams-up-with-states-on-probe-of-big-tech-firms-idUSKCN1VA1OR [https://perma.cc/D4MX-RX6K].

contribution. Representative articles include editorial content alerting incumbent firms to the growing competitive threat posed by big tech platforms[129] and advising incumbent firms how to compete with their big tech rivals.[130] Regulation comes into this discussion in three ways that have little to do with techno-libertarian themes: (1) as an impediment hindering incumbent banks' ability to compete with fintech rivals;[131] (2) as a potential "accelerator for banks"[132] in their efforts to meet competition from platform companies; and (3) as a challenge that technology can help banks solve (i.e., by helping them manage their regulatory obligations).[133]

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[129] *See, e.g.*, Suprana Biwas, Brant Carson, Violet Chung, Shwaitang Singh & Renny Thomas, *AI-Bank of the Future: Can Banks Meet the AI Challenge?*, MCKINSEY & CO. (Sept. 19, 2020), https://www.mckinsey.com/industries/financial-services/our-insights/ai-bank-of-the-future-can-banks-meet-the-ai-challenge [https://perma.cc/J8JM-P9LB] (reporting that "big-tech companies are looking to enter financial services as the next adjacency"); CXOtoday News Desk, *Digital Transformation In Financial Sector To Get Bigger*, CXOTODAY.COM (Jan. 30, 2019), https://www.cxotoday.com/news-analysis/digital-transformation-in-financial-sector-to-get-bigger [https://perma.cc/95BG-Q3RH] (discussing banks' need to innovate to compete with FinTechs).

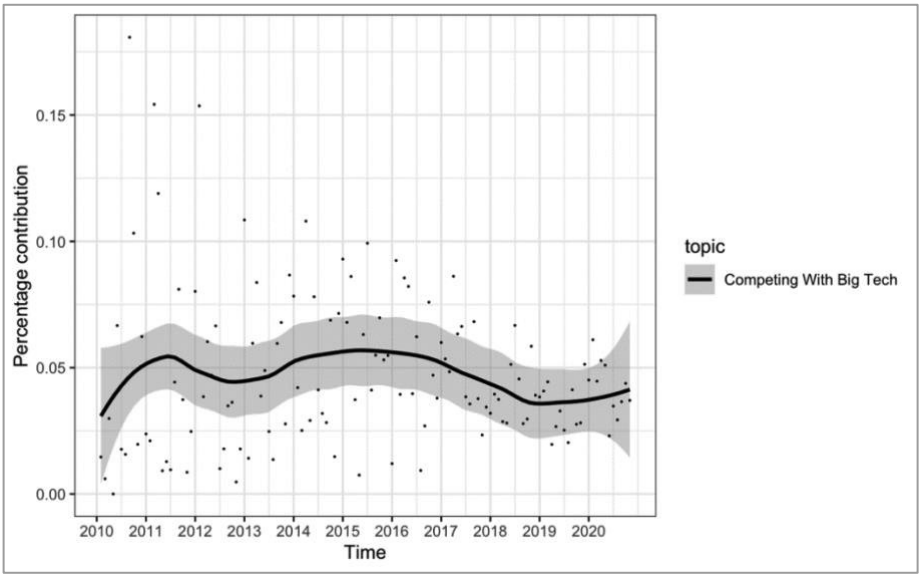
[130] *Wealth Managers Need to 'Democratize' Their Services to Thrive in the Hyper-Personalized, Digital Banking Era, Warns Avaloq*, AVALOQ (Sept. 17, 2020), https://www.avaloq.com/en/-/wealth-managers-need-to-democratize-their-services [https://perma.cc/Y42D-J8YU]; Chira Barua, Balazs Gati, András Havas, Tara Lajumoke, Miklos Radnai & Zubin Taraporevala, *How Banks Can Use Ecosystems to Win in the SME Market*, MCKINSEY & CO. (June 10, 2019), https://www.mckinsey.com/industries/financial-services/our-insights/how-banks-can-use-ecosystems-to-win-in-the-sme-market [https://perma.cc/5QQW-A32B] (discussing how banks can use existing technology platforms (ecosystems) to attract new customers).

[131] CXOtoday News Desk, *supra* note 129.

[132] *Id.* ("[R]egulation, such as GDPR is often viewed as a hindrance to digital transformation. But, in many cases it's acted as an accelerator for banks and the trends will continue for the coming year.").

[133] Biwas et al., *supra* note 129 (describing how AI can help banks with their regulatory reporting obligations); Obi Omile, *Why Niche SaaS Scales So Well*, VENTUREBEAT (Sep. 12, 2020, 5:07 PM), https://venturebeat.com/2020/09/12/why-niche-saas-scales-so-well [https://perma.cc/9F7V-TAMW] (marketing a product to help companies "quickly scale and operate more efficiently" to compete more effectively with big tech platforms).

Figure 8. Topic: Competing with Big Tech

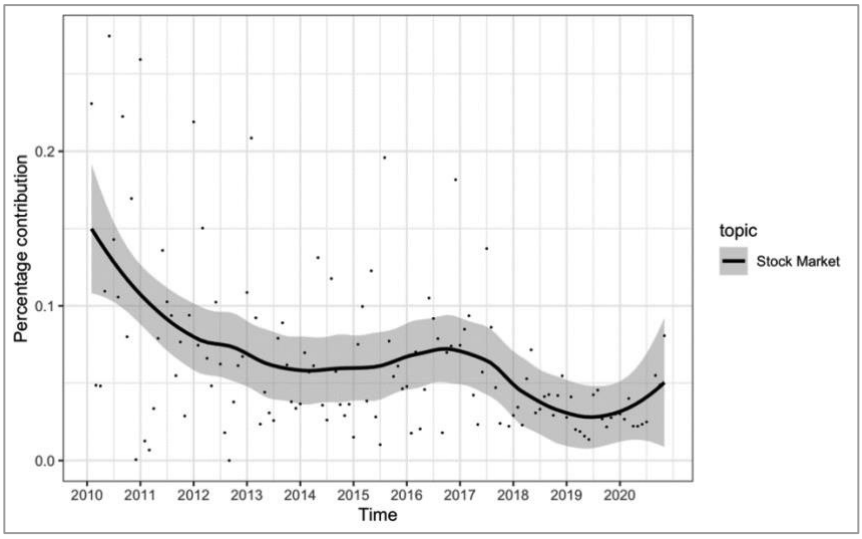


Beyond explicit discussions of regulation, the model reveals interesting trends in two broader themes relating to technology and the economy. First, the topic titled "Stock Market" (see Figure 9) comprises articles reporting on the performance of tech stocks and their outsize influence on the stock market.[134] This topic contributes 15% of the

[134] Angela Moon, *Tech Earnings Take the Focus Next Week*, GRAND FORKS HERALD, July 12, 2014, at C3 (reporting that the tech sector is out-performing the rest of the market in anticipation of next quarterly earnings report); Paul R. La Monica, *The Stock Market Now Has Two $1 Trillion Companies: Amazon and Microsoft*, CNN (July 11, 2019, 5:47 PM), https://www.cnn.com/2019/07/11/investing/amazon-microsoft-trillion-dollar-market-value/index.html [https://perma.cc/M7MN-9QAZ] ("Big Tech stocks have soared this year, despite concerns about the possibility of more regulation in the United States and worldwide as well as trade tension between the United States and China. So far, their sales and earnings growth have remained relatively strong."); Noel Randwich, *Deep Losses Leave Big Tech With Small Earnings Multiples*, REUTERS (Dec. 10, 2018, 6:02 AM), https://www.reuters.com/article/us-usa-stocks-earnings-faangs/deep-losses-leave-big-tech-with-small-earnings-multiples-idUSKBN1O91C3 [https://perma.cc/Q9DK-AJRA] (reporting on the unexpectedly poor performance of big tech stocks in 2018); Paul R. La Monica, *When Apple Has a Bad Day, We All Have a Bad Day*, CNN (Mar. 29, 2018, 1:14 PM), https://money.cnn.com/2018/03/29/investing/tech-stocks-apple-amazon-facebook-google-microsoft/index.html [https://perma.cc/K89C-EZDC] (tying stock market performance to big tech stock performance and inquiring whether big tech companies have too much sway over financial markets); Stan Choe & Damina J. Troise, *Stocks End Another Day of Sharp Swings With Meager Gains*, ASSOCIATED PRESS (Sept. 11, 2020, 4:14 PM), https://www.detroitnews.com/story/business/2020/09/11/us-stocks-edge-higher-end-

corpus at the beginning of the sample period in 2010 but declines dramatically to under 5% by 2020. Although this still represents a significantly larger portion of the discourse on big tech (compared to a uniform distribution model), it appears that discussions of big tech's market performance are being crowded out to some degree by the increasing calls for regulation documented above.

Figure 9. Topic: Stock Market



The second broad topic, titled "Critiques of Capitalism" (see Figure 10), encompasses articles that present deep critiques of capitalism[135] and big technology's role in it. This topic trends upward from 3% in 2010 to nearly one-tenth of the entire corpus by 2018, returning to just over 5% by the of the sample years. The most representative articles include: an interview with Slavoj Zizek on the rise of populism and other anti-establishment trends,[136] an essay critiquing prevailing conceptions of privacy as supporting "bourgeois

rocky-week-trading/3467455001/ [https://perma.cc/6PEA-VN4L] (discussing big tech stocks' influence on the broader market).

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[135] Gabriel Winant, *Is Anti-monopolism Enough?*, THE NATION (Jan. 21, 2020, 1:25 PM), https://www.thenation.com/article/culture/goliath-monopoly-and-democracy-matt-stoller-review [https://perma.cc/925M-LSG9].

[136] N.B., *Are Liberals and Populists Just Searching for a New Master?*, ECONOMIST (Oct. 8, 2018), https://www.economist.com/open-future/2018/10/08/are-liberals-and-populists-just-searching-for-a-new-master [https://perma.cc/X5YL-8ET6].

values of personal autonomy and selfhood";[137] the need for regulation of big tech companies to sustain open, democratic societies;[138] and a proposal to convert private technology companies into publicly owned utilities.[139] It is interesting to note that most of the words comprising this topic have a positive valence (political, public, even, power, people, social, way, free, become, right, world, problem). Indeed, this is the type of language big tech companies commonly deploy to describe themselves, their missions, and their value to society. However, based on a manual review of representative articles, these positive words appear to be associated not with big technology, but with an idealized society cleansed of (or protected from) the pathologies of big technology. Technology companies are portrayed as no different from any other big business supporting the capitalist order. For example, in his critical review of Matt Stoller's book, *Goliath: The 100-Year War Between Monopoly Power and Democracy*, historian Gabriel Winant recalls that John F. Kennedy once griped, "[m]y father always told me that all businessmen were sons of bitches, but I never believed it until now!"[140] Winant goes on to suggest that tech businesses are even more dangerous than the mid-century monopolies to which Kennedy referred because they "have sunk their roots into large sections of society. Come after Amazon, and you come after its tens of millions of users too."[141]

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[137] Daniël de Zeeuw, *Immunity from the Image: The Right to Privacy as an Antidote to Anonymous Modernity*, 17 EPHEMERA 259, 259 (2017).

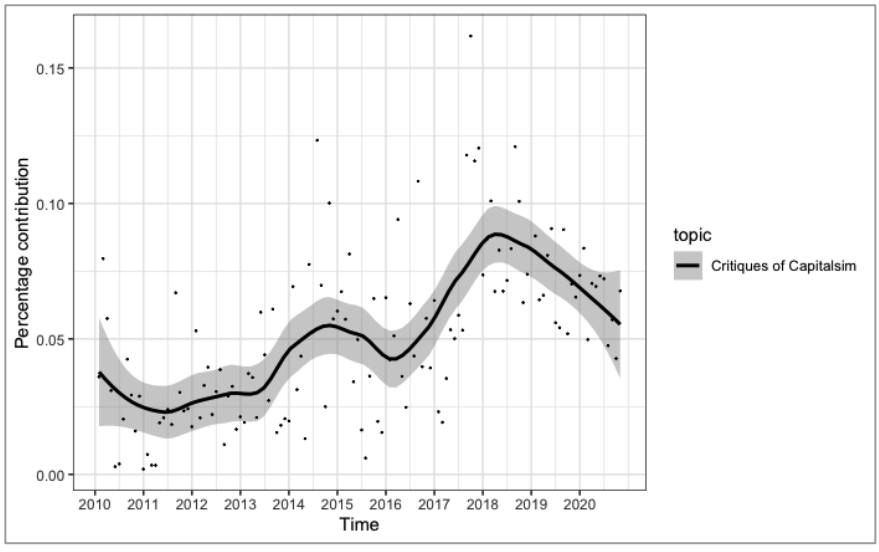
[138] *Open Societies Most Likely to Overcome Power, Technological Disruptions, Stanford Historian Says*, STATES NEWS SERV. (Feb. 20, 2018) ("The societies most likely to strike the right balance between old hierarchies and new social networks will be the open societies, where appropriate regulation of big tech companies is more likely to be worked out than in closed societies.").

[139] *How the Pandemic Revealed a Morally Bankrupt Culture*, ECONMATTERS (May 14, 2020), https://www.econmatters.com/2020/05/how-pandemic-revealed-morally-bankrupt.html [https://perma.cc/82V8-LD87].

[140] Gabriel Winant, *Is Anti-monopolism Enough?*, THE NATION BLOGS (Jan. 21, 2020), https://www.thenation.com/article/culture/goliath-monopoly-and-democracy-matt-stoller-review [https://perma.cc/S4RR-6XU3].

[141] *Id.*

Figure 10. Topic: Critiques of Capitalism



In addition to these topic trends, several additional topics capture bursts of discursive activity surrounding isolated regulatory events. For instance, representative articles in the "Content Compensation" topic report on events surrounding the enactment of an Australian law that authorized local news publishers to charge large platform companies such as Google and Facebook "fair payment" for content they post for free. Representative articles comprising the "Trump Censorship" topic are about a single tweetstorm launched by then-president Donald Trump in spring of 2020 calling for social media to be shut down after Twitter added a "fact-check" label to two of his tweets disparaging mail-in ballots. Similarly, representative articles in the "Calls for Accountability" topic are clustered in the period immediately following the Cambridge Analytica scandal, and present interviews with and quotes from former close associates of Mark Zuckerberg calling for action to hold Facebook accountable for decisions precipitating the breach. Finally, representative articles in the "Campaign Criticisms" topic recount speeches by presidential candidates in the 2020 democratic primary season criticizing big tech and proposing more aggressive regulation.

V. Conclusion

The technology industry has doggedly assembled and deployed a techno-libertarian ideology proclaiming the social and economic benefits of—indeed, the social and economic imperative of—an unfettered internet operating in unregulated markets. What's more, this industry has immense power to shape public discourse. Thus, we might have expected our analysis of news articles to identify topics reflecting the view that regulating big tech would be a disaster. But it did not. Instead, the topic model reveals that the public discourse around big tech and regulation tends to be about how the tech sector should be regulated and the harms it causes. This counterintuitive finding opens the field for promising new scholarly inquiries and paves the way for more meaningful policy debate around the regulation of technology. We hope that our findings will motivate new research to dig deeper into the mechanisms driving rhetoric about tech regulation and its relationship to public policy. Analysis of different corpora—for instance, spanning a longer time period or encompassing different sources such as blog posts or social media—could yield useful insights. In the meantime, our findings should embolden legal and policy advocates to pursue regulatory initiatives aimed at addressing the social and economic harms produced by the technology sector knowing that the techno-libertarian rhetoric likely to be deployed against them may not have sufficient public traction to win the day.

Appendix 1: Choice of Hyperparameters

Following Cohen Priva and Austerweil,[142] α and η were set to .1, which encourages the model to represent each document as composed of only a few topics and to assign high probability to only a few words for a certain topic. The lower bound on per-term topic probability for inclusion in analyses was set to .01.

Per-word Perplexity: In natural language processing, perplexity is a measurement of how well a model is at predicting unseen words. Smaller values are preferable. Note that the per-word perplexity is lower for evaluation sets with 25 and 50 topics compared with the relevant training sets. The latter represent held out, randomly selected documents that add up to 1% of the corpus. This means that the modeling results do not reflect overfitting to noise within the training set.

25 Topics	50 Topics	75 Topics	100 Topics
Lower bound on per-word perplexity for training set:			
359.71	604.98	1031.05	1777.85
Lower bound on per-word perplexity for evaluation set:			
72.42	127.03	164.18	188.90

UMass Coherence This measure was calculated over the training set. Larger numbers indicate the words in each topic are more likely co-occur.

25 Topics	50 Topics	75 Topics	100 Topics
-1.030	-1.163	-1.493	-1.398

[142] Uriel Cohen Priva & Joseph L. Austerweil, *Analyzing the History of Cognition Using Topic Models*, 135 COGNITION 4 (2015), https://doi.org/10.1016/j.cognition.2014.11.006 [https://perma.cc/353R-QH7B].

Appendix 2: Calculating Topic Contributions

To determine the relative popularity of different topics over time, we calculated the monthly contribution of topic z_j (for $j \in [1, n]$) to the learned model. Following Cohen Priva and Austerweil, this measure was defined as:

$$p_m(z_j) = \frac{1}{|D_m|} \sum_{d \in D_m} \frac{|\{w_i \in d : topic(w_i) = z_j\}|}{|d|}$$

where w_i is a word in document d; d is a document, represented as an unordered bag of words in D_m (the set of documents from month m); and $topic(w_i)$ stands for the most likely topic for w_i given the prior distribution over topics and the other words present in d. This measure reflects the percentage of words in a month that are most strongly associated with a certain topic. In calculating the norm of documents, only words were counted for which the conditional probability of at least one topic was more than .01.