## 1AC – UK

### Innovation Adv

#### Advantage One: Innovation

#### Innovation lags cause China conflict and existential threats

Suchodolsk 20 [Jeanne Suchodolsk, attorney with the United States Navy Office of General Counsel, December 2020 https://scholarship.law.unc.edu/cgi/viewcontent.cgi?article=1416&context=ncjolt]

Innovation, in particular, technology-based innovation, is the key driver for both economic competitiveness and national security. Other nations, with interests adverse to the United States, recognize this fact. In an increasingly interconnected world, nation states seek to accumulate innovation prowess, and hence economic strength, as a key element of their geopolitical power. Especially savvy nation states also pursue such ends as a mechanism to influence or diminish the national security and geopolitical power of the United States. There is no need to inflict upon the world the carnage of war if one’s geopolitical aims can be achieved via alternative competitive means.

Several authors suggest China’s long-term ambitions include unseating the United States as the world’s economic and political leader.1 More compelling than opinions, several United States (“U.S.”) government and private studies document a systematic and coordinated effort by China to achieve technical and economic dominance through misappropriation of U.S. technology.2 These efforts are additionally supported by a companion effort to weaken international economic institutions and norms designed to protect U.S. intellectual property and free trade.3 The Chinese tactics include illegal means, and sophisticated use of legal means, to misappropriate U.S. technology and weaken the U.S. innovation infrastructure including:

a) Leveraging the open university and laboratory ecosystem via direct sponsorship and engagement of Chinese nationals;4 b) Devaluing U.S. positions in patents and technology platforms;5 and c) Accessing private sector U.S. technology through acquisitions and ownership stakes in existing firms, funding of high-tech start-ups, and forced joint ventures and other contractual agreements as a prerequisite for entering the Chinese market.6 This particular form of competitive strategy targeting the innovation ecosystem in the United States is labeled by the Authors as “Innovation Warfare,”7 and it is defined as an executable competitive strategy: a) Reflecting an innovation, intellectual property, and technology strategy articulated and executed by the state (e.g. China); b) Using illegal means, political means, and legal economic activities—of the type previously residing solely in the province of commercial enterprise, to achieve the state’s objectives; c) Employing these economic and innovation activities to achieve both economic geopolitical power and to enhance military capabilities; and d) Functioning as a military, national security, and defense doctrine not solely as a reflection of the state’s economic policy goals nor commercial competition in the ordinary course.

Innovation Warfare does not just threaten American jobs and economic prosperity. By simultaneously co-opting and weakening the innovation capabilities of the United States, China seeks to advance its rise to world power. China’s prosecution of Innovation Warfare not only encompasses a rejection of a rules-based international order, but also poses an existential threat. A world where China dominates the technology landscape is not just about who earns the profits or prevails in an abstract geopolitical fight. According to the National Security Strategy of the United States of America (“National Security Strategy”), China pursues a world in which economies are less free, less fair, and less likely to respect human dignity and freedoms.8 China’s Innovation Warfare activities risk the type of economic and geopolitical aggressions that were a root cause of two World Wars.

#### Arguments that the US will continue to beat China in innovation are highly risky assumptions – the US is losing its edge and is in danger of failing

Atkinson 19 (Robert David Atkinson is a Canadian-American economist. He is president of the Information Technology and Innovation Foundation, a public policy think tank based in Washington, D.C., that promotes policies based on innovation economics. He was previously Vice President of the Progressive Policy Institute, Caleb Foote is a research assistant at the Information Technology and Innovation Foundation NOT the actor from The Kids are Alright, unfortunately :/ April 2019, “Is China Catching Up to the United States in Innovation?” Page 6, Information Technology and Innovation Foundation <https://projects.iq.harvard.edu/files/innovation/files/2019-china-catching-up-innovation.pdf>) MULCH

The second factor relates to national security and the defense industrial base—a critical issue for the United States as U.S. defense superiority is based is in largely part on technological superiority. American service men and women go into any conflict with the advantage of fielding technologically superior weapons systems. But sustaining that advantage depends on the U.S. economy maintaining global technological superiority, not just in defense-specific technologies, but in a wide array of dual-use technologies. To the extent the United States continues to lose technological capabilities to China, U.S. technological advantage in defense over China will diminish, if not evaporate, as U.S. capabilities whither and Chinese ones strengthen. It is certainly a highly risky proposition to assume the United States can continue its weapons systems superiority over the Chinese if: 1) the Chinese continue to advance, largely through unfair, predatory practices, at their current pace; and 2) the United States loses a moderate to significant share of its advanced technology innovation and production capabilities. As ITIF wrote in 2014, “The United States defense system is still the most innovative in the world, but that leadership is not assured and is in danger of failing. This decline is not only impacting defense innovation and capabilities, but also overall commercial innovation and U.S. competitiveness.

#### Pursue inevitable- no uniq for turns

Lewis 18 (James Lewis. Senior vice president at the Center for Strategic and International Studies. November 30th 2018 “Technological Competition and China.” <https://www.csis.org/analysis/technological-competition-and-china>)

The United States and China are in a growing competition, perhaps verging on conflict, but it is not a nineteenth century competition between empires for control of territory and resources. Unlike great power competition in previous centuries, the focal point is not military strength or territorial expansion. This conflict is over control of the modern levers of power—global rules and institutions, standards, trade, and technology. The ability to create new technologies, particularly digital technologies (given their importance for politics, security, and economic growth) have become key factors in the U.S.-China relationship, which is marked by close commercial cooperation and deep governmental distrust. This disparity creates unavoidable tensions.

The link between technology, innovation, national security, and international power is now widely recognized. When Vladimir Putin says that the country that leads in artificial intelligence (AI) “will be the ruler of the world,” it is hyperbole, but hyperbole that confirms that political leaders recognize that the ability to innovate is a potent source of national power. In the digital age, national security and national power have different requirements shaped by technological change and cyberspace.

Innovation has become a central element of its international influence. This is not new—the U.S.-Soviet space race was a contest of the ability of different systems to produce new technologies, but those were unique government programs. Technological competition today is as much between companies as states. A country’s ability to innovate and produce advanced technologies provides economic strength, military power, and an intangible benefit of perceived leadership.

Both China and the United States have advantages and disadvantages in this contest, and while it is usual to focus on quantitative aspects—such as the number of engineers or patents and spending on research and development (R&D)—these are not the key determinants of technological competition between states. This competition is a contest of ideas on governance for investment, innovation, and the internet. The internet and global connectivity not only reshape the environment for competition but also create political and market forces that both nations find difficult to control.

#### Specifically, Parker immunity discourages disruptive healthcare innovation

Sage 17 (William Sage, James R. Dougherty Chair for Faculty Excellence in the School of Law and Professor of Surgery and Perioperative Care in the Dell Medical School, University of Texas at Austin; and David Hyman Professor at Georgetown University School of Law, “Antitrust as Disruptive Innovation in Health Care: Can Limiting State Action Immunity Help Save a Trillion Dollars?” Loyola University Chicago Law Journal, Pages 731-734, modified for ableist language indicated by strikethrough and [brackets]) MULCH

Physicians possess this power for a simple reason: the body of doctrines and practices that we call “health law” systematically supports it. Laws protect the public from individuals and therapies not controlled by physicians, and discourage medical self-help. Laws fund physicians’ tools and assure their quality—though unfortunately not their value. Laws mandate and subsidize insurance coverage for the treatments physicians recommend. Laws insulate physicians from corporate structures and contractual norms. Laws mediate disputes between physicians and patients based on professional standards. Laws apply medical criteria to most ethical issues. Finally, laws such as those challenged in North Carolina State Board delegate substantial rule making and disciplinary authority to state licensing boards (i.e., to entities populated from, and controlled by, the medical profession). States typically justify this abdication of direct oversight in terms of physicians’ scientific expertise, and their ethical duty to heal, not harm, patients.

Both individually and collectively, these laws profoundly distort competition in health care and severely hamper the market’s ability to generate the benefits of competition that we see in other industries. Production remains fragmented. Prices are both inflated and arbitrary— and price competition is minimal (when it even exists at all). There are many barriers to competitive entry—even to deliver the most basic services. Geographic markets are needlessly small and are surprisingly concentrated. Supply bottlenecks are common, often to the mutual benefit of large health insurers and dominant health care providers. And innovation is limited to the sorts of inputs that fit into existing production processes—mainly drugs, diagnostics, and medical devices.

The result is that our health care system almost never trades in the types of consumer products that dominate other costly, complex, technologically sophisticated industries. Instead of fully assembled products accompanied by a strong performance warranty, patients are expected to pay for disaggregated professional process steps (including procedures and consultations) to which billing codes have been assigned, and for equally atomized inputs and complements to those professional processes (such as diagnostic tests and surgical supplies). Health insurance agglomerates these unstructured procedural steps and physical inputs into “covered benefits,” but it does not assemble them into actual, useful products—and only a few true Health Maintenance Organizations (“HMOs”) provide comprehensive prepaid care.

The past decade has witnessed growing agreement regarding both the necessary attributes of a high-performing health care system,17 and the managerial strategies for achieving them.18 Much less attention has been paid to the legal obstacles that have long hindered attempts to redesign acute and complex care—let alone to moving the locus of basic care “upstream,” where it can be communally or self-administered, rather than professionally controlled. As currently constituted, American health law presents concrete structural impediments to accomplishing these consensus health policy goals, and also creates opportunities for incumbent providers to delay or sabotage such efforts.

C. Anticompetitive Effects of Medical Licensing The deep legal architecture of health care strongly favors physician self-regulation, and furthers physicians’ professional insularity and self interest. Physician-controlled medical licensing boards have attracted criticism for decades. Milton Friedman famously wrote in 1962: I am . . . persuaded that [restrictive] licensure has reduced both the quantity and quality of medical practice; . . . that it has forced the public to pay more for less satisfactory medical service[;] and that it has ~~retarded~~ [slowed] technological development both in medicine itself and in the organization of medical practice.19

At the time he made it, Friedman’s harsh economic critique of occupational licensing was not widely shared (except among other libertarians). Professional elites were thought to represent a progressive, prosperous alternative to industrial commodification and the supposed exploitation of labor. To be sure, there was some recognition that the professions might use ethical codes to pursue their own economic selfinterest.20 But mainstream economists such as Kenneth Arrow still believed that collective professionalism improved the marketability of health care by fostering the trust needed to overcome medical uncertainty and informational asymmetry between physicians and patients.21 More recently, a wide array of voices have questioned the economics, and even the justice, of professional privilege.22 In 2015, the Obama Administration issued a report on occupational licensing, finding that “licensing can . . . reduce employment opportunities and lower wages for excluded workers, and increase costs for consumers,” and that “the costs of licensing fall disproportionately on certain populations.”23

To be sure, medical licensing laws are not solely to blame for health care’s competitive shortcomings. Other federal and state regulations and subsidies bear responsibility as well. Still, licensing boards set the tone for the rest of health law as gatekeepers into the health professions and arbiters of practice once admitted. These boards determine the permitted scope of practice, confer authority to write prescriptions, police departures from conventional patterns of care, respond to complaints by licensees about outsiders, and decide when (and, usually, when not) to take disciplinary action against a licensed professional.

From a health policy perspective, physician-imposed barriers to market entry and innovation—typically enforced by a professional licensing board—are the most pernicious practice. Licensing boards set standards for acceptability and impose discipline on licensees who violate their dictates. Unlicensed practice is a criminal act. These entry barriers not only deter novel approaches from new directions, such as telehealth and various “upstream” self-care modalities, but they also discourage existing competitors from adopting practices introduced to the market by disruptive innovators.

#### Disruptive innovation in healthcare solves pandemics

Shaikh 15 (Affan T. Shaikh, Professor at Emory’s school of public health Lisa Ferland, Robert Hood-Cree, Loren Shaffer, and Scott J. N. McNabb, September 23rd 2015, “Disruptive Innovation Can Prevent the Next Pandemic” NCBI <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4585064/>) MULCH

Public health surveillance (PHS) is at a tipping point, where the application of novel processes, technologies, and tools promise to vastly improve efficiency and effectiveness. Yet twentieth century, entrenched ideology and lack of training results in slow uptake and resistance to change. The term disruptive innovation – used to describe advances in technology and processes that change existing markets – is useful to describe the transformation of PHS. Past disruptive innovations used in PHS, such as distance learning, the smart phone, and field-based laboratory testing have outpaced older services, practices, and technologies used in the traditional classroom, governmental offices, and personal communication, respectively. Arguably, the greatest of these is the Internet – an infrastructural innovation that continues to enable exponential benefits in seemingly limitless ways. Considering the Global Health Security Agenda and facing emerging and reemerging infectious disease threats, evolving environmental and behavioral risks, and ever changing epidemiologic trends, PHS must transform. Embracing disruptive innovation in the structures and processes of PHS can be unpredictable. However, it is necessary to strengthen and unlock the potential to prevent, detect, and respond.

Introduction

Fifty-two years ago, Alexander Langmuir articulated our modern understanding of public health surveillance (PHS) – the systematic collection, consolidation and evaluation, and dissemination of data (1). In this workflow process, public health provides epidemiologic intelligence to assess and track conditions of public health importance, define public health priorities, evaluate programs, and conduct public health research (2). However, amid this rapidly changing world, PHS has remained sluggish and hindered by the impediments of siloed, vertical (outcome-specific) systems, inadequate training and technical expertise, different information and communication technology (ICT) standards, concerns over data sharing and confidentiality, poor interoperability, and inadequate analytical approaches and tools (3–7).

Gaps and impediments in PHS have become increasingly evident to the world in the wake of the largest Ebola epidemic ever – in which these challenges impacted our ability to prevent, detect, and respond. Under the looming threat of MERS-CoV, leishmaniasis, influenza, multidrug-resistant tuberculosis, and plague, the global public health community now realizes the urgent need to address shortcomings in PHS. Properly preparing for the next major outbreak hinges on our willingness to transform; the consequences of not doing so are dire.

Transforming PHS to meet the needs of the twenty-first century requires novel approaches. A helpful concept to understand and chart this future is disruptive innovation – a term first introduced by Clayton Christensen to describe innovations in technology and processes that disrupt existing markets (8). Disruptive innovations occur when advances in technologies or processes create markets in existing industries. This differs from sustaining innovations, where existing practices are incrementally improved to meet the demands of existing customers; in contrast, newly introduced innovations with disruptive potential (typically unrefined, simple, and affordable in character) target lower-end market needs or create entirely new market segments. As sustaining innovations improve disrupting technologies or processes, these new innovations will meet increasingly greater needs, capture greater market share, and eventually reshape the industry. Christensen uses the example of increasingly smaller disk sizes in the hard disk drive industry, the introduction of hydraulic technology in the mechanical excavator industry, and the rise of minimills in the steel industry to demonstrate the impact of disruptive innovations (8). Here, we describe the need for disruptive innovation in PHS and identify opportunities for disruption in PHS structures and processes.

#### New pandemics are coming and cause extinction – preventative measures solve

Diamandis 21 (Eleftherios P. Diamandis, Division Head of Clinical Biochemistry at Mount Sinai Hospital and Biochemist-in-Chief at the University Health Network and is Professor & Head, Clinical Biochemistry, Department of Laboratory Medicine and Pathobiology, University of Toronto, Ontario, Canada, April 14th 2021, “The Mother of All Battles: Viruses vs. Humans. Can Humans Avoid Extinction in 50-100 Years?” modified to fix author typo [“could result n” 🡪 “could result in” <https://www.preprints.org/manuscript/202104.0397/v1>) MULCH

The recent SARS-CoV-2 pandemic, which is causing COVID 19 disease, has taught us unexpected lessons about the dangers of human extinction through highly contagious and lethal diseases. As the COVID 19 pandemic is now being controlled by various isolation measures, therapeutics and vaccines, it became clear that our current lifestyle and societal functions may not be sustainable in the long term. We now have to start thinking and planning on how to face the next dangerous pandemic, not just overcoming the one that is upon us now. Is there any evidence that even worse pandemics could strike us in the near future and threaten the existence of the human race? The answer **is** unequivocally yes. It is not necessary to get infected by viruses of bats, pangolins and other exotic animals that live in remote forests in order to be in danger. Creditable scientific evidence indicates that the human gut microbiota harbor billions of viruses which are capable of affecting the function of vital human organs such as the immune system, lung, brain, liver, kidney, heart etc. It is possible that the development of pathogenic variants in the gut can lead to contagious viruses which can cause pandemics, leading to destruction of vital organs, causing death or various debilitating diseases such as blindness, respiratory, liver, heart and kidney failures. These diseases could result [in] the complete shutdown of our civilization and probably the extinction of human race. In this essay, I will first provide a few independent pieces of scientific facts and then combine this information to come up with some (but certainly not all) hypothetical scenarios that could cause human race misery, even extinction. I hope that these scary scenarios will trigger preventative measures that could reverse or delay the projected adverse outcomes.

#### **Health innovation solves ABR – kills 10 million people per year, more market access is key**

McMurry-Heath 9/16 (Michelle McMurry-Heath is president and CEO of the Biotechnology Innovation Organization, and lives in Washington, D.C. Tomaras is chief scientific officer at Forge Therapeutics, and lives in San Diego, September 16th 2021, “Opinion: Antibiotic-resistant superbugs are a ticking time bomb in global health care” San Diego Union Tribune, <https://www.sandiegouniontribune.com/opinion/commentary/story/2021-09-16/superbug-drugs-therapy-antibiotics>) MULCH

The global health-care system faces a ticking time bomb.

Deadly bacteria and fungi are evolving to resist all current antimicrobials. If that happens, everything from chemotherapy to routine surgeries will become extraordinarily risky, since patients’ weakened immune systems won’t be able to fight off these dangerous infections, and existing medicines will be of little use. The United Nations estimates that without new antibiotics, by 2050, superbugs could kill 10 million people a year.

We don’t know exactly when our last antibiotics will lose their efficacy. We don’t know which strain of “superbug” will push us past the tipping point. But we do know that America’s small biotechnology firms house some of the brain power to avert this disaster.

These firms and their scientists — many based here in California — are battling hard against this microscopic enemy. But small biotechnology firms are not just fighting microbial evolution; they are also grappling with a broken antibiotics market whose inefficiencies are putting millions of lives at risk.

Antibiotics are expensive to develop, costing upwards of $1 billion per new medicine. But doctors only prescribe advanced new antibiotics sparingly — because every dose gives bacteria a chance to evolve and become resistant. And most patients only need antibiotics for a few days, unlike insulin or statins, which many chronic disease patients need to take every day for years or even decades.

Because of the high research and development costs and low probability of earning a financial return on antibiotics, many large pharmaceutical companies have pivoted away from antibiotics development. Since the 1980s, the number of major drug companies developing new antibiotics has fallen from 18 to three.

#### Antibiotic resistant superbugs and zoonotic viruses are catastrophic risks that guarantee extinction.

Victor 20 — Gavin Victor, Pioneer Journalist and Philosophy Research Assistant for Whitman College, 2020 (“Forget coronavirus: Worry about antibiotic resistance instead,” *Whitman Wire*, March 12th, Available Online at https://whitmanwire.com/opinion/2020/03/12/forget-coronavirus-worry-about-antibiotic-resistance-instead/, Accessed 07-02-2021)

A survey of experts from the “Future of Humanity Institute” at the University of Oxford states that there is a 19 percent chance of human extinction before 2100. If this is the risk of our extinction, then consequently, an extreme decrease in quality of life is much more likely, too. Among the many risks within contemporary life, issues surrounding antibiotic resistance are almost completely unacknowledged, incredibly dangerous and subject to change with only slight cultural and industrial shifts. The WHO claims that, “without urgent action, we are heading towards a post-antibiotic era, in which common infections and minor illnesses can once again kill.” The UN claims that by 2050, ten million people will die every year from antibiotic-resistant diseases – which is more than the current figure for cancer.

Antibiotic resistance stems from the misuse of antibiotics. The more we use antibiotics, the more we allow bacteria to build up a tolerance to them. We have already seen the advent of MRSA and antibiotic-resistant salmonella. The most obvious fix for this is to only prescribe antibiotics when absolutely necessary, which doctors are beginning to do. Humans, however, only use 20 percent of the antibiotics manufactured. The rest are consumed constantly by animals waiting for slaughter in massive feeding operations. Lance Price, an expert on bacteria resistant “superbugs”, claims that our food system’s predication on a constant use of antibiotics for animals is a recipe for disaster, because it uses antibiotics in a way that will inevitably lead to antibiotic resistance.

As with almost all recent disease outbreaks – like Swine-flu, MERS and SARS – COVID-19 is zoonotic, meaning that it originated in animals. Not only did these diseases originate in animals but in a particular species of animals that inhabit unnatural conditions for the sake of humans: including Swine-flu from pigs, MERS from camels, as well as SARS and COVID-19 likely originating from bats. While viruses are not the same problem as is antibiotic resistance, overlap between them indicates that top priority global health issues are stemming from our failure to have a healthy relationship with animals. We get zoonotic diseases as a result of exploitative and unnatural relationships with animals.

We need to use the fear generated by COVID-19 to jump start legitimate action in order to mitigate the fallout from catastrophes right around the corner. The fact that we turn a blind eye to pandemics that are becoming more and more inevitable is a sign that we shouldn’t trust our natural tendency to just “deal with it later.” Dealing with it later, dealing with the pandemics that are coming, doesn’t work. We should be scared – but of much more than COVID-19.

#### Narrowing Parker immunity empowers the FTC to challenge anticompetitive business sanctioned by state regulatory schemes. Those stifle innovation – incumbent regulations are outdated and block new entrants.

Crane 19 [Daniel A. Crane, Frederick Paul Furth Sr. Professor of Law, University of Michigan, 60 Wm. & Mary L. Rev. 1175, 2019, Lexis]

INTRODUCTION

This Article's intended audience holds a common view that state and local governments frequently adopt anticompetitive regulations for the benefit of economic special interests and that these acts of cronyism are pernicious to democracy, consumers, and economic efficiency. 1 In other words, the costs to society of these regulations far outweigh any reasonable benefits. A wise, beneficent, and all-knowing Platonic guardian of the state would have little trouble in striking down such regulations.

A further point of general consensus might relate to the particularly pernicious effect of anticompetitive state and local regulation in stifling new production innovation. In a variety of ways, our constitutional order is stodgy. Its conservatism lends a hand to the beneficiaries of incumbent technologies as they seek to deploy state power to block or to slow the advent of new technologies that may eventually displace the old, thereby preventing a realignment of wealth and position. In recent years, innovative technologies developed by companies such as Tesla, Uber, Lyft, and Airbnb have encountered determined opposition from purveyors of predecessor technologies, who have often used state and local regulation to thwart innovation. 2

So much for the common ground. Where consensus quickly fragments is on the question of what, if anything, to do about such regulations given that wise, beneficent, and all-knowing Platonic guardians of the state are in short supply. In the imperfect messiness that is liberal democracy, we frequently accept a host of comparatively petty inconveniences--political and economic--in order to preserve larger values. Just as we tolerate many market failures because the attempt at a regulatory fix might aggravate matters, we may have to tolerate some political failures on the same grounds.

[\*1178] Much of the difficulty has to do with the fact that while there might be a broad consensus that state and local governments enact many unjustifiable anticompetitive regulations, there is not a clear consensus on which ones they are. The experience with economic substantive due process in the late nineteenth and early twentieth centuries, epitomized in Lochner v. New York, 3 has left the American political psyche gun-shy about permitting judges to strike down protectionist economic regulations on constitutional grounds. Shortly after getting out of the Lochner business, the Supreme Court announced that it would not get into the same business under the guise of the antitrust laws. 4 Over time, the development of the Parker state action doctrine allowed the courts to play a somewhat expanded role with respect to anticompetitive state and local regulations, but the zone of judicial review remains relatively constricted. 5

The purpose of this Article is to compare the deployment of constitutional and antitrust tools to scrutinize potentially anticompetitive state and local regulations against the backdrop of the ubiquitous concern about "Lochnerizing" under the auspices of either constitutional or statutory authority. Here is the question in a nutshell: If one believes that courts (or perhaps federal administrative agencies) should do somewhat more than they currently do to scrutinize and potentially invalidate anticompetitive state and local regulations, which lever should they pull--constitutional doctrines, antitrust preemption, or both? Because there are some overlapping, and some separate, institutional constraints and potential pathologies between constitutional and antitrust law, it is important to compare the two tools before deploying them.

This Article is organized as follows: Part I diagnoses the underlying features of democratic government that produce anticompetitive regulation. Some of this story is quite familiar, but I present some new observations with respect to the role of technological incumbency as a strong factor in invoking regulation to thwart innovation.

[\*1179] Part II explores the historical, ideological, and institutional foundations of the current legal doctrines with respect to constitutional and antitrust scrutiny of anticompetitive regulations. It shows that, despite the narrowing of Parker immunity in recent decades and some recent revival of equal protection and substantive due process as constraints on anticompetitive regulation, a good deal of anticompetitive state and local regulation remains impervious to legal challenge.

Part III compares the potential efficacy and pitfalls of deploying constitutional or antitrust doctrines as checks on anticompetitive state and local regulations. It considers: (1) the reach and domain of constitutional and antitrust theories; (2) the ways in which each theory could accommodate genuine and sufficient justifications for the challenged regulations; (3) ways in which the antitrust and constitutional tools differ substantively and procedurally; and (4) ways in which the two theories might interact.

I. WHY ANTICOMPETITIVE REGULATION SUCCEEDS

This Article opened with the assumption that a wide universe of unjustified state and local anticompetitive regulation exists that a benevolent Platonic guardian of the state would instantly nullify. Given this conceit, the presence of such regulations necessarily represents democratic failures, as democracy should, in principle, strive for laws that confer positive, rather than negative, public benefit. What, then, accounts for the pervasive existence of these undesirable regulations? The answer comes in two parts--a generic (and largely familiar) story concerning anticompetitive regulations as a whole, and a more specific story concerning the battle between incumbent and innovative technologies.

A. The Generic Story

The generic story is largely familiar from public choice theory and the literature on the Parker state action doctrine. Democratic processes systematically fail to overcome two embedded hurdles to matching regulatory schemes to broad public preferences: (1) the asymmetrical distribution of costs and benefits of anticompetitive [\*1180] regulations, and (2) the externalization of costs on populations outside the boundaries of the relevant democratic unit. 6 In tandem, these hurdles to democratic correction of cronyistic dispensations of monopoly power by governmental regulators perpetuate regulatory schemes that a broad majority of citizens would vote to overturn if they understood the issue and were sufficiently motivated to invest political energy in correcting it. 7 The first democratic deficit, well documented in public choice literature, arises because producers typically receive a much more concentrated benefit from anticompetitive regulations in comparison to the relatively unconcentrated cost imposed on consumers. 8 A small band of producers may lobby aggressively to enact or maintain an anticompetitive scheme that permits the producers to collect significant monopoly rents. 9 Those rents, in turn, may be spread across thousands or millions of consumers, each one paying a relatively small increase in rent. 10 Collective action constraints--the cost of mobilizing consumer sentiment and action to oppose the regulation--give the producers a systematic advantage in maintaining the regulation. 11 As John Shepard Wiley explained in bringing public choice theory literature to bear on Parker immunity questions: [I]f the group [of consumers] is large, individual members have little incentive to participate because participation is personally costly and contributes little to the group's chances for successful joint action. Small groups encounter fewer of such problems. If group members behave in this rational self-interested manner, then "there is a systematic tendency for exploitation of the great by the small"; less numerous, more intensely concerned special [\*1181] interests can predictably outmatch more numerous, more mildly concerned consumer or "public" interests in legislative or regulatory fora--even though the actions of special interests impose a net loss on society. 12 The second deficit arises when governmental units--whether state or local--externalize the costs of the anticompetitive regulation outside their jurisdiction. The classic example is Parker itself, in which 90 percent of the raisins subject to California's agricultural cartel mandate were sold outside of California. 13 Out-of-state consumers could not be counted on to mobilize democratically to oppose the California regulation, as they had no political voice in California. 14 Many similar examples of jurisdictional cost externalization have been documented. 15 One arose in an important Supreme Court decision on state action immunity, Town of Hallie v. City of Eau Claire. 16 Hallie, Seymour, Union, and Washington were unincorporated towns adjacent to the city of Eau Claire, Wisconsin. 17 Their citizens could not vote in Eau Claire, but Eau Claire wanted to annex those territories into its boundaries, possibly through coercive means. 18 Eau Claire received federal funds to build a sewage treatment plant in its service area, which covered the four towns, then refused to supply sewage treatment services to the towns. 19 However, the city did agree to provide treatment services to certain homeowners in the towns if a majority of area voters voted by referendum to allow Eau Claire to annex their homes and to commit to use Eau Claire's sewage and transportation services. 20 The towns claimed this scheme was designed to keep the other towns from effectively competing with Eau Claire's sewage collection and transportation services. 21 The scheme also possibly allowed the [\*1182] city to raise costs for nonresidents while at the same time leveraging the higher prices to bring the nonresidents (and presumably their property taxes) into the city. 22 Although the city's motivation was ultimately political rather than narrowly economic, it used an anticompetitive strategy to dump monopoly costs on nonresidents who could not vote to rescind the regulations until they joined the city, at which point the question would be moot. 23 Together, these two deficits--asymmetrical costs and benefits to both producers and consumers and cost externalization--explain why democratic processes often fail to weed out anticompetitive regulations. Without concerted efforts by champions of consumer interests to overcome collective action problems and mobilize support for regulatory reform, the regulatory barriers to competition can linger indefinitely. As discussed next, these failures of democratic self-correction are exacerbated by regulations that entrench incumbent technologies at the expense of innovation.

B. Additional Considerations Affecting Product Market Innovation

Many of the contemporary regulatory battles between old and new technologies (particularly those involving the sharing economy) can be understood as follows. The incumbent regulatory scheme arose many decades ago and may well have been legitimately justified (in the sense of not imposing more costs than benefits) at the time of its adoption. 24 Our hypothesized Platonic guardian might even have approved of it at the time of its adoption. 25 The passage of time and advent of new technologies has now eroded the original basis of the regulation, and our Platonic guardian would therefore want the regulation rescinded or reformed. However, incumbent firms succeed in blocking or slowing innovative competition by circling the wagons around the incumbent regulatory schemes. 26 In [\*1183] these wars, the incumbents have a decisive advantage for at least three structural reasons.

First, if the incumbent regulatory scheme has allowed the incumbent firms to collect monopoly rents, then there may be a sharp asymmetry of incentives between old and new firms. 27 This is the same asymmetry that attends any struggle between incumbent monopolists and new competitive entrants: the monopolist is seeking to protect a large market share at a monopoly price, whereas the new entrant can only hope to gain a smaller market share at a competitive price. 28 Because the incumbent has more to gain than the new entrant has to lose, the incumbent will be willing to spend more to entrench the regulatory monopoly than the new entrant will be to challenge it. 29 This, in turn, discourages potential new entrants from investing in innovative new technologies and mounting political and market-oriented challenges to the incumbents. 30

Second, the incumbents have the advantage of status quo biases and fears about the consequences of technological change. 31 Costs of the existing system--to human safety, for example--may be seen as an inevitable baseline, whereas potential risks from the new technology may be seen as incremental threats. 32 Hence, risks and costs of the existing system may be undercounted or not counted at all, while risks and costs of the new system will be made to bear the full weight of their risks and costs.

For example, in recent months there have been widely reported stories of Uber drivers sexually abusing passengers. 33 These stories rarely report the base rate of abuse by taxi drivers or public transit [\*1184] workers, who might well present similar risks to passengers. 34 Similarly, the news media seem to wait with bated breath to report every accident involving a driverless vehicle 35 --even ones where the vehicle was stationary and hit by another at-fault vehicle--without reporting the base rate of nearly 40,000 deaths a year from human-driven vehicles. 36 The focus of news reporting seems to be on the incremental risks created by automated driving without regard to the baseline number of deaths that automated driving might diminish. 37 In principle, regulators should compare the likely risks of allowing new technologies to those of perpetuating the incumbent technology, but they often default to some version of the precautionary principle, insisting that new technologies prove their safety and efficacy in an absolute rather than comparative sense. 38 Given this baseline asymmetry, proponents of new technologies frequently must overcome significant regulatory hurdles not faced by incumbent technologies. Or, incumbent technologies may persuade regulators to force new technologies to play by rules that favor the incumbent technologies--a form of raising rivals' costs and creating regulatory entry barriers. 39

Finally, incumbents enjoy the generic benefits of incumbency in a structurally conservative constitutional and political system. The multiple "veto gates" to reform legislation--structural factors such as bicameralism, presentment, filibusters, and committee structures 40 --empower technological incumbents to ride the status quo for years or decades after our hypothetical Platonic guardian would have instituted public-minded reforms. 41

[\*1185] In combination, these three factors create additional barriers to the expected flow of democratic processes toward majoritarian equilibria--that is to say, equilibria that favor consumers' interests in competition and innovation over those of producers in capturing monopoly rents. In light of these factors and the collective action and cost externalization factors discussed earlier, 42 it is unsurprising that regulation serves as a barrier to innovation.

C. An Illustration from Automobile Distribution

The ongoing story of Tesla's efforts to break into the American automobile market illustrates the stickiness of incumbent regulations. 43 For a variety of business reasons, when Tesla entered the market in 2012, it decided that it would have to sell its all-electric vehicles (EVs) directly to consumers, meaning that it would have to open its own showrooms and service centers rather than outsourcing that function to franchised dealers. 44 Among other things, Tesla believed that traditional dealerships would be reluctant and ill-positioned to sell EVs and that Tesla therefore could not expect to convince already skeptical customers to buy EVs unless it opened its own retail facilities. 45 Since the mid-twentieth century, however, most states have adopted laws intended to protect dealers from unfair exploitation by manufacturers. 46 Among the provisions in many of these state statutes is a prohibition on a manufacturer opening its own showrooms and service centers. 47 In many states, manufacturers are required to distribute through independent dealers only. 48

Legislatures adopted these direct distribution prohibitions at a time when American car manufacturing was dominated by the "Big Three" (Chrysler, Ford, and General Motors) and many dealers were [\*1186] "mom and pop" businesses. 49 State legislatures were convinced that the dominant manufacturers were taking advantage of their franchisees by selling cars through their company-owned stores at lower prices than the dealers could afford to charge given the wholesale prices charged by the manufacturers. 50 The direct distribution prohibitions were justified as correcting a severe imbalance in bargaining power leading to contracts of adhesion and unfair exploitation in manufacturer-dealer relations. 51

Assuming that dealer protection rationale made sense in circa 1950, its basis has almost entirely vanished today. With the advent of competition from Europe and Asia, the Big Three are no longer dominant. 52 Dealers have many choices of automobile franchisors and hence considerably more power in negotiations over franchise terms. Further, the dealers are no longer mostly mom and pops. 53 Rather, most dealers are organized into multi-dealer groups, many with hundreds of millions or billions of dollars in annual revenue. 54 Indeed, some of the largest dealer groups have more annual revenue than Tesla. 55 Most significantly, the dealer protection rationale has nothing to do with a company such as Tesla that does not seek to distribute through dealers at all. 56 No dealers, no dealer exploitation.

Recognizing that the dealer protection rationale that justified the original statutes no longer works, the dealers have attempted to recast the direct distribution prohibitions as consumer protection decisions. 57 They have argued that forcing consumers to buy automobiles from dealers rather than from manufacturers will lead to more price competition, and hence lower prices, and prevent [\*1187] consumers from manufacturer exploitation. 58 These consumer protection arguments have been roundly rejected by economists, 59 the Federal Trade Commission (FTC), 60 and major proconsumer groups such as the Consumer Federation of America, Consumer Action, Consumers for Automobile Reliability and Safety, and the American Antitrust Institute. 61 Nonetheless, the dealers have succeeded in using the existing structure of dealer protection laws to block or slow Tesla's direct distribution program in a number of states. 62

The Tesla story evidences most of the factors that contribute to the persistence of anticompetitive regulations. The dealers have a concentrated interest in preserving their protected position, while the costs of that protectionism are spread out over millions of consumers. In the state with arguably the most pernicious record with respect to direct distribution reform--Michigan--there is a record of antireform advocacy by a leading incumbent--General Motors--and acquiescence by the political class to protect an in-state champion against an out-of-state challenger. 63 Even though consumers complain more about car dealers than about any other business, indicating the baseline system is not particularly attractive to them, 64 the dealers have invoked fears about the risks of direct distribution in opposition to legislative reforms. And legislative [\*1188] inertia has slowed the consideration of reform bills in some states, extending the incumbent regulatory scheme long past its reasonable expiration date. 65

The structural factors weighing against proconsumer and pro-innovation reforms will not block Tesla forever. The company has already seen significant successes in some state legislatures and courts and is progressively penetrating the market. 66 Yet it would be misguided to consider the company's eventual success a reason not to worry about the structural factors entrenching anticompetitive regulations, especially those foreclosing innovation. No monopoly is permanent--even the most persistent are eventually eroded. 67 Innovative technologies will almost always find a way out eventually, despite incumbent machinations. 68 What incumbents can buy is not monopoly in perpetuity but in extension. 69 Those years or decades of extension are costly to society. They represent significant overcharges to consumers, misallocations of social resources and, in the extreme, impairment to health and safety-- even lives lost. 70

Not every instance of anticompetitive state or local regulation exhibits the full set of explanatory factors discussed in this Article as cleanly as the ongoing Tesla saga does. Yet the Tesla story is more paradigmatic than idiosyncratic. Across the economy, incumbent technologies are structurally advantaged to deploy regulatory forces to stifle or slow innovation.

[\*1189] II. CONSTITUTIONAL AND ANTITRUST PRINCIPLES AS A CHECK ON ANTICOMPETITIVE REGULATION

If democratic processes fail to check anticompetitive state and local regulations on a systematic basis, then what can be done about it? Among the potential tools are institutional efforts to address the quality of legislation and regulation through democratic processes, such as creating governmental competition advocacy bodies within state and local governments or using federal purse strings to incentivize state and local governments to reevaluate their regulations. These democratic options are important, but they often fall prey to the pathologies of democratic decision making identified earlier. 71 Competition advocates--whether in government or in the private sector--often face formidable structural barriers to advancing the procompetition interest: entrenched incumbent monopolies, difficulties in mobilizing consumer support given the often diffuse nature of consumer harm, and institutional biases against change. 72

In addition to the democratic options, there are what could be styled counterdemocratic possibilities, insofar as they involve the use of courts or agencies to strike down anticompetitive statutes and regulations as inconsistent with some overarching norm of federal law, whether statutory or constitutional. 73 These counterdemocratic possibilities often do not run into the same structural status quo biases as the democratic possibilities do. For example, advocates of a legal theory for overruling an anticompetitive state or local regulation do not have to mobilize broad political support for their position or surmount the "veto gates" 74 built into ordinary political processes. Rather, they typically only have to persuade a small set of elite decision makers that their position is legally correct. It is with these counter-democratic possibilities that this Article is primarily interested.

[\*1190] The counterdemocratic or countermajoritarian quality of these deployments of judicial review is what places their use in some doubt, 75 even granting the assumption that they are targeting objectively undesirable regulations. 76 In the arc of American history, the courts have vacillated in their willingness to engage in such judicial review since the mid-twentieth century. Late nineteenth and early twentieth century courts were willing to engage in broad judicial review of economic regulation, 77 but the tide turned strongly against such review in the mid-twentieth century. 78 Only in recent years have glimmers of a return to some form of strong judicial review of anticompetitive regulations made a reappearance. 79

A. Lochner, anti-Lochner, and Parker

The stage for the current constellation of judicial doctrines and attitudes towards federal judicial review of anticompetitive state and local regulations was set through the progression of Lochner-era substantive due process, the anti-Lochner constitutional revolution of 1937, and the extension of anti-Lochner sentiment to federal antitrust law in the creation of Parker's state action immunity doctrine in 1943. 80 In 1905, the Supreme Court in Lochner struck down a New York law regulating bakeshop working hours on substantive due process grounds, 81 over Justice Oliver Wendell Holmes's famous objection that "[t]he Fourteenth Amendment does not enact Mr. Herbert Spencer's Social Statics." 82 During the Progressive and New Deal eras, Lochner and Lochnerism were broadly vilified for interfering with progressive reforms and substituting judges' economic views for those of legislatures. 83 In the New Deal constitutional revolution associated with the year 1937 (although spanning a few years in either direction), the Supreme [\*1191] Court announced it was getting out of the Lochner business--that it would not strike down economic legislation simply on the grounds that it was, in the judgment of the court, ill-considered. 84 Over time, it became clear that the anti-Lochner jurisprudence extended to nakedly anticompetitive regulations adopted to favor economic special interests to the detriment of the consuming public. In cases such as Williamson v. Lee Optical 85 and Ferguson v. Skrupa, 86 there was a fairly apparent record that the regulations in question had been adopted to stifle competition and benefit economic special interests, but the courts refused to create an exception to the anti-Lochner doctrine on those grounds. 87 In Williamson, the Court acknowledged that the "Oklahoma law may exact a needless, wasteful requirement in many cases," but insisted that the "day is gone when this Court uses the Due Process Clause of the Fourteenth Amendment to strike down state laws, regulatory of business and industrial conditions, because they may be unwise, improvident, or out of harmony with a particular school of thought." 88 Rather, the Court held that "[f]or protection against abuses by legislatures the people must resort to the polls, not to the courts." 89 In 1943, the Supreme Court in Parker v. Brown also made clear that it would not permit the federal Sherman Act to be used as an end-run around the anti-Lochner cases. 90 Parker involved both dormant commerce clause and Sherman Act challenges to California's Agricultural Prorate Act, which forced farmers into a marketing plan that effectively operated as an output reduction cartel run by farmers. 91 The Supreme Court rejected both challenges. 92 Finding "nothing in the language of the Sherman Act or in its history which suggests that its purpose was to restrain a state or its officers or agents from activities directed by its legislature," 93 the Court created a doctrine of state action immunity for anticompetitive state [\*1192] and local laws. 94 The effect of this ruling was to restrict the Sherman Act's coverage solely to purely private conduct. 95 Anticompetitive schemes orchestrated by the state would be excluded from judicial review. 96 As Judge Merrick Garland has observed, Parker is best understood as a continuation of the post-1937 jurisprudence rejecting Lochner: Parker v. Brown was much less a case about judicial faith in economic regulation than it was a case about judicial respect for the political process. Parker was indeed a child of its times, but the most salient element of that historical context was the Court's recent rejection of the Lochner-era doctrine of substantive due process, under which federal courts struck down economic regulations they viewed as unreasonably interfering with the liberty of contract. Having only just determined not to use the Constitution in that manner, the Court was not about to resurrect Lochner in the garb of the Sherman Act. 97

B. The Potential for an Increased Level of Judicial Scrutiny

As of 1943, one would have been justified in believing that, at least from the perspective of federal judicial review, anticompetitive state and local regulations would receive a free pass unless they [\*1193] committed certain egregious violations, such as disadvantaging "discrete and insular minorities" 98 or discriminating against out-of-state commerce. 99 But the judicial impulse to cast a stern glance at perniciously anticompetitive regulations could not be forever stifled, and before long cracks began to appear in the courts' anti-Lochnerian resolve.

Antitrust law and its state action immunity doctrine were the first to move in a significantly more interventionist direction. By the time of the Midcal decision, the state action immunity doctrine had been narrowed to permit judicial scrutiny unless the state regulation met a two-part test: (1) clear and affirmative expression of the anticompetitive policy by the sovereign state itself, and (2) active supervision of the policy's implementation by state actors. 100 Under this structure, the courts have invalidated a number of anticompetitive state regulatory schemes--most recently the practice of delegating regulatory power to occupational licensing boards staffed with potentially self-interested industry participants. 101

The Midcal test invokes a democracy-reinforcement theory of antitrust judicial review. 102 States may enact anticompetitive regulations so long as they take conspicuous responsibility for them. 103 If the state can be obviously identified with the scheme, then perhaps citizens will "vote out the bums" if the costs to consumers are too high. 104 Alas, many anticompetitive regulations escape Midcal's net because of the systemic factors identified in the previous section. 105 Even when a state conspicuously takes ownership of an anticompetitive scheme, democratic processes may fail to provide a remedy because of the asymmetry of costs and benefits [\*1194] between producers and consumers, the externalization of costs outside the voting jurisdiction, and the entrenched advantage of technological incumbency. 106

In light of the limited efficacy of Midcal's regime, one could consider additional ways to increase the level of antitrust scrutiny of anticompetitive state and local regulations. Commentators have proposed various such doctrinal approaches to invigorate antitrust preemption. For example, courts might adopt a cost-externalization test, which would invalidate regulatory schemes that externalize a disproportionate share of monopoly overcharges outside the boundaries of the political district enacting the regulation. 107 Or, as I have proposed elsewhere, they might read the Parker doctrine as entirely inapplicable to enforcement actions by the FTC--a legal question that the Supreme Court has held is still open. 108 In the event that the courts hold Parker inapplicable to the FTC, the Commission might play a significantly enhanced role in checking anticompetitive abuses by state and local governments.

Despite calls for a broader use of federal antitrust law to police anticompetitive state and local regulations, the Supreme Court continues to refine the Parker doctrine with an eye on Lochner. Then-Justice Rehnquist once worried that the Court should not "engage in the same wide-ranging, essentially standardless inquiry into the reasonableness of local regulation that th[e] Court … properly rejected" in terminating Lochnerism. 109 In his dissenting opinion in Community Communications Co. v. City of Boulder, Justice [\*1195] Rehnquist warned about the risks of opening up antitrust review of municipal regulations in a way that would require cities to justify their regulations, and the courts, in turn, to weigh those justifications. 110 Rehnquist wrote:

If the Rule of Reason were "modified" to permit a municipality to defend its regulation on the basis that its benefits to the community outweigh its anticompetitive effects, the courts will be called upon to review social legislation in a manner reminiscent of the Lochner era. Once again, the federal courts will be called upon to engage in the same wide-ranging, essentially standardless inquiry into the reasonableness of local regulation that this Court has properly rejected. Instead of "liberty of contract" and "substantive due process," the procompetitive principles of the Sherman Act will be the governing standard by which the reasonableness of all local regulation will be determined. Neither the Due Process Clause nor the Sherman Act authorizes federal courts to invalidate local regulation of the economy simply upon opining that the municipality has acted unwisely. The Sherman Act should not be deemed to authorize federal courts to "substitute their social and economic beliefs for the judgment of legislative bodies, who are elected to pass laws." The federal courts have not been appointed by the Sherman Act to sit as a "superlegislature to weigh the wisdom of legislation." 111

Also in the shadow of Lochner, recent years have shown glimmers of a reinvigoration of constitutional doctrines checking anticompetitive abuses by state and local governments. The negative or dormant commerce clause--limited by the Parker Court on anti-Lochner grounds--has occasionally been deployed to invalidate not only anticompetitive regulatory schemes 112 that discriminated against out-of-state interests, but also, on occasion, those that impose significant burdens on interstate commerce without a sufficient justification. 113 As of this writing, Tesla is testing the limits of these [\*1196] doctrines in its challenge to Michigan's direct distribution law. 114 Its complaint for injunctive relief asserts:

[Michigan's] [p]articularly egregious protectionist legislation … blocks Tesla from pursuing legitimate business activities and subjects it to arbitrary and unreasonable regulation in violation of the Due Process Clause of the Fourteenth Amendment; subjects Tesla to arbitrary and unreasonable classifications in violation of the Equal Protection Clause of the Fourteenth Amendment; and discriminates against interstate commerce and restricts the free flow of goods between states in violation of the dormant Commerce Clause. 115

Thus far, Tesla has survived a motion to dismiss in federal court and won a key discovery motion seeking automobile dealers' communications concerning the Michigan ban on direct distribution. 116

Perhaps even more significant have been a handful of court of appeals decisions applying equal protection principles to invalidate anticompetitive regulations designed solely to protect a discrete group of economic actors from competition--although there remains a circuit split over this practice. Morbidly, the most significant cases have all been related to funeral parlors and casket sales.

In 2004, the Tenth Circuit in Powers v. Harris rejected a constitutional challenge to an Oklahoma statute that limited casket sales to licensed funeral parlors. 117 The court accepted the premise that the statute had no genuine health and safety rationale and was "a classic piece of special interest legislation designed to extract monopoly rents from consumers' pockets and funnel them into the coffers of a small but politically influential group of business people--namely, Oklahoma funeral directors." 118 Nonetheless, the court held its hands were tied by the anti-Lochner cases--particularly [\*1197] Williamson and Ferguson, which also involved (arguably) nakedly parochial anticompetitive regulations. 119

On the other hand, in their own casket cases, the Fifth and Sixth Circuits invalidated the anticompetitive schemes on equal protection grounds, holding that "protecting a discrete interest group from economic competition is not a legitimate governmental purpose" and therefore fails even rational basis review. 120 This exercise of what Judge Ginsburg calls "rational basis with economic bite" could grow into a significant check on anticompetitive state and local regulation if utilized more expansively. 121 If this Article's premise is valid--that regulations designed solely to protect "discrete interest group[s] from economic competition" 122 are pervasive--then the federal courts have their work cut out for them if they take up the casket maxim with seriousness.

However, it is far from certain that they will or should. Despite the movement towards enhanced scrutiny of anticompetitive economic cronyism just described, the ghosts of Lochner continue to loom large. Even judges unsympathetic to the casket regulations may be concerned about the prospect of unelected judges substituting their own economic preferences for those of democratically elected representatives. In Powers, the Tenth Circuit listed a series of classically anti-Lochner rationales (including a rejection of the role of the Platonic guardian hypothesized in this Article) for refusing to embrace the Sixth Circuit's antiparochialism principle:

First, in practical terms, we would ~~paralyze~~ state governments if we undertook a probing review of each of their actions, constantly asking them to "try again." Second, even if we assumed such an exalted role, it would be nothing more than substituting our view of the public good or the general welfare for that chosen by the states. As a creature of politics, the definition of the public good changes with the political winds. There simply is no constitutional or Platonic form against which [\*1198] we can (or could) judge the wisdom of economic regulation. Third, these admonitions ring especially true when we are reviewing the regulatory actions of states, who, in our federal system, merit great respect as separate sovereigns. 123

So here is the question for those who accept this Article's central premise regarding the prevalence of anticompetitive state and local regulation and yet worry, like the Powers court, about a return to Lochner: If one is interested in pulling additional judicial levers to scrutinize anticompetitive state and local regulations, but worried about returning to Lochnernism, how do the constitutional and antitrust levers compare? Are both equally susceptible to misuse and abuse, is one less risky than the other, and are there limits that could be placed on both to cabin their potential risks? This Article's final Part compares the constitutional and antitrust tools as potential foils to anticompetitive state and local regulation to help answer these questions.

III. COMPARING THE RISKS AND LIMITS OF THE CONSTITUTIONAL AND ANTITRUST TOOLS

A. Limiting the Scope of Judicial Review to Regulations Affecting Competition

The fear of a return to Lochnerism is in large part a fear that judicial review of economic regulatory decisions is a Pandora's box that, once open, would quickly unleash a full-scale movement toward a substitution of judicial economic philosophies for those of the democratically responsive branches. 124 Hence, in the current constellation of Lochner-phobia, it is important to explain how any doctrine that invites increased judicial scrutiny of economic regulation would be cabined or restrained by a workable limitation principle. Both the antitrust and constitutional tools under consideration embody such a limitation principle insofar as they do not propose universal federal scrutiny of all undesirable state economic regulation. Instead, they limit the scrutiny to regulations that harm [\*1199] competition for the benefit of identifiable special interests. In other words, the prima facie case in either event requires demonstration of competitive harm as opposed to merely social undesirability. 125 The "competitive harm" limitation principle excludes from judicial review a wide set of regulations and hence limits the range of judicial interference with state regulatory schemes. Many cronyist regulations line the pockets of politically connected special interests without necessarily impairing competition. Consider, for example, a city ordinance that required disposal of a certain kind of medical waste at a pharmacy. Assume further that the waste in question could be safely disposed of through ordinary garbage collection, and the sole purpose of the scheme in question was to provide pharmacies with an opportunity to charge a fee for collecting the waste. Our hypothesized Platonic guardian would wish to overturn that regulation but could not do so on the constitutional or antitrust grounds under consideration because the regulation in question does not limit competition in any important sense. Rather than stifling competition in a legitimate market, it creates a new market for an undesired and unnecessary service. Lochner-phobes may wonder whether this limitation principle is limited enough. Although the limitation carves off a large swath of cronyist regulations from review, it still includes a relatively large universe of regulations, creating the possibility that judges will have a free hand to strike down many important state regulatory programs in the name of enhanced competition. Those less worried about Lochner and more willing to encourage judicial review of economic regulation may worry that the limitation principle is too limited and that it would allow a vast universe of cronyist regulation to escape judicial scrutiny on the same grounds that much cutthroat business behavior escapes antitrust scrutiny today--it may be unethical or undesirable, but does not fall within the purview of the antitrust laws because it does not impair general market competitiveness. 126 [\*1200] Limiting the scope of judicial review to economic regulations impairing competition also raises a question of legal principle. As to antitrust, it is easy to justify such a principle. Notwithstanding Oliver Wendell Holmes's protestation that the Sherman Act "says nothing about competition," 127 a century of judicial construction has oriented the antitrust laws towards a singular focus on competition. 128 On the other hand, it is not obvious that constitutional scrutiny should rise or fall on the effects a cronyist regulation has on competition. It may be true that "protecting a discrete interest group from economic competition is not a legitimate governmental purpose," 129 but it seems equally true that dispensing economic rents to favored discrete interest groups more generally is also not a legitimate government purpose. In either case, the argument for limiting judicial review is not that the set of targeted regulations is constitutionally legitimate, but that the process of separating sheep from goats is fraught with the potential for judicial usurpation.

B. Considering Governmental Justifications for Restraints on Competition

Assuming that judicial review of anticompetitive state and local regulations is to occur with some degree of bite, the fighting question may often become how to evaluate the state's proffered justifications for the restraint on competition. Both antitrust and constitutional tools would need to allow ample room for the state to demonstrate verifiable justifications for the challenged regulations. To put this point in antitrust parlance, there are no per se unlawful state restraints on competition--the state's reasons for regulating will always be up for review in judicial or administrative proceedings challenging their validity. [\*1201] The critical question is how much interrogation into the state's proffered justifications a court or reviewing agency would, could, or should undertake. In conventional post-Lochner terms, economic regulations were subjected to no more than rational basis review--an exceedingly deferential standard of review. 130 The state did not have to advance any empirical support for its proffered justifications and, indeed, did not have to advance any justifications at all. 131 Judges were supposed to uphold the regulation if they could conceive of any justification that might plausibly support it: A State, moreover, has no obligation to produce evidence to sustain the rationality of a statutory classification. "[A] legislative choice is not subject to courtroom factfinding and may be based on rational speculation unsupported by evidence or empirical data." A statute is presumed constitutional, and "[t]he burden is on the one attacking the legislative arrangement to negative every conceivable basis which might support it," whether or not the basis has a foundation in the record. Finally, courts are compelled under rational-basis review to accept a legislature's generalizations even when there is an imperfect fit between means and ends. A classification does not fail rational-basis review because it "is not made with mathematical nicety or because in practice it results in some inequality." 132 That sort of rational basis review is far from the sort of review conducted by the Craigmiles and St. Joseph Abbey courts in striking down the Tennessee and Louisiana casket rules. 133 Those courts required evidentiary support for states' claimed justifications and subjected the states' claims to rigorous cross-examination for logical consistency. 134 In the Sixth Circuit case--Craigmiles--the court rejected the state's arguments that the casket regulation protected casket quality and public health, made it more feasible for casket sellers to advise bereaved families about which casket was most suitable for their needs, and protected against sharp business [\*1202] dealing. 135 The court found these arguments inconsistent with the state's own regulatory practices and unsupported by any record evidence. 136 Similarly, in the Fifth Circuit case--St. Joseph Abbey--the court repeated the familiar proposition that "rational basis review places no affirmative evidentiary burden on the government," but quickly added that "plaintiffs may nonetheless negate a seemingly plausible basis for the law by adducing evidence of irrationality." 137 The court then inquired into evidentiary support for the state's proferred "rational bases." 138 For example, on the ostensible consumer protection rationale for prohibiting casket sales except by licensed funeral parlors, the court observed that the FTC had largely rejected this argument as an empirical matter, noting that the FTC found "insufficient evidence that … third-party sellers of funeral goods are engaged in widespread unfair or deceptive acts or practices" and that the empirical "record [is] 'bereft of evidence indicating significant consumer injury caused by third-party sellers.'" 139 This form of review resembles antitrust litigation, where once a plaintiff raises a prima facie case of anticompetitive effect (outside of per se rules, where no justifications are allowed), the defendant typically can proffer procompetitive justifications but bears the burden of offering evidentiary support. 140 Although giving lip service to the norms of rational basis review, these courts were in fact taking a hard look at the states' proffered justifications once the regulation in question appeared prima facie to meet the description of a measure designed to protect "discrete interest group[s] from economic competition." 141 Inquiries into offsetting justifications for prima facie suspect conduct raise two doctrinal-analytical questions: (1) how tight must the fit between means and ends be in order for the conduct in question to survive scrutiny, and (2) once the conduct has been shown to advance legitimate ends, should its harms be balanced against its [\*1203] benefits, or should it simply be deemed lawful without any balancing? 142 Both constitutional and antitrust tools for addressing anticompetitive regulation would need to address these questions. As to the first question--the required tightness of means-ends fit--both constitutional and antitrust law already contain suitable doctrines. Moving up the ladder of scrutiny from rational basis review, intermediate scrutiny in constitutional law (such as that applicable to content-neutral restrictions on speech) requires that the restriction in question advance important governmental interests and not burden the protected interest (speech in the speech cases, competition in competition cases) more than necessary to further these interests. 143 The fit between means and ends need be only "reasonable," not strictly necessary or essential. 144 Unless the constitutional limitation on anticompetitive cronyism should fall into the more stringent strict scrutiny category--a very doubtful possibility--this sort of fit between regulatory means and ends would seem applicable. Antitrust law shares a similar approach to the less restrictive alternative analysis under the rule of reason, and it too would presumably apply to government restraints on competition under an expanded form of judicial review. 145 As explained in the Justice Department and FTC competitor collaboration guidelines, a reasonable, but not essential, fit between means and ends is required to credit proffered justifications for prima facie anticompetitive agreements: The Agencies consider only those efficiencies for which the relevant agreement is reasonably necessary. An agreement may be "reasonably necessary" without being essential. However, if the participants could have achieved or could achieve similar efficiencies by practical, significantly less restrictive means, then the Agencies conclude that the relevant agreement is not [\*1204] reasonably necessary to their achievement. In making this assessment, the Agencies consider only alternatives that are practical in the business situation faced by the participants; the Agencies do not search for a theoretically less restrictive alternative that is not realistic given business realities. 146 A potential difference between constitutional and antitrust analysis might arise on the second important means-ends question--whether to balance harms against benefits of the regulatory restriction. For example, suppose that a regulation limiting ride-sharing services resulted in some small safety benefit to customers but an arguably much greater harm to customers in the form of diminished choice of service options and higher prices. Should a reviewing court or agency balance the safety enhancements against the harms to competition, or should it rather conclude that, having shown a legitimate reason for its existence, the regulation should stand? Although intermediate scrutiny in constitutional law is often described as a "balancing test," courts do not generally engage in explicit balancing after passing the less restrictive alternatives inquiry. 147 Some degree of value judgment must be embedded in the inquiry into whether the state's interest is sufficiently "important," but it is rare to see a court say, in effect, that although the state's interest is concededly important and the regulation at stake is reasonably related to it, the harms caused by the regulation outweigh its benefits. 148 For purposes of the principle against protecting "discrete interest group[s] from economic competition," it seems apparent that there is no room for balancing at all, as a state [\*1205] regulation that serves some legitimate end by definition is not "simple economic protectionism." 149 By contrast, antitrust law is, in principle, supposed to require open-ended balancing at this final step: "if the monopolist's procompetitive justification stands unrebutted, then the plaintiff must demonstrate that the anticompetitive harm of the conduct outweighs the procompetitive benefit." 150 If followed in state action doctrine cases, this sort of balancing could precipitate serious accusations of Lochnerizing, as it would put judges in the position of substituting their own preferences for market outcomes over the state's legitimate regulatory objectives. Fortunately, although antitrust law nominally calls for balancing, courts typically do not engage in it. 151 Even in Microsoft--the case that most explicitly and authoritatively called for final-stage balancing--the D.C. Circuit engaged in very little, if any, true balancing. 152 Perhaps because of the incommensurability between anticompetitive or procompetitive effects or concern about chilling procompetitive conduct, courts tend to exonerate competitive behavior that is necessary to procompetitive effects without asking whether the harms outweigh the benefits. 153 In order to stave off Lochnerizing concerns, any expanded antitrust review of state and local regulations might need to formalize this practice doctrinally: Once a state demonstrates that the regulation in question is reasonably tailored to achieve some legitimate governmental objective, [\*1206] antitrust does not require balancing of the harms to competition against the legitimate governmental objectives. A final question unique to antitrust review is whether, when it comes to means-ends review, the catalogue of permissible ends is limited to those recognized by antitrust law as "procompetitive." One of the important doctrinal and policy structures of antitrust law is a division of the world into virtues that are said to be "procompetitive" and those that are not. 154 To count as a legitimate virtue in the antitrust domain, an effect must be "procompetitive," meaning that it must work to enhance or improve market competition. 155 Supposed benefits of a restraint that assume that competition is itself the problem in need of curtailment are labeled with the epithet of "ruinous competition" theories and are dismissed as inconsistent with the Sherman Act's procompetition policy. 156 While this single-minded devotion to competition may make sense as to the world of private restraints, it is less clear that it can be applied sensibly to governmental regulation. Do governments not have the right to take the view that competition of certain types causes social evils that should be curtailed? For example, many regulatory restrictions on alcohol and tobacco distribution are designed to decrease competition and hence reduce output as compared to that which would be obtained in a competitive market. 157 While it may be undesirable for private actors to limit harmful output through private means, the state's police power surely includes the right to do so, including by limiting competition. 158 This suggests that the range of regulatory interests [\*1207] states might legitimately advance in support of challenged regulations would be broader than those deemed "procompetitive" in conventional antitrust analysis. Opening the door to a wider scope of justifications in cases where the restraint on competition is imposed by governmental rather than private actors would appear on first impression to favor the government. Such a widening of the rule of reason, however, raises precisely the Lochnerizing concern raised by Justice Rehnquist in his previously quoted City of Boulder dissent. 159 If courts were called upon to balance health and safety benefits against traditional competition concerns around prices and innovation, then they might well slip into a Lochnerizing mold. But perhaps such concerns could be abated by limiting the reviewing court or agency's role to determining whether the regulation in question actually supported the state's proffered goals. As long as the goals were permissible (that is, not simply protecting discrete interest groups from competition as a form of political patronage) and the regulations were reasonably related to the goals, the reviewing court or agency would not inquire more broadly into the regulation's overall desirability.

C. Institutional and Procedural Distinctions

Antitrust preemption and constitutional review are differently situated in one significant way: Constitutional equal protection, substantive due process, and dormant commerce clause principles are privately enforceable by any party that meets the Article III standing requirements--which, in this context, means at least anyone directly affected by a regulation impairing competition. 160 Antitrust has its own private right of action standing rules, 161 as well as an additional institutional feature that might significantly limit some of the abuses associated with Lochnerizing. One proposed route for increasing the preemptive scope of federal antitrust law over anticompetitive state and local regulation is to hold the [\*1208] Parker doctrine inapplicable to the FTC. 162 This would give the FTC enhanced power to challenge anticompetitive state and local regulations. Not only would this limit the incidence of challenges to state regulation (the FTC Act is not privately enforceable and only the Commission can initiate an action under the Act), 163 but it would also put the Commission itself, rather than an Article III court, in the position of making an initial decision on the case. An Article III court could ultimately become involved, as adverse Commission decisions are appealable to any federal court of appeal in which the case could have been initially brought. 164 However, lodging the antitrust review function in the FTC would grant the Commission an initial regulatory review function and the power to make factual findings subject to "substantial evidence" review. 165

### Plan

The United States Federal Government should substantially increase prohibitions on anticompetitive business practices by the private sector by narrowing the state action immunity doctrine.

### Federalism Adv

#### Advantage Two: Federalism

#### Nextgen tech is emerging at an exponential rate – effective state regulatory experimentation avoids downsides and maximize the benefits of AI and nano

McGinnis 11(John, George C. Dix Professor of Law, Northwestern Law School, “LAWS FOR LEARNING IN AN AGE OF ACCELERATION,” <http://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=3404&context=wmlr>)

The twenty-first century’s information age has the potential to usher in a more harmonious and productive politics. People often disagree about what policies to adopt, but the cornucopia of data that modern technology generates can allow them to better update their beliefs about policy outcomes on the basis of shared facts. In the long run, convergence on the facts can lead incrementally to more consensus on better policies. More credible factual information should over time also help make for a less divisive society, because partisans cannot as easily stoke social tensions by relying on false facts or exaggerated claims to support conflicting positions. Thus, a central task of contemporary public law is to accelerate a politics of learning whereby democracy improves a public reason focused on evaluating policy consequences. Government should be shaped into an instrument that learns from the analysis of policy consequences made available from newly available technologies of information.1 Greater computer capacity is generating more empirical analysis.2 The Internet permits the rise of prediction markets that forecast policy results even before the policies are implemented.3 The Internet also creates a dispersed media that specializes in particular topics and methodologies, gathers diverse information, and funnels salient facts about policy to legislators and citizens.4 But a public reason focused on policy consequences will improve only if our laws facilitate it. For instance, constitutional federalism must be reinvigorated to permit greater experimentation across jurisdictions, because with the rise of empiricism, decentralization has more value for social learning today than ever before.5 Congress should include mandates for experiments within its own legislation making policy initiatives contain the platforms for their own selfimprovement.6 Creating a contemporary politics of democratic updating on the basis of facts is a matter both of great historical interest and of enormous importance to our future. In the historical sweep of ideas, a government more focused on learning from new information moves toward fulfilling the Enlightenment dream of a politics of reason—but a reason based not on the abstractions of the French Revolution, but instead on the hard facts of the more empirical tradition predominating in Britain. By displacing religion from the center of politics, the Enlightenment removed issues by their nature not susceptible to factual resolution, permitting a focus on policies that could be improved by information.7 The better democratic updating afforded by modern technology can similarly increase social harmony and prosperity by facilitating policies that actually deliver the goods. For the future, a more consequentially informed politics is an urgent necessity. The same technological acceleration that potentially creates a more information-rich politics also generates a wide range of technological innovation—from nanotechnology to biotechnology to [AI] artificial intelligence. Although these technologies offer unparalleled benefits to mankind, they may also create catastrophic risks, such as rapid environmental degradation and new weapons of mass destruction.8 Only a democracy able to rapidly assimilate the facts is likely to be able to avoid disaster and reap the benefits inherent in the technology that is transforming our world at a faster pace than ever before. Every industry that touches on information—book publishing, newspapers, and college education to name just a few—is undergoing a continuous series of revolutionary changes as new technology permits delivery of more information more quickly at lower cost. The same changes that are creating innovation in such private industries can also quickly create innovation in social governance. But the difference between information-intensive private industries and political institutions is that the latter lack the strong competitive framework for these revolutions to occur spontaneously. This Essay thus attempts to set out a blueprint for reform to make better use of some available information technologies. Part I describes the reality of technology acceleration as the acceleration both creates the tools for democratic updating and prompts its necessity. Technological acceleration is the most important development of our time—more important even than globalization. Although technologists have described and discussed its significance, its implications for law and political structure have been barely noticed. Part II briefly discusses how better social knowledge can change political results. A premise of the claim is that some political disagreements revolve about facts, not simply values. As a result, better social knowledge can help democracies design policies to achieve widely shared goals. Social knowledge energizes citizens to act on those encompassing interests, like improved public education, because they come to better recognize the policy instruments to advance those interests. Better social knowledge provides better incentives for citizens to vote on these interests. Part III considers the mechanisms for creating a contemporary politics of democratic updating that begins to meet the needs of the age of accelerating technology. It focuses on two of the new resources that can have substantial synergies in improving social common knowledge and shows how an increase in common knowledge can systematically improve political results by providing better incentives for citizens to work for encompassing social goods. First, Part III considers the improvement in empirical analysis of social policy that flows from increasing computational capacity. It then discusses how specialized and innovative media does much more than disseminate opinions: it widely distributes facts and factual analysis. The combination of these technologies can better discipline experts and representatives, providing stronger incentives for them to update on the basis of new facts. Part IV discusses the information-eliciting rules that will maximize the impact of new technologies of information. These steps include a program of restoring, where possible, governmental structures that permit appropriate decentralization for experimentation, empirical testing, and learning. Congress and regulatory agencies should structure legislation and regulations to include social experiments when such experiments would help resolve disputed matters of policy. The Supreme Court should generally refrain from imposing new substantive rights for the nation so that it is easier to evaluate the consequences of different bundles of rights chosen by the states. But it should also protect the dispersed media, like blogs, from discriminatory laws, because this dispersed media plays a crucial role in modern policy evaluation. In short, the Supreme Court needs to emphasize a jurisprudence fostering social discovery and the political branches need to create frameworks for better social learning. Constitutive structures encouraging and evaluating experimentation become more valuable in an age where better evaluation of social experiments is possible. I. TECHNOLOGICAL ACCELERATION It is the premise of this Essay that technological acceleration is occurring and that our political system must adapt to the world it is creating. The case for technological acceleration rests on three mutually supporting kinds of evidence. First, from the longest-term perspective, epochal change has sped up: the transitions from hunter-gatherer society to agricultural society to the industrial age each took progressively less time to occur, and our transition to an information society is taking less time still. Second, from a technological perspective, computational power is increasing exponentially, and increasing computational power facilitates the growth of other society-changing technologies like biotechnology and nanotechnology. Third, even from our contemporary perspective, technology now changes the world on a yearly basis both in terms of hard data, like the amount of information created, and in terms of more subjective measures, like the social changes wrought by social media. From the longest-term perspective, it seems clear that technological change is accelerating and, with it, the basic shape of human society and culture is changing.9 Anthropologists suggest that for 100,000 years, members of the human species were hunter-gather- ers.10 About 10,000 years ago humans made a transition to agricultural society.11 With the advent of the Industrial Revolution, the West transformed itself into a society that thrived on manufacturing.12 Since 1950, the world has been rapidly entering the information age.13 Each of the completed epochs has been marked by a transition to substantially higher growth rates.14 The period between each epoch has become very substantially shorter.15 Thus, there is reason to extrapolate to even more and faster transitions in the future. This evolution is consistent with a more fine-grained evaluation of human development. Recently, the historian Ian Morris has rated societies in the last 15,000 years on their level of development through objective benchmarks, such as energy capture.16 The graph shows relatively steady, if modest, growth when plotted on a log linear scale, but in the last 100 years development has jumped to become sharply exponential.17 Morris concludes that these patterns suggest that there may be four times as much social development in the world in the next 100 years than there has been in the last 14,000.18 The inventor and engineer Ray Kurzweil has dubbed this phenomenon of faster transitions “the law of accelerating returns.”19 Seeking to strengthen the case for exponential change, he has looked back to the dawn of life to show that even evolution seems to make transitions to higher organisms ever faster.20 In a more granulated way, he has considered important events of the last 1000 years to show that the periods between extraordinary advances, such as great scientific discoveries and technological inventions, have decreased.21 Thus, both outside and within the great epochs of recorded human history, the story of acceleration is similar. The technology of computation provides the second perspective on accelerating change. The easiest way to grasp this perspective is to consider Moore’s Law. Moore’s Law—named after Gordon Moore, one of the founders of Intel—is the observation that the number of transistors that can be fitted onto a computer chip doubles every eighteen months to two years.22 This prediction, which has been approximately accurate for the last forty years,23 means that almost every aspect of the digital world—from computational calculation power to computer memory—is growing in density at a similarly exponential rate.24 Moore’s Law reflects the rapid rise of computers to become the fundamental engine of mankind in the late twentieth and early twenty-first centuries.25 The power of exponential growth is hard to overstate. As the economist Robert Lucas has said, once you start thinking about exponential growth, it is hard to think about anything else.26 The computational power in a cell phone today is a thousand times greater and a million times less expensive than all the computing power housed at MIT in 1965.27 Projecting forward, the computing power of computers twenty-five years from now is likely to prove a million times more powerful than computing power today. To be sure, many people have been predicting the imminent death of Moore’s Law for a substantial period now,29 but it has nevertheless continued. Intel—a company that has a substantial interest in accurately telling software makers what to expect—projects that Moore’s Law will continue at least until 2029.30 Ray Kurzweil shows that Moore’s Law is actually part of a more general exponential computation growth that has been gaining force for over a 100 years.31 Integrated circuits replaced transistors that previously replaced vacuum tubes that in their time had replaced electromechanical methods of computation.32 Through all of these changes in the mechanisms of computation, its power increased at an exponential rate.33 This perspective suggests that other methods under research—from carbon nanotechnology to optical computing to quantum computing—are likely to continue growing exponentially even when silicon-based computing reaches its physical limits.34 Focusing on the exponential increase in hardware capability may actually understate the acceleration in computational capacity in two ways. First, a study considering developments in a computer task using a benchmark for measuring computer speed over a fifteen-year period suggests that the improvements in software algorithms improved performance even more than the increase in hardware capability.35 Second, computers are interconnected more than ever before through the Internet, and these connections increase collective capacity, not only because of the increasing density among computer connections, but because of the increasing density of connections among humans made possible by computers. The salient feature of computers’ exponential growth is their tremendous range of application compared to previous improvements. Almost everything in the modern world can be improved by adding an independent source of computational power. That is why computational improvement has a far greater social effect than improvements in technologies of old. Energy, medicine, and communication are now being continually transformed by the increase in computational power.36 As I will discuss in Part II, even the formulation of new hypotheses in natural and social science will likely be aided by computers in the near future. The final perspective on accelerating technology is the experience that the contemporary world provides. Technology changes the whole tenor of life more rapidly than ever before. At the most basic level, technological products change faster.37 Repeated visits to a modern electronics store—or even a grocery store—reveal a whole new line of products within very few years. In contrast, someone visiting a store in 1910 and then again in 1920—let alone in 1810 and 1820—would not have noticed much difference. Even cultural generations move faster. Facebook, for instance, has changed the way college students relate in only a few years,38 whereas the tenor of college life would not have seemed very different to students in 1920 and 1960. Our current subjective sense of accelerating technology is also backed by more objective evidence from the contemporary world. Accelerating amounts of information are being generated.39 Information, of course, is a proxy for knowledge. Consistent with this general observation, we experience exponential growth in practical technical knowledge, as evidenced by the rise in patent applications.40 Thus, the combination of data from our present life, together with the more sweeping historical and technological perspectives, makes a compelling case that technological acceleration is occurring. It is this technological acceleration that creates both the capacity and the need for improving collective decision making. As technology accelerates, it creates new phenomena, from climate change to biotechnology to artificial intelligence of a human-like capacity. These technologies may themselves have very large positive or negative externalities and may require government decisions about their prohibition, regulation, or subsidization to forestall harms and capture their full benefits. They may also cause social dislocations, from unemployment to terrorism, that also require certain collective decisions. Society can best handle these crises not only by making better social policy to address them directly but by improving social policy more generally to create both more resources and more social harmony to endure them. Thus, society must deploy information technology in the service of democratic updating if it is to manage technological acceleration

#### U.S. model is key to stable nano---checks gray goo, super-weapons, and eco-collapse

Dennis 6 (Lindsay V., JD Candidate – Temple University School of Law, “Nanotechnology: Unique Science Requires Unique Solutions”, Temple Journal of Science, Technology & Environmental Law, Spring, 25 Temp. J. Sci. Tech. & Envtl. L. 87, Lexis)

Nanotechnology, a newly developing field merging science and technology, promises a future of open-ended potential. [6](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n6) Its scientific limits are unknown, and its myriad uses cross the boundaries of the technical, mechanical and medical fields. [7](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n7) Substantial research [8](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n8) has led scientists, [9](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n9) politicians [10](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n10) and academicians [11](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n11) to believe that nanotechnology has the potential to profoundly change the economy and to improve the national standard of living. [12](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n12) In addition, nanotechnology may touch every facet of human life because its products cross the boundaries of the most important industries, including electronics, biomedical and pharmaceutical  [\*89]  industries, and energy production. [13](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n13) In the future, nanotechnology could ensure longer, healthier lives with the reduction or elimination of life-threatening diseases, [14](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n14) a cleaner planet with pollution remediation and emission-free energy, [15](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n15) and the innumerable benefits of increased information technology. [16](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n16) However, certain uses, such as advanced drug delivery systems, [17](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n17) have given rise to an ethical debate similar to that surrounding cloning and stem cell research. [18](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n18) Moreover, some analysts have theorized that nanotechnology may endanger humankind with more dangerous warfare and weapons of terrorism, [19](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n19) and that nanotechnology may lead to artificial intelligence beyond human control. [20](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n20) The widespread use of nanotechnology far in the future threatens to alter the societal framework and create what has been called "gray goo." [21](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n21) Because nanotechnology has the potential to improve the products that most of us rely on in our daily lives, but also imperil society as we know it, we should research, monitor and regulate nanotechnology for the public good with trustworthy systems, and set up pervasive controls over its research, development, and deployment. In addition, its substantial impacts on existing regulations should be ascertained, and solutions incorporated into the regulatory framework. This paper addresses these concerns and provides potential solutions. Part I outlines the development of nanotechnology. Parts II and III explore the current and theoretical future applications of nanotechnology, and its potential side-effects. Then, Part IV analyzes the government's current role in monitoring nanotechnology, and the regulatory mechanisms available to manage or eliminate the negative implications of nanotechnology. Part V considers the creation of an Emerging Technologies Department as a possible solution to maximize the benefits and minimize the detrimental effects of nanotechnology. Lastly, Part VI examines certain environmental regulations to provide an example of nanotechnology's impact on existing regulatory schema.  [\*90]  Part I: Nanotechnology Defined   Nanoscience is the study of the fundamental principles of molecules and structures with at least one dimension roughly between 1 and 100 nanometers (one-billionth of a meter, or 10[su'-9']), otherwise known as the "nanoscale." [22](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n22) Called nanostructures, these are the smallest solid things possible to make. [23](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n23) Nanofabrication, or nanoscale manufacturing, is the process by which nanostructures are built. [24](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n24) Top-down nanofabrication creates nanostructures by taking a large structure and making it smaller, whereas bottom-up nanofabrication starts with individual atoms to build nanostructures. [25](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n25) Nanotechnology applies nanostructures into useful nanoscale devices. [26](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n26) The nanoscale is distinctive because it is the size scale where the properties of materials like conductivity, [27](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n27) hardness, [28](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n28) or melting point [29](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n29) are no longer similar to the properties of these same materials at the macro level. [30](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n30) Atom interactions, averaged out of existence in bulk material, give rise to unique properties. [31](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n31) In  [\*91]  nanotech research, scientists take advantage of these unique properties to develop products with applications that would not otherwise be available. [32](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n32) Although some products using nanotechnology are currently on the market, [33](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n33) nanotechnology is primarily in the research and development stage. [34](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n34) Because nanoparticles are remarkably small, tools specific to nanotechnology have been created to develop useful nanostructures and devices. [35](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n35) Two techniques exclusive to nanotechnology are self-assembly, and nanofabrication using nanotubes and nanorods. [36](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n36)  [\*92]  In self-assembly, particular atoms or molecules are put on a surface or preconstructed nanostructure, causing the molecules to align themselves into particular positions. [37](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n37) Although self-assembly is "probably the most important of the nanoscale fabrication techniques because of its generality, its ability to produce structures at different length-scales, and its low cost," [38](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n38) most nanostructures are built starting with larger molecules as components. [39](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n39) Nanotubes [40](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n40) and nanorods, [41](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n41) the first true nanomaterials engineered at the molecular level, are two examples of these building blocks. [42](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n42) They exhibit astounding physical and electrical properties. [43](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n43) Certain nanotubes have tensile strength in excess of 60 times high-grade steel while remaining light and flexible. [44](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n44) Currently, nanotubes are used in tennis rackets and golf clubs to make them lighter and stronger. [45](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n45) Part II: Nanotechnology's Uses   Researching and manipulating the properties of nanostructures are important for a number of reasons, including, most basically, to gain an understanding of how matter is constructed, and more practically, to use these unique properties to develop unique products. [46](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n46) Nanoproducts can be divided into four general categories: [47](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n47) smart materials, [48](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n48) sensors, [49](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n49) biomedical applications, [50](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n50) and optics and electronics. [51](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n51)  [\*93]  A "smart" material incorporates in its design a capability to perform several specific tasks. [52](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n52) In nanotechnology, that design is done at the molecular level. [53](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n53) Clothing, enhanced with nanotechnology, is a useful application of a smart material at the nanoscale. Certain nano-enhanced clothing contains fibers that have tiny whiskers that repel liquids, reduce static and resist stains without affecting feel. [54](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n54) Nano-enhanced rubber represents another application of a nanoscale smart material. [55](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n55) Tires using nanotech-components increase skid resistance by reducing friction, which reduces abrasion and makes the tires last longer. [56](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n56) The tires may be on the market "in the next few years" according to the National Nanotechnology Initiative (NNI). [57](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n57) Theoretically, this rubber could be used on a variety of products, ranging from tires to windshield wiper blades to athletic shoes. [58](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n58) A more complex nanotechnology smart material is a photorefractive polymer. [59](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n59) Acting as a nanoscale "barcode," these polymers could be used as information storage devices with a storage density exceeding the best available magnetic storage structures. [60](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n60) Nano-sensors may "revolutionize much of the medical care and the food packaging industries," [61](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n61) as well as the environmental field because of their ability to detect toxins and pollutants at fewer than ten molecules. [62](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n62) As the Environmental Protection Agency (EPA) recognizes: Protection of human health and ecosystems requires rapid, precise sensors capable of detecting pollutants at the molecular level. Major improvements in process control, compliance monitoring, and environmental decision-making could  [\*94]  be achieved if more accurate, less costly, more sensitive techniques were available. Nanotechnology offers the possibility of sensors enabled to be selective or specific, detect multiple analytes, and monitor their presence in real time. [63](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n63) Examples of research in sensors include the development of nano-sensors for efficient and rapid biochemical detection of pollutants; sensors capable of continuous measurement over large areas; integration of nano-enabled sensors for real-time continuous monitoring; and sensors that utilize "lab-on-a-chip" technology. [64](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n64) All fundamental life processes occur at the nanoscale, making it the ideal scale at which to fight diseases. [65](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n65) Two quintessential examples of biomedical applications of nanotechnology are advanced drug delivery systems and nano-enhanced drugs. [66](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n66) The promise of advanced drug delivery systems lies in that they direct drug molecules only to where they are needed in the body. [67](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n67) One example is focusing chemotherapy on the site of the tumor, instead of the whole body, thereby improving the drug's effectiveness while decreasing its unpleasant side-effects. [68](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n68) Other researchers are working to develop nanoparticles that target and trick cancer cells into absorbing certain nanoparticles. [69](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n69) These nanoparticles would then kill tumors from within, avoiding the destruction of healthy cells, as opposed to the indiscriminate damage caused by traditional chemotherapy. [70](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n70) Nano-enhanced suicide inhibitors [71](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n71) limit enzymatic activity by forcing naturally occurring enzymes to form bonds with the nanostructured molecule. [72](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n72) This may treat conditions such as epilepsy and depression because of the enzyme action component involved in these conditions. [73](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n73) Lastly, nanotechnology has the potential to revolutionize the electronics and optics fields. [74](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n74) For instance, nanotechnology has the potential to produce clean,  [\*95]  renewable solar power. [75](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n75) Through a process called artificial photosynthesis, solar energy is produced by using nanostructures based on molecules which capture light and separate positive and negative charges. [76](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n76) Certain Swiss watches and bathroom scales are illuminated through a nanotech procedure that transforms captured sunlight into an electrical current. [77](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n77) In the electronics field, nanostructures offer many different ways to increase memory storage by substantially reducing the size of memory bits and thereby increasing the density of magnetic memory, increasing efficiency, and decreasing cost. [78](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n78) One example is storing memory bits as magnetic nanodots, which can be reduced in size until they reach the super-paramagnetic limit, the smallest possible magnetic memory structure. [79](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n79) Advances in electronics and computing brought on by nanotechnology could allow reconfigurable, "thinking" spacecraft. [80](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n80) Some uses of nano-products already on the market include suntan lotions and skin creams, tennis balls that bounce longer, faster-burning rocket fuel additives, and new cancer treatments. [81](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n81) Solar cells in roofing tiles and siding that provide electricity for homes and facilities, and the prototypic tires, supra, may be on the market in the next few years. [82](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n82) The industry expects advanced drug delivery systems with implantable devices that automatically administer drugs and sensor drug levels, and medical diagnostic tools such as cancer-tagging mechanisms to be on the market in the next two to five years. [83](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n83) It is nearly impossible to foresee what developments to expect in nanotechnology in the decades to come. [84](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n84) Nonetheless, the book Engines of Creation presented one vision of the possibilities of advanced nanotechnology. [85](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n85) Nano-machines could be designed to construct any product, from mundane items such as a chair, to exciting items such as a rocket engine. [86](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n86) These "assemblers" could also be programmed to build copies of themselves. [87](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n87) Known as "replicators," these nano-machines could alter the world by producing an exponential quantity of themselves that are to be put to work as assemblers. [88](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n88) The development of assemblers could advance the space  [\*96]  exploration program, [89](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n89) biomedical field, [90](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n90) and even repair the damage done to the world's ecological systems. [91](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n91) Over time, production costs may sharply decrease because the assemblers will be able to construct all future products from an original blueprint at virtually no additional cost. [92](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n92) Part III: Nanotechnology's Side-Effects   With the good, however, comes the bad. The "gray goo problem," the most well-known unwanted potential consequence of the spread of nanotechnology, [93](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n93) arises when replicators and assemblers produce almost anything, and subsequently spread uncontrolled, obliterating natural organisms and replacing them with nano-enhanced organisms. [94](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n94) A more foreseeable issue is environmental contamination. [95](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n95) The EPA noted   As nanotechnology progresses from research and development to commercialization and use, it is likely that manufactured nanomaterials and nanoproducts will be released into the environment... . The unique features of manufactured nanomaterials and a lack of experience with these materials hinder the risk evaluation that is needed to inform decisions about pollution prevention, environmental clean-up and other control measures, including regulation. Beyond the usual concerns for most toxic materials ... the adequacy of current toxicity tests for chemicals needs to be assessed ... . To the extent that nanoparticles  [\*97]  ... elicit novel biological responses, these concerns need to be accounted for in toxicity testing to provide relevant information needed for risk assessment to inform decision making. [96](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n96)   In addition, nanotechnology could change the face of global warfare and terrorism. [97](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n97) Assemblers could be used to duplicate existing weapons out of superior materials, and chemical and biological weapons could be created with nano-enhanced components. [98](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n98) Modern detection systems would be inadequate to detect nano-enhanced weapons built with innocuous materials such as carbon. [99](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n99) Luckily, nanotechnology offers responses to these problems, and researchers are already tackling these issues. [100](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n100) "Labs-on-a-chip," a sensor system the size of a microchip, could be woven into soldiers' uniforms to detect toxins immediately. [101](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n101) Adding smart materials could make soldiers' uniforms resistant to certain chemical and biological agents. [102](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n102) Nanotechnology also enhances threats against citizens. Drugs and bugs (electronic surveillance devices) could be used by police states to monitor and control its citizenry. [103](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n103) Viruses could be created that target specific genetic characteristics. [104](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n104) Not only is the development of technologically advanced, devastating weaponry itself a hazardous effect of nanotechnology, but also, millions of dollars have already been spent researching potential uses of nanotechnology in the military sphere, [105](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n105) thus diverting funds from more beneficial uses such as biomedical applications and clean energy. However, these negative effects are not inevitable. By analyzing the scope of potential drawbacks accompanying these research investments, lawmakers can institute regulatory controls that could mitigate these problems.  [\*98]  Part IV: Maximizing Benefits, Minimizing Catastrophe   To minimize or eliminate the problems associated with nanotechnology, while maximizing the beneficial effects, nanotechnology research and development should be monitored and regulated by "trustworthy systems." [106](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n106) Currently, the federal government oversees a massive funding and research program with the purpose of "ensuring United States global leadership in the development and application of nanotechnology." [107](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n107) Nonetheless, as nanotechnology becomes more prevalent, more thorough regulation may be necessary. [108](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n108) Nanotechnology may greatly impact some of the largest revenue producing industries in the United States, such as the pharmaceutical and medical fields, utilities and power generation, and computer electronics. [109](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n109) Thus, it is clear that nanotechnology will likely touch every facet of human life. In addition, these powerful industries have been known to promote profits over human safety, [110](http://www.lexis.com/research/retrieve?cc=&pushme=1&tmpFBSel=all&totaldocs=&taggedDocs=&toggleValue=&numDocsChked=0&prefFBSel=0&delformat=XCITE&fpDocs=&fpNodeId=&fpCiteReq=&brand=&_m=82ab008e42cdd5d1d23cfd1d96b430bb&docnum=5&_fmtstr=FULL&_startdoc=1&wchp=dGLbVtz-zSkAb&_md5=f86737f923f2df1de12147f84a019421&focBudTerms=Nanotechnology%3A+Unique+Science+Requires+Unique+Solutions&focBudSel=all#n110) one of the reasons for their stringent regulation.  [\*99]

#### Federal nanotech regulation fails – state experimentation solves knowledge gaps and flexibility

Strifling 10(David, Freedman Fellow, Temple University Beasley School of Law, “ENVIRONMENTAL FEDERALISM AND EFFECTIVE REGULATION OF NANOTECHNOLOGY,” http://www.msulawreview.org/wp-content/uploads/2012/10/2010-4\_Strifling.pdf)

As noted in Part I, the presence of interstate externalities, whether physical, economic, intertemporal, or psychological, is considered by many scholars on both sides of the federalism debate to be the best justification for centralized regulation.240 That recognition is why the consideration of externalities is the first part of the contextual analysis proposed in Part I. As this Part will discuss, the question of whether nanotechnology production, emissions, and use will generate significant externalities is the first of many knowledge gaps that are likely to plague regulators attempting to regulate nanotechnology and other emerging technologies. The question of physical externalities is perhaps easiest to begin assessing. Many nanoparticles are incorporated into products and seem more likely to be found in solid waste as opposed to air emissions.241 For example, nanoparticle-silver is often incorporated in ordinary consumer products like socks because it has antibacterial and odor-fighting properties. But, the nanosilver can leach into wash water during ordinary laundering, and will ultimately join the solid waste stream when the socks are thrown away. Solid wastes are typically handled locally and therefore have a more limited transport range than pollutants released in air emissions.242 This makes it less likely, although not impossible, that significant interstate externalities will result, and may weigh in favor of decentralization. However, such conclusions should be drawn only with caution because studies have shown that at the nanoscale, even small changes in production methods may lead to different toxicological properties and perhaps increased mobility.243 Geographically, it is difficult to quantify how much of a particular nanoparticle is produced in a given state, region, or country.244 This makes application of the “[m]atching [p]rinciple” difficult.245 It may be that certain emerging technologies will be produced within a single state, or that they will be national in scale. At this point, it appears that nanotechnology production will not be limited to a single state or region, but it is not clear how dispersed the activity will be. It is possible that as with other emerging technologies, nanotechnology development may occur within localized or regional hot spots of activity. At this stage, it is more difficult to assess the possibility of economic, intertemporal, or psychological externalities. The presence or absence of economic and psychological externalities will become apparent as the technology proliferates. Intertemporal externalities are perhaps the toughest to assess immediately. Because nanoparticles have characteristics that differ from macro-scale equivalents (for example, nanosilver has different physical properties than macro-scale silver), it cannot be proven that they will not also have different long-term consequences.246 At least at the outset, it seems likely that state regulators will be better equipped than federal regulators to form an opinion as to whether nanotechnology generates significant externalities. Most obviously, they will be aware of whether their individual states are on the receiving end of “nanopollution” from other states. State and local regulators can, of course, report their experiences of this kind to their federal counterparts for compilation and comparison with similar information from other states. This process will provide a solid base of knowledge with which to assess the next generation of regulations. B. Knowledge Gap Two: What Are the Costs and Benefits of Nanotechnology Regulation? The second part of the contextual analysis described in Part I recommends examining the economies of scale associated with federal or state regulation. Professor Esty remarked that it will most likely be inefficient for every “hamlet” to perform detailed and highly technical analyses of nanotechnology.247 That is intuitive, although the costs and benefits involved with either centralized or decentralized regulation of nanotechnology are difficult to measure. In particular, the difficulty in estimating the benefits of nanotechnology will make economically efficient regulation (i.e., maximizing the difference between benefits and costs) impossible, but finding the most cost-effective policy (i.e., minimizing the costs) may eventually become an achievable goal. The governance scheme should also provide incentives for new research and development efforts to better control future nanoparticle emissions. This likely counsels against the use of a federal command and control scheme rooted in the uniform imposition of a particular control technology across state jurisdictions.248 Such standards tend to “freeze” the development of technology because a company that develops one may be “‘rewarded’ by being held to a higher standard of performance and thereby not benefit financially from its investment.”249 Here, too, the diverse experiments and experiences of various state regulators will help to illustrate the differences between various policy choices. It may be that a particular state’s regulatory approach maximizes the economic benefits of nanotechnology while another state is devoted to maintaining environmental quality. The balance between the two can best be struck if the consequences of these differing approaches are known. C. Knowledge Gap Three: Do Regulators Have the Tools to Successfully Monitor and Enforce Compliance with Standards? The third part of the contextual analysis described in Part I recommends analyzing whether regulatory failures are likely to occur. As discussed in more detail later in this Paper, one of the difficulties with using existing statutory authority to regulate nanotechnology is that it is uncertain whether those authorities adequately cover particles at the nanoscale.250 Similarly, some existing authorities contain minimum thresholds (typically weights) below which entities are accepted from regulations. Those limits may not be low enough to cover comparatively large cumulative quantities of nanoparticles. A related question is whether regulators have the technological tools to successfully monitor compliance with the standards that are ultimately enacted. Many environmental statutes are set up such that the governing standards are set at the federal level, and enforcement is handled locally.251 But, such standards cannot be effectively implemented if they cannot be enforced. To give one example, state regulators cannot discern the quantity of nanoparticles emitted due to their miniscule size. State experimentation with varying enforcement methods can provide useful information both to the federal government and to other states in at least three ways. First, states can supplement limited federal enforcement resources. As in the context of water and air regulation, it is extremely unlikely that the federal government has the resources to successfully police all regulated firms. Placing some enforcement control in the hands of the states multiplies the resources available for this task. Second, and more relevant to the point of filling knowledge gaps, the success or failure of di- verse state experiences can help tailor future enforcement efforts both in other states and at the federal level. For example, if one state chooses a method of compliance verification (e.g., self-monitoring and reporting) and that method proves effective and less resource-intensive, other jurisdictions may choose to adopt it to preserve their own resources. Finally, a cooperative state and federal scheme would offer more adaptability, which as discussed above is critically important to successful governance of emerging technologies.252 D. Knowledge Gap Four: How Will the Public React to Widespread Deployment of Nanotechnology? The fourth facet of the contextual analysis considers democratic ideals and public involvement. As previously discussed, Professor Revesz has suggested that public choice theory (suggesting that concentrated industry pressure will dominate diffuse pro-environment interests) is overtaking—or has already overtaken—externalities as the top justification for federal environmental regulation.253 It is not surprising, then, that several scholars have suggested that stakeholder involvement, and especially public involvement, is an important facet of an equitable governance scheme.254 This is true even though the public may not have the technical expertise to evaluate these questions.255 At first glance, it would seem that such involvement is more likely under a decentralized regulatory scheme. However, there are conflicting reports about what the public actually wants. One line of thinking is that even though most of the public has no technical expertise, they prefer not to give up control over emerging technology policy.256 For example, one survey reported that only about one-fourth of Americans believe that “decisions about the issue of genetically modified food are so complicated that it is a waste of time to consult the public on this subject.”257 But in another survey nearly three-fourths said they would prefer that the views of experts guide scientific policy.258 Yet, another survey reported that three-fourths of the public preferred that technology decisions be made on the basis of science rather than morals.259 The upshot of these studies is that about half of the public is happy with the status quo of experts making decisions based on science.260 The other half would prefer that decisions about technology “be influenced by some combination of moral and ethical principles shared by average citizens.”261 Perhaps the bottom line is that scientific experts are better qualified to judge science, but average people are better qualified to judge ethics and morality.262 State and local governments are likely better equipped to handle public information campaigns as opposed to the federal government. For example, the city of Cambridge, Massachusetts has created the Cambridge Nanomaterials Advisory Committee, which the City Manager charged with developing recommendations for oversight of local nanotechnology activities.263 One of the Committee’s recommendations was that the city “[o]ffer up-to-date health information to residents on products containing nanomaterials and sponsor public outreach events.”264 The Committee recommended two specific strategies to accomplish this goal. The first is to post on the City’s website basic information about nanotechnology and, to the extent possible, about the types of nanomaterials being used in Cambridge.265 The second is to sponsor public forums to discuss nanotechnology with Cambridge residents, including gathering information about the residents’ preferred methods to receive information about nanotechnology.266 Both of the Cambridge strategies would be impossible to successfully implement at the federal level simply because of the scale of the undertaking. The best that federal regulators can likely do in this direction is to post general information about nanotechnology on the internet, as the EPA has done.267 This illustrates the advantage of state and local involvement in public outreach efforts. And if national use of this information becomes desirable, state and local agencies can simply compile the information they have gained into an aggregated database or survey instrument. E. Knowledge Gap Five: What Substantive Standards Should Govern Nanoparticle Emissions? The final and perhaps the most daunting knowledge gap consists of the types of substantive controls and standards that are necessary to successfully regulate nanotechnology to appropriately protect public health and the environment while authorizing safe technological development.268 The case for state and local involvement here is less clear than those related to the other knowledge gaps because it seems likely that the initial scientific and technical standards that will govern nanotechnology will likely be developed at the federal level.269 And yet, state and local regulators can provide valuable data that their federal counterparts can use in ongoing standards development. For example, the first recommendation of the Cambridge Nanomaterials Advisory Committee was that the City should “develop an inventory of commercial, industrial, and research facilities in Cambridge that manufacture, process, handle, or store engineered nanoscale materials (excluding nanomaterial-containing consumer products).”270 The Committee noted that “[l]essons learned from the information gathered through this survey will be incorporated into further efforts to provide technical assistance to encourage best practices for health and safety.”271 It also noted that to the extent firms have concerns about sharing such information, they could be protected as confidential business information under state public records laws.272 To the extent that confidentiality is a concern, state and local governments could simply aggregate the information collected without identifying specific responders, as the totals (rather than individual responses) would likely be more useful to federal regulators working on standards development. Some commentators have called for entirely new regulatory regimes to govern nanotechnology.273 There is no question that creating a new environmental law out of whole cloth, or totally overhauling existing regimes, is very expensive. In this fractured political climate, it may also be politically impossible. Congress has not passed significant environmental legislation since the Clean Air Act Amendments of 1990.274 In 2009, Congress expected to, but failed to, pass comprehensive energy legislation despite Democratic majorities in both houses as well as a Democratic president.275 As such, it appears unlikely that Congress will enact a new statutory scheme to govern nanotechnology. However, both the EPA and a series of American Bar Association (ABA) analyses have suggested that in practice, existing statutory schemes provide the necessary authority to regulate nanotechnology.276 But, this strategy has its shortcomings, as demonstrated in the following convoluted hodgepodge of statutory authority described in the EPA’s 2008 Draft Nanomaterial Research Strategy: Regulatory decisions regarding nanomaterials are covered under current statutes. EPA intends to review nanomaterial products and processes, pursuant to its authorities under the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Clean Air and Water Acts (CAA and CWA), the Safe Drinking Water Act (SDWA)[,] Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA). Under the Toxic Substances Control Act . . . [t]here is some question as to whether nanomaterials are “new” compounds. Under FIFRA nanomaterials added to an existing pesticide product may require reapproval, and the EPA must determine whether the altered product might cause unreasonable adverse effects on the environment including human health risks. The CAA allows for the development of air quality criteria for pollutants anticipated to endanger public health and welfare, mandates the identification of the sources and the issuance of technology-based emissions standard for 189 pollutants, and requires that any mobile source fuel or additive be registered. Risks from airborne nanomaterials may reasonably need assessing in all of these areas. Wastewater streams containing nanomaterials might be controlled through effluent limits in permits established under the CWA. If nanomaterials enter drinking water they may be subject to regulation using Maximum Contaminant Level Goals and Maximum Contaminant Levels under SDWA. Risks from nanomaterials in waste sites would be evaluated and controlled under the authority of CERCLA and RCRA.277 However, other assessments of these existing schemes have concluded that existing federal regulatory schemes are inadequate to assess and respond to the prospective risks posed by nanotechnology.278 Significant regulatory coverage gaps (and in some cases, gulfs) would manifest upon any effort to use existing federal regulatory authority, and only that authority, to regulate nanotechnology.279 These gaps can take multiple forms. For example, some existing environmental statutes (such as the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA)) are triggered based on volume or mass.280 Such measures are inappropriate for nanotechnology regulation.281 Alternatively, the fundamental incapacity to detect and measure nanoscale quantities will make regulation difficult.282 In practice, the experience of state and local regulators can ultimately help the EPA decide which regulatory authority works best. The discussion of potentially applicable federal statutes should make clear that even if nanotechnology is regulated at a centralized level, coordination difficulties will likely arise because nanotechnology arguably falls within the purview of a variety of different statutes and different agencies.283 Therefore, centralized regulation cannot be justified on the basis of improved coordination. Similarly, numerous emerging technology scholars have stressed the need for an adaptable scheme that can identify and fill regulatory gaps as time passes and new discoveries and applications for the technology arise.284 A unitary scheme across all jurisdictions would likely come with decreased flexibility, and some have argued that such an outcome is preferable because flexible regulation leads to power imbalances between concentrated corporate interests and diffuse public interests.285 On the other hand, use of the states as “laboratories” would allow increased experimentation and, perhaps, increased responsiveness to developments in the technology. As noted above, the scientific and technical knowledge gaps will make it difficult to utilize solely centralized federal regulation to govern emerging technologies.286 This is especially true as to the lack of capacity to monitor and control emissions, traditionally a state function.287 On the other hand, widespread involvement of states and local governments could generate significant amounts of data and help to fill these knowledge gaps. The next and final Part elaborates on this conclusion and reviews an example of the roles that state and local governments might play in information generation to fill knowledge gaps and to simplify ultimate decisions about nanotechnology regulation through the contextual analysis or otherwise. IV. CONCLUSION The foregoing discussion illustrates the daunting knowledge gaps that will hamper attempts to regulate nanotechnology. And yet, it is necessary to formulate governance strategies now that preserve options and flexibility while averting the necessity to act later under emergency conditions. The solution to this quandary is to build our knowledge base as quickly as possible while retaining the flexibility to adapt the regulatory scheme as time goes on. In practice, such a system might develop as outlined in the following two steps. Initial scientific and technical analyses, including standard development, should take place at the federal level to preserve economies of scale. The EPA has already begun this process.288 Simultaneously, states and local governments can begin information collection efforts that inform the federal standards development process. Once the standards are issued, application and enforcement of those standards could be handled at the decentralized state or regional level in order to give due consideration to democratic ideals and public involvement. This approach will lead to diversification and expansion of our nanotechnology knowledge base because it would engender widespread familiarity with nanotechnology regulation at the state level. As more and more states fulfill roles as one of Justice Brandeis’s “laboratories,” the whole regulatory community will learn more about new approaches to nanotechnology regulation that can play a part in filling all of the knowledge gaps previously identified.289 Several arguments to the contrary are not convincing. First, some have claimed that inconsistent regulatory efforts in different jurisdictions could have a “chilling effect” on nanotechnology development, as would have been the case if “third car” standards had been allowed under the Clean Air Act.290 But it is not at all clear, or even likely, that individual jurisdictions would apply individual standards to nanotechnology design, as opposed to production, distribution, use, and disposal. Second, agency capture and race to the bottom are unlikely to occur. By definition, emerging technologies are new, and thus capture seems less likely because of the absence of the factors that are typically thought to cause it: a well-established industry lobby; agency officials with previous experience in industry, and vice versa; and little or no local political pressure.291 A race to the bottom seems unlikely for similar reasons. As noted above, the geographic distribution of nanotechnology production and use remains unclear. It is possible that some areas may have little to no nanotechnology development, making a race to the bottom less likely because nanotech industries will prefer to locate plants in states and regions with an existing nanotechnology base. Therefore, arguments against decentralization do not overcome the substantial benefits that will arise from using the information generated by state and local governments to fill knowledge gaps. And yet, the valuable information obtained during early regulatory efforts will only be useful if the regulatory system initially put in place has the flexibility to assimilate and respond to the new information. Initial regulatory schemes must therefore provide the opportunity to revisit both substantive and administrative provisions as time goes by.

#### Only existential impact---that outweighs

Bostrom 2 – Nick Bostrom, Professor of Philosophy at Oxford University, “Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards”, Journal of Evolution and Technology, 9(1), http://www.nickbostrom.com/existential/risks.html

1.2 Existential risks In this paper we shall discuss risks of the sixth category, the one marked with an X. This is the category of global, terminal risks. I shall call these existential risks. Existential risks are distinct from global endurable risks. Examples of the latter kind include: threats to the biodiversity of Earth’s ecosphere, moderate global warming, global economic recessions (even major ones), and possibly stifling cultural or religious eras such as the “dark ages”, even if they encompass the whole global community, provided they are transitory (though see the section on “Shrieks” below). To say that a particular global risk is endurable is evidently not to say that it is acceptable or not very serious. A world war fought with conventional weapons or a Nazi-style Reich lasting for a decade would be extremely horrible events even though they would fall under the rubric of endurable global risks since humanity could eventually recover. (On the other hand, they could be a local terminal risk for many individuals and for persecuted ethnic groups.) I shall use the following definition of existential risks: Existential risk – One where an adverse outcome would either annihilate Earth-originating intelligent life or permanently and drastically curtail its potential. An existential risk is one where humankind as a whole is imperiled. Existential disasters have major adverse consequences for the course of human civilization for all time to come. 2 The unique challenge of existential risks Risks in this sixth category are a recent phenomenon. This is part of the reason why it is useful to distinguish them from other risks. We have not evolved mechanisms, either biologically or culturally, for managing such risks. Our intuitions and coping strategies have been shaped by our long experience with risks such as dangerous animals, hostile individuals or tribes, poisonous foods, automobile accidents, Chernobyl, Bhopal, volcano eruptions, earthquakes, draughts, World War I, World War II, epidemics of influenza, smallpox, black plague, and AIDS. These types of disasters have occurred many times and our cultural attitudes towards risk have been shaped by trial-and-error in managing such hazards. But tragic as such events are to the people immediately affected, in the big picture of things – from the perspective of humankind as a whole – even the worst of these catastrophes are mere ripples on the surface of the great sea of life. They haven’t significantly affected the total amount of human suffering or happiness or determined the long-term fate of our species. With the exception of a species-destroying comet or asteroid impact (an extremely rare occurrence), there were probably no significant existential risks in human history until the mid-twentieth century, and certainly none that it was within our power to do something about. The first manmade existential risk was the inaugural detonation of an atomic bomb. At the time, there was some concern that the explosion might start a runaway chain-reaction by “igniting” the atmosphere. Although we now know that such an outcome was physically impossible, it qualifies as an existential risk that was present at the time. For there to be a risk, given the knowledge and understanding available, it suffices that there is some subjective probability of an adverse outcome, even if it later turns out that objectively there was no chance of something bad happening. If we don’t know whether something is objectively risky or not, then it is risky in the subjective sense. The subjective sense is of course what we must base our decisions on.[2] At any given time we must use our best current subjective estimate of what the objective risk factors are.[3] A much greater existential risk emerged with the build-up of nuclear arsenals in the US and the USSR. An all-out nuclear war was a possibility with both a substantial probability and with consequences that might have been persistent enough to qualify as global and terminal. There was a real worry among those best acquainted with the information available at the time that a nuclear Armageddon would occur and that it might annihilate our species or permanently destroy human civilization.[4] Russia and the US retain large nuclear arsenals that could be used in a future confrontation, either accidentally or deliberately. There is also a risk that other states may one day build up large nuclear arsenals. Note however that a smaller nuclear exchange, between India and Pakistan for instance, is not an existential risk, since it would not destroy or thwart humankind’s potential permanently. Such a war might however be a local terminal risk for the cities most likely to be targeted. Unfortunately, we shall see that nuclear Armageddon and comet or asteroid strikes are mere preludes to the existential risks that we will encounter in the 21st century. The special nature of the challenges posed by existential risks is illustrated by the following points: · Our approach to existential risks cannot be one of trial-and-error. There is no opportunity to learn from errors. The reactive approach – see what happens, limit damages, and learn from experience – is unworkable. Rather, we must take a proactive approach. This requires foresight to anticipate new types of threats and a willingness to take decisive preventive action and to bear the costs (moral and economic) of such actions. · We cannot necessarily rely on the institutions, moral norms, social attitudes or national security policies that developed from our experience with managing other sorts of risks. Existential risks are a different kind of beast. We might find it hard to take them as seriously as we should simply because we have never yet witnessed such disasters.[5] Our collective fear-response is likely ill calibrated to the magnitude of threat. · Reductions in existential risks are global public goods [13] and may therefore be undersupplied by the market [14]. Existential risks are a menace for everybody and may require acting on the international plane. Respect for national sovereignty is not a legitimate excuse for failing to take countermeasures against a major existential risk. · If we take into account the welfare of future generations, the harm done by existential risks is multiplied by another factor, the size of which depends on whether and how much we discount future benefits [15,16]. In view of its undeniable importance, it is surprising how little systematic work has been done in this area. Part of the explanation may be that many of the gravest risks stem (as we shall see) from anticipated future technologies that we have only recently begun to understand. Another part of the explanation may be the unavoidably interdisciplinary and speculative nature of the subject. And in part the neglect may also be attributable to an aversion against thinking seriously about a depressing topic. The point, however, is not to wallow in gloom and doom but simply to take a sober look at what could go wrong so we can create responsible strategies for improving our chances of survival. In order to do that, we need to know where to focus our efforts. 3 Classification of existential risks We shall use the following four categories to classify existential risks[6]: Bangs – Earth-originating intelligent life goes extinct in relatively sudden disaster resulting from either an accident or a deliberate act of destruction. Crunches – The potential of humankind to develop into posthumanity[7] is permanently thwarted although human life continues in some form. Shrieks – Some form of posthumanity is attained but it is an extremely narrow band of what is possible and desirable. Whimpers – A posthuman civilization arises but evolves in a direction that leads gradually but irrevocably to either the complete disappearance of the things we value or to a state where those things are realized to only a minuscule degree of what could have been achieved. Armed with this taxonomy, we can begin to analyze the most likely scenarios in each category. The definitions will also be clarified as we proceed. 4 Bangs This is the most obvious kind of existential risk. It is conceptually easy to understand. Below are some possible ways for the world to end in a bang.[8] I have tried to rank them roughly in order of how probable they are, in my estimation, to cause the extinction of Earth-originating intelligent life; but my intention with the ordering is more to provide a basis for further discussion than to make any firm assertions. 4.1 Deliberate misuse of nanotechnology In a mature form, molecular nanotechnology will enable the construction of bacterium-scale self-replicating mechanical robots that can feed on dirt or other organic matter [22-25]. Such replicators could eat up the biosphere or destroy it by other means such as by poisoning it, burning it, or blocking out sunlight. A person of malicious intent in possession of this technology might cause the extinction of intelligent life on Earth by releasing such nanobots into the environment.[9] The technology to produce a destructive nanobot seems considerably easier to develop than the technology to create an effective defense against such an attack (a global nanotech immune system, an “active shield” [23]). It is therefore likely that there will be a period of vulnerability during which this technology must be prevented from coming into the wrong hands. Yet the technology could prove hard to regulate, since it doesn’t require rare radioactive isotopes or large, easily identifiable manufacturing plants, as does production of nuclear weapons [23]. Even if effective defenses against a limited nanotech attack are developed before dangerous replicators are designed and acquired by suicidal regimes or terrorists, there will still be the danger of an arms race between states possessing nanotechnology. It has been argued [26] that molecular manufacturing would lead to both arms race instability and crisis instability, to a higher degree than was the case with nuclear weapons. Arms race instability means that there would be dominant incentives for each competitor to escalate its armaments, leading to a runaway arms race. Crisis instability means that there would be dominant incentives for striking first. Two roughly balanced rivals acquiring nanotechnology would, on this view, begin a massive buildup of armaments and weapons development programs that would continue until a crisis occurs and war breaks out, potentially causing global terminal destruction. That the arms race could have been predicted is no guarantee that an international security system will be created ahead of time to prevent this disaster from happening. The nuclear arms race between the US and the USSR was predicted but occurred nevertheless. 4.2 Nuclear holocaust The US and Russia still have huge stockpiles of nuclear weapons. But would an all-out nuclear war really exterminate humankind? Note that: (i) For there to be an existential risk it suffices that we can’t be sure that it wouldn’t. (ii) The climatic effects of a large nuclear war are not well known (there is the possibility of a nuclear winter). (iii) Future arms races between other nations cannot be ruled out and these could lead to even greater arsenals than those present at the height of the Cold War. The world’s supply of plutonium has been increasing steadily to about two thousand tons, some ten times as much as remains tied up in warheads ([9], p. 26). (iv) Even if some humans survive the short-term effects of a nuclear war, it could lead to the collapse of civilization. A human race living under stone-age conditions may or may not be more resilient to extinction than other animal species. 4.3 We’re living in a simulation and it gets shut down A case can be made that the hypothesis that we are living in a computer simulation should be given a significant probability [27]. The basic idea behind this so-called “Simulation argument” is that vast amounts of computing power may become available in the future (see e.g. [28,29]), and that it could be used, among other things, to run large numbers of fine-grained simulations of past human civilizations. Under some not-too-implausible assumptions, the result can be that almost all minds like ours are simulated minds, and that we should therefore assign a significant probability to being such computer-emulated minds rather than the (subjectively indistinguishable) minds of originally evolved creatures. And if we are, we suffer the risk that the simulation may be shut down at any time. A decision to terminate our simulation may be prompted by our actions or by exogenous factors. While to some it may seem frivolous to list such a radical or “philosophical” hypothesis next the concrete threat of nuclear holocaust, we must seek to base these evaluations on reasons rather than untutored intuition. Until a refutation appears of the argument presented in [27], it would intellectually dishonest to neglect to mention simulation-shutdown as a potential extinction mode. 4.4 Badly programmed superintelligence When we create the first superintelligent entity [28-34], we might make a mistake and give it goals that lead it to annihilate humankind, assuming its enormous intellectual advantage gives it the power to do so. For example, we could mistakenly elevate a subgoal to the status of a supergoal. We tell it to solve a mathematical problem, and it complies by turning all the matter in the solar system into a giant calculating device, in the process killing the person who asked the question. (For further analysis of this, see [35].) 4.5 Genetically engineered biological agent With the fabulous advances in genetic technology currently taking place, it may become possible for a tyrant, terrorist, or lunatic to create a doomsday virus, an organism that combines long latency with high virulence and mortality [36]. Dangerous viruses can even be spawned unintentionally, as Australian researchers recently demonstrated when they created a modified mousepox virus with 100% mortality while trying to design a contraceptive virus for mice for use in pest control [37]. While this particular virus doesn’t affect humans, it is suspected that an analogous alteration would increase the mortality of the human smallpox virus. What underscores the future hazard here is that the research was quickly published in the open scientific literature [38]. It is hard to see how information generated in open biotech research programs could be contained no matter how grave the potential danger that it poses; and the same holds for research in nanotechnology. Genetic medicine will also lead to better cures and vaccines, but there is no guarantee that defense will always keep pace with offense. (Even the accidentally created mousepox virus had a 50% mortality rate on vaccinated mice.) Eventually, worry about biological weapons may be put to rest through the development of nanomedicine, but while nanotechnology has enormous long-term potential for medicine [39] it carries its own hazards. 4.6 Accidental misuse of nanotechnology (“gray goo”) The possibility of accidents can never be completely ruled out. However, there are many ways of making sure, through responsible engineering practices, that species-destroying accidents do not occur. One could avoid using self-replication; one could make nanobots dependent on some rare feedstock chemical that doesn’t exist in the wild; one could confine them to sealed environments; one could design them in such a way that any mutation was overwhelmingly likely to cause a nanobot to completely cease to function [40]. Accidental misuse is therefore a smaller concern than malicious misuse [23,25,41]. However, the distinction between the accidental and the deliberate can become blurred. While “in principle” it seems possible to make terminal nanotechnological accidents extremely improbable, the actual circumstances may not permit this ideal level of security to be realized. Compare nanotechnology with nuclear technology. From an engineering perspective, it is of course perfectly possible to use nuclear technology only for peaceful purposes such as nuclear reactors, which have a zero chance of destroying the whole planet. Yet in practice it may be very hard to avoid nuclear technology also being used to build nuclear weapons, leading to an arms race. With large nuclear arsenals on hair-trigger alert, there is inevitably a significant risk of accidental war. The same can happen with nanotechnology: it may be pressed into serving military objectives in a way that carries unavoidable risks of serious accidents. In some situations it can even be strategically advantageous to deliberately make one’s technology or control systems risky, for example in order to make a “threat that leaves something to chance” [42].

#### US model ensures best use of emerging tech

Work 19 Robert Orton Work is an American national security professional who served as the 32nd United States Deputy Secretary of Defense for both the Obama and Trump administrations from 2014 to 2017. “The American AI Century: A Blueprint for Action.” DECEMBER 17, 2019. Foreword. <https://www.cnas.org/publications/reports/the-american-ai-century-a-blueprint-for-action> {DK}

We find ourselves in the midst of a technological tsunami that is inexorably reshaping all aspects of our lives. Whether it be in agriculture, finance, commerce, health care, or diplomatic and military activities, rapid technological advancements in fields like advanced computing, quantum science, AI, synthetic biology, 5G, miniaturization, and additive manufacturing are changing the old ways of doing business. And AI—the technologies that simulate intelligent behavior in machines—will perhaps have the most wide-ranging impact of them all. This judgment is shared by many countries. China, Russia, members of the European Union, Japan, and South Korea all are increasing AI research, development, and training. China in particular sees advances in AI as a key means to surpass the United States in both economic and military power. China has stated its intent to be the world leader in AI by 2030 and is making major investments to achieve that goal. The United States needs to respond to this technological challenge in the same way it responded to prior technology competitions, such as the space race. U.S. leadership in AI is critical not only because technology is a key enabler of political, economic, and military power, but also because the United States can **shape how AI is used around the world**. As this report explains, while AI can be used for incredible good by societies, it already is being abused by authoritarian states to surveil and repress their populations. And advances in AI technology are enabling future malign uses, such as launching sophisticated influence attacks against democratic nations. The United States must make sure it leads in AI technologies and shapes global norms for usage in ways that are consistent with democratic values and respect for human rights.

#### Defense doesn’t assume interactions of multiple simultaneous threats

Pamlin, 15 -- Dennis Pamlin, Executive Project Manager of the Global Risks Global Challenges Foundation, and Stuart Armstrong, James Martin Research Fellow at the Future of Humanity Institute of the Oxford Martin School at University of Oxford, Global Challenges Foundation, February, http://globalchallenges.org/wp-content/uploads/12-Risks-with-infinite-impact.pdf

If a safe artificial intelligence is developed, this provides a great resource for improving outcomes and mitigating all types of risk.585 Artificial intelligence risks worsening nanotechnology risks, by allowing nanomachines and weapons to be designed with intelligence and without centralised control, overcoming the main potential weaknesses of these machines586 by putting planning abilities on the other side. Conversely, nanotechnology abilities worsen artificial intelligence risk, by giving AI extra tools which it could use for developing its power base.587 Nanotechnology and synthetic biology could allow the efficient creation of vaccines and other tools to combat global pandemics.588 Nanotechnology’s increased industrial capacity could allow the creation of large amounts of efficient solar panels to combat climate change, or even potentially the efficient scrubbing of CO2 from the atmosphere.589 Nanotechnology and synthetic biology are sufficiently closely related 590 (both dealing with properties on an atomic scale) for methods developed in one to be ported over to the other, potentially worsening the other risk. They are sufficiently distinct though (a mainly technological versus a mainly biological approach) for countermeasures in one domain not necessarily to be of help in the other. Uncontrolled or malicious synthetic pathogens could wreak great damage on the ecosystem; conversely, controlled and benevolent synthetic creations could act to improve and heal current ecological damage.

#### Strong risk reduction key to prevent AI-driven extinction---it’s uniquely likely, but success solves every impact

Pamlin, 15 -- Dennis Pamlin, Executive Project Manager of the Global Risks Global Challenges Foundation, and Stuart Armstrong, James Martin Research Fellow at the Future of Humanity Institute of the Oxford Martin School at University of Oxford, Global Challenges Foundation, February, http://globalchallenges.org/wp-content/uploads/12-Risks-with-infinite-impact.pdf

Despite the uncertainty of when and how AI could be developed, there are reasons to suspect that an AI with human-comparable skills would be a major risk factor. AIs would immediately benefit from improvements to computer speed and any computer research. They could be trained in specific professions and copied at will, thus replacing most human capital in the world, causing potentially great economic disruption. Through their advantages in speed and performance, and through their better integration with standard computer software, they could quickly become extremely intelligent in one or more domains (research, planning, social skills...). If they became skilled at computer research, the recursive self-improvement could generate what is sometime called a “singularity”, 482 but is perhaps better described as an “intelligence explosion”, 483 with the AI’s intelligence increasing very rapidly.484 Such extreme intelligences could not easily be controlled (either by the groups creating them, or by some international regulatory regime),485 and would probably act in a way to boost their own intelligence and acquire maximal resources for almost all initial AI motivations.486 And if these motivations do not detail 487 the survival and value of humanity in exhaustive detail, the intelligence will be driven to construct a world without humans or without meaningful features of human existence. This makes extremely intelligent AIs a unique risk,488 in that extinction is more likely than lesser impacts. An AI would only turn on humans if it foresaw a likely chance of winning; otherwise it would remain fully integrated into society. And if an AI had been able to successfully engineer a civilisation collapse, for instance, then it could certainly drive the remaining humans to extinction. On a more positive note, an intelligence of such power could easily combat most other risks in this report, making extremely intelligent AI into a tool of great positive potential as well.489 Whether such an intelligence is developed safely depends on how much effort is invested in AI safety (“Friendly AI”)490 as opposed to simply building an AI.49

#### AI-nano combo causes Universe extinction

Bostrom 14

[Nick, Professor in the Faculty of Philosophy at Oxford University. He is the founding Director of the Future of Humanity Institute, Superintelligence: Paths, Dangers, Strategies, Oxford University Press, 2014]

An agent’s ability to shape humanity’s future depends not only on the absolute magnitude of the agent’s own faculties and resources—how smart and energetic it is, how much capital it has, and so forth—but also on the relative magnitude of its capabilities compared with those of other agents with conflicting goals. In a situation where there are no competing agents, the absolute capability level of a superintelligence, so long as it exceeds a certain minimal threshold, does not matter much, because a system starting out with some sufficient set of capabilities could plot a course of development that will let it acquire any capabilities it initially lacks. We alluded to this point earlier when we said that speed, quality, and collective superintelligence all have the same indirect reach. We alluded to it again when we said that various subsets of superpowers, such as the intelligence amplification superpower or the strategizing and the social manipulation superpowers, could be used to obtain the full complement. Consider a superintelligent agent with actuators connected to a nanotech assembler. Such an agent is already powerful enough to overcome any natural obstacles to its indefinite survival. Faced with no intelligent opposition, such an agent could plot a safe course of development that would lead to its acquiring the complete inventory of technologies that would be useful to the attainment of its goals. For example, it could develop the technology to build and launch von Neumann probes, machines capable of interstellar travel that can use resources such as asteroids, planets, and stars to make copies of themselves.13 By launching one von Neumann probe, the agent could thus initiate an open-ended process of space colonization. The replicating probe’s descendants, travelling at some significant fraction of the speed of light, would end up colonizing a substantial portion of the Hubble volume, the part of the expanding universe that is theoretically accessible from where we are now. All this matter and free energy could then be organized into whatever value structures maximize the originating agent’s utility function integrated over cosmic time—a duration encompassing at least trillions of years before the aging universe becomes inhospitable to information processing (see Box 7). The superintelligent agent could design the von Neumann probes to be evolution-proof. This could be accomplished by careful quality control during the replication step. For example, the control software for a daughter probe could be proofread multiple times before execution, and the software itself could use encryption and error-correcting code to make it arbitrarily unlikely that any random mutation would be passed on to its descendants.14 The proliferating population of von Neumann probes would then securely preserve and transmit the originating agent’s values as they go about settling the universe. When the colonization phase is completed, the original values would determine the use made of all the accumulated resources, even though the great distances involved and the accelerating speed of cosmic expansion would make it impossible for remote parts of the infrastructure to communicate with one another. The upshot is that a large part of our future light cone would be formatted in accordance with the preferences of the originating agent. This, then, is the measure of the indirect reach of any system that faces no significant intelligent opposition and that starts out with a set of capabilities exceeding a certain threshold. We can term the threshold the “wise-singleton sustainability threshold” (Figure 11):

#### The Court has recently narrowed Parker immunity to limit deference to the states in antitrust law

Allensworth 16 [Rebecca Haw Allensworth, Associate Professor of Law, Vanderbilt Law School; J.D., Harvard Law School; M.Phil, University of Cambridge; B.A., Yale University, October 2016, ARTICLE: THE NEW ANTITRUST FEDERALISM, 102 Va. L. Rev. 1387]

Introduction

IN just three relatively obscure antitrust cases, 1

[Footnote 1] N.C. State Bd. of Dental Exam'rs v. FTC, 135 S. Ct. 1101 (2015) [hereinafter NC Dental]; FTC v. Phoebe Putney Health Sys., Inc., 133 S. Ct. 1003 (2013); FTC v. Ticor Title Ins. Co., 504 U.S. 621 (1992).

the U.S. Supreme Court has quietly revolutionized how states and the federal government share power. These cases addressed a doctrine - unfamiliar to those outside of the field of antitrust law - that grants "state action" immunity from federal antitrust liability 2 and thus marks the thin line that insulates state regulation from wholesale invalidation through federal antitrust lawsuits. 3 For decades, the Court conceived of this line, and the "antitrust federalism" it effected, as a formal question about where the state ended and antitrust liability began. This was the old antitrust federalism: a boundary-drawing exercise that gave strong deference to state regulation. The Court's state action revolution ushers in a new antitrust federalism, one that all but dispenses with the notion of separate spheres in favor of something less deferential to the states - procedural review of state regulation.

Antitrust federalism may be less familiar than its constitutional cousin, but it is just as important - if not more so - to the state-federal balance of power. The Sherman Act forbids anticompetitive restraints of trade and monopolization of markets, and it does not seem to limit these prohibitions to private citizens and corporations. 4 Because regulation often tinkers with the free market economy and tends to create competitive winners and losers, Sherman Act liability for state conduct would severely restrict a state's ability to regulate within its borders. 5 So when [\*1390] the Court extended the reach of the Sherman Act - along with all federal regulation passed under the Commerce Clause - during the New Deal, 6 it became necessary to define an exemption for "state action" or risk the demise of state regulatory autonomy altogether. And state action immunity from the Sherman Act was born. 7

#### But, the current interpretation fails to account for interstate spillovers. Limiting Parker is crucial to establish federal role limiting regulatory externalities

Sack 21 [John Sack, J.D., Duke Law School, Class of 2022, B.S. University of Michigan, 2019, 2021 https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1196&context=djclpp\_sidebar]

III. DOCTRINAL CRITICISM

Although the Court has continued to re-affirm Parker v. Brown’s central holding, many have criticized the Parker doctrine. Both scholars and the Federal Trade Commission (FTC) have highlighted problems with the doctrine and offered a number of solutions for how to remedy its faults.63

The first common critique of the doctrine is that it does not account for out-of-state economic effects. Unless a regulation runs afoul of another constitutional barrier, no consideration of interstate spillovers applies.64 One need not look farther than Parker itself to see how the state action doctrine can impose costs on out-of-state residents, even though those residents have diminished political capital in the state. At the time Parker was decided, between 90 and 95 percent of raisins produced in California entered interstate commerce and California provided almost all of the nation’s raisins.65 Most American raisin consumers lived outside of California and had no political means to oppose the state’s legislative program, yet they bore the costs of California’s state-sanctioned monopoly.66

Second, similar concerns about political representation animate critiques of Parker immunity. The policy at issue in Parker restricted output and artificially raised prices, two results federal antitrust law generally seeks to prohibit.67 Although the benefits of such a program were borne almost exclusively by California, the costs of the program were incurred by raisin consumers across the nation.68 The political incentives to promote such a program follow closely with economic costs and benefits.69 California raisin producers have a strong incentive to lobby their own government to install such a program, but it would be nearly impossible for non-California residents to challenge such a policy through the normal political channels.70 The government of California is not the appropriate body to properly weigh the benefits to in-state raisin producers with the costs to out-of-state consumers, yet the Parker doctrine grants California per se immunity on federalism grounds.71 Although the California program was implicitly endorsed by Congress, one is just as likely to find similar programs with no similar implicit endorsement.72

The U.S. Constitution embodies a system of federalism where the federal government is sovereign in some respects, and the several states are sovereign in others.73 This system of federalism gives states the power to regulate local matters and the federal government the power to regulate issues that states are less suited to regulate.74 When costs spill over into other states, the national government becomes the appropriate body to regulate the costs and benefits of such a program.75 The Court has recognized such spillover effects, and how political actors, even government entities, can act solely in self-interest.76 Such state self-interest can directly harm consumers outside of its territorial jurisdiction.77

Parker immunity, as it stands, runs counter to longstanding ideals of national unity that harken back to the Founding era. The law has long prohibited states from imposing excessive costs on the nation as a whole, solely for the purpose of furthering its own intrastate policy interests. McCulloch v. Maryland illustrates the Court’s wariness of self-serving state action.78 In McCulloch, Chief Justice Marshall held that states may not tax the national bank, as they would be wielding power against the whole of the United States, even though the whole of the United States is not represented by each state.79 Similar to a state tax being problematic since it is the part acting on the whole, anticompetitive restraints by the states would unduly impose costs on the nation. The people of the United States, acting through Congress, christened competition and free markets through the Sherman Act.80 Just as one state could not tax the resources of the United States, one state should not be allowed to use state policy to burden the national economy. Because the potential costs to state-created monopolies are so high,81 federal policy should prohibit states from allocating those costs beyond their borders. Any state that wishes to impose monopoly costs outside of its borders to benefit itself and undermine competition should be carefully scrutinized when it does so. This scrutiny would not be fatal-in-fact for the legislation, but it should be enough for states to second-guess an attempt to enrich itself to the detriment of its sister states.

IV. PROPOSED SOLUTIONS

The Sherman Act, and specifically Parker immunity, should be interpreted in light of the above concerns. After all, the Sherman Act is the standard-bearer for the U.S. free market system, and so our interpretation of it should evolve with our understanding of constitutional principles and economic conditions.82 Justice Burger’s concurrence in City of Lafayette elaborates on this point:

Our conceptions of the limits imposed by federalism are bound to evolve, just as our understanding of Congress’ power under the Commerce Clause has evolved. Consequently, since we find it appropriate to allow the ambit of the Sherman Act to expand with evolving perceptions of congressional power under the Commerce Clause, a similar process should occur with respect to “state action” analysis under Parker. That is, we should not treat the result in the Parker case as cast in bronze; rather, the scope of the Sherman Act’s power should parallel the developing concepts of American federalism.83

As states impose costs on each other through state-sanctioned monopolies, the Court’s understanding of federalism and the Commerce Clause counsels scrutiny of the Parker doctrine. An entirely new doctrine is not necessary to curtail Parker immunity. Rather, the issue can be resolved by applying Parker immunity in light of the American dual system of federalism and the Commerce Clause. Modern scholarship critiques the lack of concern for interstate spillovers. By that token, the modern Parker doctrine fails to account for economic efficiency and undermines political representation values meant to be protected by federalism.84 So while scholars almost universally recognize that interstate economic spillovers are problematic, there is no consensus on what remedy is most appropriate.

#### The aff preserves state authority to enforce antitrust but absent clarification on the transboundary effects from broad Parker immunity turf wars cause enforcement failures

Kobayashi 20 [Bruce H. Kobayashi, George Mason University, Antonin Scalia Law School Professor, 10-4-2020 https://gaidigitalreport.com/2020/10/04/exemptions-and-immunities/#\_ftn92]

B. Spillover Effects and Antitrust Federalism

The current state action doctrine does not enable jurisdictional competition or promote the principles of federalism because it does not account for the spillover effects of anticompetitive state regulation. Judge Easterbrook examined the Court’s state action holdings and found that the Court’s rulings were indifferent as to whether the effects of the regulation were actually internalized by the regulating state.[91] Allowing states to enact anticompetitive legislation reduced the extent and effectiveness of competition among the states, and thereby increased the cost of exit and relocation.[92]

This nature of the spillover effect is exemplified in Parker v. Brown.[93] The state action doctrine was used to uphold a California regulation which authorized a raisin cartel. California raisin growers benefited greatly from that ability to price fix. However, over 90% of the grapes were exported outside of California—nationally and internationally—making the impact of the California raisin regulation reach beyond state lines.[94] The regulation harmed a large number of consumers outside of California while only benefiting a small number of private interest parties within the state.

State action doctrine, although meant to preserve that state’s independence, actually allows the state to reap the benefits of the anticompetitive regulation while displacing the costs onto other states.[95] Therefore, it is worth considering if the current state action doctrine should be thought of differently, in a way that fully takes into accounts issues of federalism. Judge Easterbrook proposes a state action rule which considers the spillover effect of anticompetitive state regulation. Instead of examining clear articulation and active supervision, the Court would uphold an anticompetitive state regulation as long as its anticompetitive effects are internalized by that state’s residents.[96] Aligning state action doctrine with the economics of federalism will not only maintain states’ roles in antitrust, but also ensure that state antitrust exemptions have a diminished negative impact on consumer welfare. Analyzing the anticompetitive overcharge of regulations is also more administrable than attempting to analyze the regulations under the dormant Commerce Clause.[97] Considered under Easterbrook’s approach, Parker’s California raisin prorate program would be subject to antitrust scrutiny because the regulation’s costs were not internalized.

State regulation of seemingly local competition is likely to effect more than just the economy of that specific state. When states grant antitrust immunities in situations involving interstate commerce, the state is exporting the anticompetitive effects of its regulations to citizens outside its own borders. Without accounting for the federal interest in an integrated national economy, state action doctrine far surpasses its narrow purpose of supervising local competition.

C. The Appropriate Role of State Attorneys General in Federal Antitrust Disputes

Federalism most often refers to the vertical relationship between the federal government and the states. Divergent viewpoints among antitrust enforcers can strain the system, thus comity and deference are crucial to efficient antitrust enforcement. A merger or acquisition is often scrutinized by multiple enforcers with multi-dimensional relationships.

For example, the Sprint/T-Mobile merger involved the Antitrust Division and Federal Communications Commission, who share a horizontal relationship, and state attorneys general, with which the federal agencies share a vertical relationship. Disagreement between enforcers may occur at either level.[98] The merger between the two telecommunications firms was cleared by the FCC, the Antitrust Division, and ten state attorneys general.[99] Although a settlement agreement—which required divestitures—was in the process of being approved, several other state attorneys general filed a lawsuit to block the merger anyway.[100] Assistant Attorney General Makan Delrahim questioned the relief sought by the states,[101] citing the federal agencies’ expertise in the matter.[102] He noted that “a minority of states and the District of Columbia” were “trying to undo [the nationwide settlement],” a situation he believed was “odd.”[103] Delrahim reaffirmed states’ rights to sue for antitrust violations but criticized their attempt to seek relief inconsistent with the federal government’s settlement.[104]

States may also enter settlement agreements with merging parties that are repugnant to sound antitrust enforcement. For example, in UnitedHealth Group/Sierra Health Services, the Nevada Attorney General required the merged firm to submit $15 million in charitable contributions which were not related to any antitrust violation.[105] Similarly, Massachusetts entered a settlement agreement with two hospitals that required increased spending on select programs and the creation of other projects and programs unrelated to antitrust concerns.[106]

On the other hand, state antitrust enforcement can play a useful role in supplementing federal antitrust enforcement. First, the use of state autonomy within a federal system allows state and local governments to act as social “laboratories,” where laws and policies are created and tested at the state level of the democratic system, in a manner similar (in theory, at least) to the scientific method.[107] Thus, even if states enter into agreements with merging parties that the federal authorities view as anticompetitive or that impose ineffective remedies for the anticompetitive effects that would be generated by the merger, the information generated by such actions can be invaluable inputs into retrospective analyses of the competitive effects of mergers. These analyses are based on causal empirical designs which require both observation of post-merger price and quality effects from consummated mergers and the ability to compare these effects with a credible control group.[108] For example, state interventions such as COPA or Certificate on Need Laws that allow hospital mergers that generate competitive effects in local geographic markets facilitate retrospective studies of hospital mergers that can be used to validate and improve the economic models and other tools used to predict merger effects.[109]

Second, in a system of federalism, the state enforcement of both the state and federal antitrust laws can be a valuable complementary resource that supplements scarce federal resources. Conflicts between the federal and state antitrust authorities are generated by the use of a cooperative or “marble cake” approach to federalism, where the tasks of the state and federal agencies are relatively undefined, overlapping, and imperfectly coordinated. In contrast, a “dual” or “layer cake” federalism approach, where power is divided ex-ante between the federal and state governments in clearly defined terms, can mitigate direct conflicts between state and federal authorities discussed above.

#### Failure to hold states accountable for spillovers destroys optimal state experimentation – correctly “right sizing” regulation impossible without accounting for externalities in interjurisdictional competition

Adler 20 [Jonathan H. Adler, Case Western University School of Law, 2020 <https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=3058&context=faculty_publications>]

The race-to-the-bottom theory presumes that interjurisdictional competition creates a prisoner’s dilemma for states. Each state wants to attract industry for the economic benefits that it provides. Each state also wishes to maintain an optimal level of environmental protection. However, in order to attract industry, the theory holds, states will lower environmental safeguards so as to reduce the regulatory burden they impose upon firms. This competition exerts downward pressure on environmental safeguards as firms seek to locate in states where regulatory burdens are the lowest, and states seek to attract industry by lessening the economic burden of environmental safeguards. Because the potential benefits of lax regulation are concentrated among relatively few firms, these firms can effectively oppose the general public’s preference for environmental protection regulation. This will lead to social welfare losses even if environmental harm does not spill over from one state to another. The result, according to the theory, is the systematic under-regulation of environmental harms, and a need for federal intervention.26

The race-to-the-bottom theory may have had some basis in the 1960s and 1970s, but there is little reason to believe that this dynamic inhibits state regulatory efforts today, particularly given how aggressive many states are in environmental policy. Empirical evidence that states race to relax their environmental regulations in pursuit of outside investment is decidedly lacking. If the prospect of interstate competition discourages state-level environmental regulation, it is hard to explain why state environmental regulation often preceded federal intervention and why many states adopt more stringent measures than federal regulations require. Numerous studies have been conducted attempting to determine whether a race-to-the-bottom can be observed in the context of environmental regulation, and they have generally failed to find any evidence that environmental quality worsens when states are given more flexibility to set their own priorities.27 Indeed, some studies have \found precisely the opposite: that when states have more flexibility to set their own environmental priorities they increase their efforts.28

None of the above should be taken as an argument against all federal environmental regulation. For just as the federal government is overly interventionist in localized environmental concerns, the federal government is unduly absent in areas where a federal presence is most necessary. That is, the undue centralization of some environmental concerns co-exists with substantial federal abdication from concerns the federal government should be addressing. The federal government devotes relatively little of its regulatory resources on those matters for which the federal government possesses a comparative advantage and abdicates its responsibility to provide the data and knowledge base necessary for successful environmental regulation at all levels of government.

It is often remarked that environmental problems do not respect state borders. This is unquestionably true, and the observation provides ample justification for federal measures to address transboundary pollution problems.29 Where pollution or other environmental problems span jurisdictional borders there is less reason to believe state and local jurisdictions will respond adequately.

Consider a simple transboundary pollution problem involving two states, A and B. When economic activity in State A causes pollution in State B, State A is unlikely to adopt measures to prevent the resulting environmental harm because it would bear the primary costs of any such regulatory measures, without capturing the primary benefits. Put simply, State A is unlikely to impose costs on itself to benefit State B. Absent some external controls or dispute resolution system, the presence of interstate spillovers can actually encourage polices that externalize environmental harms, such as subsidizing development near jurisdictional borders so as to ensure that environmental harms fall disproportionately “downstream.” Policymakers in State B may wish to take action, but they will be unable to control pollution created in State A without State A’s cooperation. Even where polluting activity imposes substantial environmental harm within State A, the externalization of a portion of the harm is likely to result in the adoption of less optimal environmental controls.

#### Only federal legal remedies solve – failure to explicitly narrow Parker over-immunizes private entities and chills state action

Weber 16 [Jayme Weber, University of Arizona, James E. Rogers College of Law, J.D., 2016 https://www.cato.org/sites/cato.org/files/pubs/pdf/teladoc-285th-cir-29.pdf]

III. REFUSING SELF-INTERESTED BOARDS IMMUNITY FROM ANTITRUST LIABILITY IS FULLY CONSISTENT WITH FEDERALISM

“Federal antitrust law . . . is ‘as important to the preservation of economic freedom and our free-enterprise system as the Bill of Rights is to the protection of our fundamental personal freedoms.’” Dental Exam’rs, 135 S. Ct. at 1109 (quoting United States v. Topco Assocs., Inc., 405 U.S. 596, 610 (1972)). Every business, regardless of its size, is guaranteed the freedom “to assert with vigor, imagination, devotion, and ingenuity whatever economic muscle it can muster.” Topco, 405 U.S. at 610. Antitrust laws—particularly the Sherman Act—are “the Magna Carta of free enterprise,” and play a crucial role in upholding the national policy of economic freedom for anyone wishing to compete in the marketplace. Id.

In line with this national policy, the states clearly have an interest in preventing anticompetitive behavior and fostering robustly competitive markets within and across their borders. State governments also have an interest in reserving the ability to create regulatory subdivisions to which they can delegate some of their authority to accomplish specific tasks. At times, the states may deem it appropriate to design a regulatory body to deliberately exempt it from antitrust laws to achieve a specialized purpose.

States may confer antitrust liability on regulatory bodies—but only under certain conditions. Applying the state-action immunity doctrine too broadly and giving private actors a limitless ability to claim antitrust immunity for themselves would empower state-created cartels to “make economic choices counseled solely by their own parochial interests and without regard to their anticompetitive effects,” disrupting the free enterprise system that protects the national policy of economic freedom. Lafayette, 435 U.S. at 408.

Furthermore, broad application of the Parker-immunity doctrine would actually undermine the states’ ability to effectively delegate authority to specialized or local regulatory bodies by endowing these bodies with an antitrust immunity that state governments may have never meant to give them. “Neither federalism nor political responsibility is well-served by a rule that essential national policies are displaced by state regulations intended to achieve more limited ends.” Ticor, 504 U.S. at 636. The doctrine enables states to create regulatory subdivisions that do not interfere with the interest in preserving the benefits of competition. By “adhering in most cases to fundamental and accepted assumptions about the benefits of competition within the framework of the antitrust laws,” courts actually increase rather than diminish the states’ regulatory flexibility. Id. State legislatures may wish to make broad delegations of authority to their political subdivisions in order to maximize the benefits of the specialized governance those bodies offer— but that does not necessarily mean that state legislatures always want to give those entities the ability to violate the federal antitrust laws.

“When a state grants power to an inferior entity, it presumably grants the power to do the thing contemplated, but not to do so anticompetitively.” Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶ 225a, at 131 (3d ed. 2006). Relying on the backdrop of the national policy favoring competition, states may enact such broad delegations that are nevertheless intended to create specific and narrow, rather than general and wide-reaching, regulatory schemes. Giving regulatory agencies state-action immunity too readily would undermine states’ ability to do so, creating the hazard that legislatures will inadvertently authorize anticompetitive conduct. State legislatures cannot possibly anticipate every potential anticompetitive consequence of these delegations of authority and explicitly disavow antitrust immunity for every one. “‘No legislature . . . can be expected to catalog all of the anticipated effects’ of a statute delegating authority to a substate governmental entity.” Phoebe Putney, 133 S. Ct. at 1012 (quoting Hallie, 471 U.S. at 43).

If a state intends a specific anticompetitive result, it may clearly articulate that result—or make it plainly foreseeable, see id. at 1011—giving voters the chance to oppose immunity-creating legislation before it becomes law and making it easier to hold legislators accountable. Otherwise, states would be impeded in their freedom of action because they would have to act “in the shadow of state-action immunity whenever they enter[ed] the realm of economic regulation.” Ticor, 504 U.S. at 636. The limited and careful application of the state-action immunity doctrine gives states the most freedom in delegating power and crafting regulatory entities, ensuring legislatures that they will not accidentally confer immunity and allow regulatory bodies to go rogue with anticompetitive conduct that deviates from the states’ interest of preserving robust marketplace competition for the benefit of their residents.

#### Court rulings on Parker empirically deny disad links

Grossman 15 [Jonathan M. Grossman, co-chair at Cozen O’Connor, Harvard Law School, J.D., 2000, 2-25-2015 https://www.cozen.com/news-resources/publications/2015/supreme-court-delivers-another-blow-to-state-action-antitrust-immunity]

Supreme Court Delivers another Blow to State Action Antitrust Immunity

Today’s Supreme Court decision in North Carolina State Board of Dental Examiners v. Federal Trade Commission1 is the second time in two years that the Court has spoken on the state action exemption to the federal antitrust laws, and the Court once again has made it clear that the days of an expansive interpretation of that exemption are over.

Under the state action exemption, which is based on the principles of state sovereign immunity, restraints imposed by a state as an act of government are exempt from federal antitrust laws. Parker v. Brown, 317 U.S. 341 (1943). Private parties carrying out a state’s regulatory program are also immune as long as the private party: 1) is acting pursuant to a “clearly articulated and affirmatively expressed … state policy;” and 2) is “actively supervised by the state itself.” Cal. Retail Liquor Dealers Ass'n v. Midcal Aluminum, 445 U.S. 97 (1980).

Today’s decision in NC Dental and the 2013 Supreme Court decision in Phoebe Putney2 each focused on one of the two prongs of the Midcal test, and each decision will have the effect of making it more difficult to extend the exemption beyond the state itself.

In NC Dental, the Court focused on the “active supervision” requirement and concluded that the North Carolina Board of Dental Examiners (the Board) did not meet that test. The controversy began in 2003 when non-dentists in North Carolina began to offer teeth-whitening services. The Board, which is designed as a state agency by statute, consisted of six licensed dentists, one licensed dental hygienist, and one consumer member; with the dentists and dental hygienists elected by their peers and the consumer member appointed by the governor of the state. The Board issued nearly 50 cease-and-desist letters to non-dentist providers that effectively resulted in the end of non-dentists providing teeth-whitening services in the state. In 2010, the Federal Trade Commission (FTC) issued an administrative complaint against the Board alleging that it had violated the FTC Act by excluding the non-dentist teeth-whitening providers. The Board argued that it was acting as a state agency and thus immune from federal antitrust laws. The FTC issued a final order against the Board and enjoined it from issuing further extrajudicial orders to teeth-whitening providers in North Carolina. The 4th Circuit denied the Board’s subsequent petition seeking review of the FTC order.3

In affirming the 4th Circuit decision, the Supreme Court held that a state board on which a controlling number of decision makers are active market participants in the occupation the board regulates must satisfy Midcal’s active supervision requirement in order to invoke antitrust immunity under the state action exemption. The Court noted that “when a State empowers a group of active market participants to decide who can participate in its market, and on what terms, the need for supervision is manifest.” Furthermore, while the Board did not argue that it was actively supervised by the state, the Court concluded its decision by reiterating the requirements of active state supervision: (1) the substance of the anti-competitive decision must be reviewed by a state supervisor; (2) the state supervisor must have the power to veto or modify decisions to ensure that they align with state policy; (3) the “mere potential for state supervision” is not a sufficient substitute for an actual decision by the state; and (4) the state supervisor may not be an active market participant.

The 2013 Phoebe Putney decision focused on the “clear articulation” prong of Midcal. That case arose out of a merger of a for-profit hospital with a hospital owned and operated by a county hospital authority (Authority), which was created by the state legislature but operated independently of the state government. The FTC alleged that the transaction was technically structured as an acquisition of the for-profit by the Authority, in a specific attempt to take advantage of the state action exemption. The 11th Circuit observed that Georgia’s Hospital Authorities Law granted hospital authorities the power to “operate projects” including hospitals, to “make and execute contracts and other instruments necessary to exercise the[ir] powers,” and to “acquire by purchase, lease or otherwise … projects.” Based on this broad language, the 11th Circuit found that the legislation clearly indicated that the Georgia Legislature anticipated that the powers it granted to the Authority would produce anti-competitive effects, and thus were a foreseeable result of the legislation and sufficient to meet the Midcal “clear articulation” test. The Supreme Court reversed, holding that the Georgia Legislature did not clearly articulate or affirmatively express a state policy to displace competition in the market for hospital services. The Court noted that the Authority needed to show not just that it had been delegated authority to act, but also that it was authorized to act or regulate in an anti-competitive manner.

The combined effect of NC Dental and Phoebe Putney is that any regulatory body that is not clearly part of the executive branch of a state will have a significantly higher burden to take advantage of the state action exemption. This will require state governments to review and reconsider the structure and procedures of such bodies and should force the bodies themselves to carefully consider whether the state action exemption applies before taking any action that might implicate the federal antitrust laws.

It will also mean that industry participants regulated by such quasi-governmental bodies likely will be emboldened to challenge more adverse actions in court. Given the prevalence of quasi-government entities in states – many of which include market participants – and that they regulate a wide variety of industries including energy, professional services, health care, transportation, and many others, these decisions will likely have significant policy and legal implications for years to come.

#### Biden’s XO empirically denies any FTC Parker links and more restrictions coming

Bulusu 21 [Siri Bulusu, Reporter Bloomberg Law, 7-12-2021 https://news.bloomberglaw.com/antitrust/worker-license-rules-emerge-as-ftc-competition-oversight-priority]

President Joe Biden’s order, signed Friday, calls on the Federal Trade Commission to boost labor market competition by writing new rules that limit “unnecessary, cumbersome” licensing requirements, often imposed by states’ regulatory boards and quasi-public organizations.

“Some overly restrictive occupational licensing requirements can impede workers’ ability to find jobs and to move between states,” according to the order. The order comes amid a flurry of lawsuits against state or state-backed licensing bodies that accuse them of violating antitrust law by imposing expensive fees or threatening to shut down out-of-state businesses. The text of the order didn’t include specific directions for federal antitrust agencies. But the FTC’s anticipated actions and possible rulemaking could lead to streamlined licensing requirements across states, eliminating demands for worker information unrelated to the job, enforcement of interstate commerce rules, and levying of punitive fines, market watchers say. Licenses are expensive and requirements vary among states, even in the same industry. Reining in the requirements could remove a significant employment barrier, particularly for military families and others who frequently move between states or offer services across state lines. But it also could shift states’ calculations in cracking down on frauds and impostors. Cosmetology licenses can cost up to $15,000 and sometimes years of study, said Dick Carpenter, a senior director of strategic research for the Institute for Justice. Other jobs, ranging from public health and safety positions to interior designers, barbers, and manicurists, also require licensing. “Without any kind of standardization of different licensing requirements—even if you have the same requirements in different jurisdictions—you still have to get a license for each jurisdiction, which impedes an employee’s ability to be mobile,” said Tracey Diamond, a partner at Troutman Pepper LLP’s labor and employment practice.

Potential FTC Moves

The FTC’s options include writing new rules or heightening enforcement of interstate commerce rules in areas where they overlap with antitrust violations, labor market watchers say. Under this principle, restricting labor through onerous licensing requirements would be tantamount to limiting movement of services across borders.

“In the past, occupational licensing was a matter overseen by the Department of Labor, but they don’t quite have the teeth that the Federal Trade Commission has in terms of working in specific locations,” said Morris Kleiner, a University of Minnesota professor of labor policy.

The FTC could turn its limited resources toward scrutinizing occupational licensing programs that narrow the practice scope of a certain profession and limit competition, Kleiner said.

How the commission interprets which licensing requirements are “unnecessary” could be scrutinized. Those could include common requirements such as citizenship and a clean criminal record, said Bobby Chung, a postdoctoral research associate at the University of Illinois at Urbana-Champaign who focuses on licensing. .

“The required training, education and exams should confer the relevant skill sets,” Chung said. “If not, I would regard those requirements as unnecessary.” The agency also may impose specific guidelines that limit fees or frequency of license renewal, Kleiner said. “But more importantly, the FTC’s guidelines could be aimed specifically at states that have ratcheted up their requirements,” he said.

Gaining Attention

Burdensome licensing requirements have increasingly come under federal scrutiny as the labor market has shifted away from manufacturing jobs to service-oriented professions. States began imposing licensing requirements in order to protect consumers from bad actors and standardize services. “Licenses create a monopoly of workers who can provide a service,” Kleiner said. “But if you provide those services without a license, the police powers of the state can arrest and severely fine those individuals.” In 2020, roughly 23% of workers were required to have a license, according to the Bureau of Labor Statistics. Over the years, many states, including Arizona, Connecticut, Nebraska, and Tennessee, have modified their rules to lower what they considered to be burdensome barriers to obtaining licenses. Biden’s move is part of states’ broader push for changes, Carpenter said. “There is a momentum building to raise awareness to the issue.” Advocates for change also cite underemployment and unemployment stemming from the burdensome licensing requirements, as well as allegations that certain industries create occupational licensing to limit competition. Immigrants also can be affected by the licensing requirements, particularly if they hold foreign degrees but are performing lesser-skilled jobs in the U.S., according to a 2017 study by the Migration Policy Institute. Licensing particularly hurts foreign nationals with temporary work visas whose immigration status impedes them from seeking a license to work within their specialty, Chung said. That in turn impedes their path to permanent residency or citizenship, he said.

State Action

The FTC has struggled to rein in licensing practices with antitrust violations partly because public entities, like state-controlled licensing boards, can claim state action immunity. Such immunity authorizes a state to carry out certain legitimate government functions, often in regulated industries that require licensing.

“Many of these state certifications don’t violate antitrust law and that’s because of this doctrine that displaces antitrust law,” said Jesse Markham, a partner at Baker & Miller PLLC’s San Francisco office. “And that’s why these certification requirements exist with impunity.”

In 2015, the Supreme Court ruled in North Carolina State Board of Dental Examiners v. FTC that the state board was operated by market participants. Without active supervision from the state, the board couldn’t claim state action immunity from federal antitrust actions.

The ruling unleashed “dozens of lawsuits"—seeking antitrust treble damages—against individual members of licensing boards, according an October 2020 statement from Reps. Mike Conaway (R-Texas), Jamie Raskin (D-Md.), and David Cicilline (D-R.I.) in support of a bill they introduced to shield board members from such suits.

Qualifying for state action immunity largely depends on whether a board is a true government actor or a private market participant. But this delineation becomes more complex if there’s a blurred line between a state agency handling its own actions or a private group acting under state guidance.

How the FTC handles that blurred line will be one issue the agency tackles as it implements the president’s order.

## t

### Prohibitions – Must Ban – 2AC

#### We meet – aff results in more conduct being banned

#### Prohibitions prevent “business as usual” --- their definition forces whole rez

Ward 21 [Christine Ward, judge of the Jefferson County Family Court of the 30th Judicial Circuit in Jefferson County, 3-22-2021 https://www.leechtishman.com/wp-content/uploads/2021/03/Ungarean-Opinion.pdf

This Court is not persuaded by Defendant’s argument that, in order to be entitled to Civil Authority coverage, the action of civil authority must be a complete and total prohibition of all access to Plaintiff’s property by any person for any reason. If this Court were to accept Defendant’s cramped interpretation of the phrase “prohibits access,” it would result in businesses being precluded from coverage in nearly every instance where an action of civil authority effectively closes the business to the vast majority of the general public, but does not necessarily preclude employees, or certain other individuals, from entering the premises to clean, maintain the building, obtain important documents, or to perform other similar functions, which, while important, remain secondary to the activities that actually generate business income.

Once again this Court notes the importance of reading the insurance contract’s provisions as a whole so that all of its parts fit together. In so doing, this Court recognizes that the insurance contract provisions at issue are generally designed to provide business owners with coverage for lost busines income in the event that their business’ operations are suspended. Accordingly, this Court’s primary focus when interpreting the phrase “prohibits access,” at least in the context of this insurance contract, is the extent to which the action of civil authority prevented the insured from accessing its premises in a manner that would normally produce actual and regular business income. Given this understanding of the insurance contract, the fact that some employees, and even some limited number of patients, were still permitted to go to Plaintiff’s property for emergency procedures does not necessarily mean that Plaintiff is altogether precluded from coverage under the Civil Authority provision. The contract merely requires that “an action of civil authority . . . prohibits access to” Plaintiff’s property. It does not clearly and unambiguously state that any such prohibition must completely and totally bar all persons from any form of access to Plaintiff’s property whatsoever.

#### It’s best---

#### Education---scope of state action immunity is vital question in antitrust enforcement---Crane & Sack

#### Aff flex---“expand the scope” massively constrains the aff---innovation prevents a sitting duck for PICs

#### Overlimits---they box out nuanced industry-specific debates and force repetitive, stale, giant innovation debates

#### Solves ground---stable direction of increasing prohibitions ensures links

#### Functional limits check---few advocates, advantages, and short list of “core” legislation

#### Reasonability best – competing interps cause a race to the bottom and substance crowd-out

## estados

### States CP – Enforce Antitrust – 2AC

#### Perm --- do both --- shields the link

#### Conditionality is a voter --- creates time and strategy skews, argumentative irresponsibility, and dispo solves their offense

#### State’s fiat is a voter --- contrived, no literature assumes uniformity, not reciprocal, and illogical because no single decision-maker could choose

#### Doesn’t solve federalism – broad Parker precedent is a barrier to effective state experimentation – Sack and Kobyashi

#### Doesn’t solve innovation – our market barrier args are about how Parker is applied – application of antitrust enforcement is irrelevant – Crane

## ftc cp

### Section 5 CP – 2AC

#### Perm – do both – solves the link

#### Perm – do the CP – plan doesn’t commit to an agent, exec functionally is the USFG. Not textually competitive – text is best: most objective and avoids the worst counterplans.

#### Normal means competition is bad – CP’s must compete on a mandate of the plan – anything else forces the aff to research infinite abnormal means and kills the search for the best policy option because the neg can just agree

#### Agent CPs are a voter --- crushes fairness by doing all the Aff and undermines education by focusing on trivial details

#### CP’s rolled back – Courts and Congress

Jones and Kovacic 20 (Alison Jones, Professor of Law, King’s College London; and William E. Kovacic, King’s College London, George Washington University, United Kingdom Competition and Markets Authority; “Antitrust’s Implementation Blind Side: Challenges to Major Expansion of U.S. Competition Policy,” The Antitrust Bulletin, 65(2), 3-20-2020, DOI: 10.1177/0003603X20912884)

B. Infirmities of Section 5 of the Federal Trade Commission Act

One possible solution to rigidities that have developed in Sherman Act jurisprudence is for the FTC to rely more heavily on the prosecution, through its own administrative process, of cases based on Section 5 of the FTC Act and its prohibition of “unfair methods of competition.”93 This section allows the FTC94 to tackle not only anticompetitive practices prohibited by the other antitrust statutes but also conduct constituting incipient violations of those statutes or behavior that exceeds their reach. The latter is possible where the conduct does not infringe the letter of the antitrust laws but contradicts their basic spirit or public policy.95

There is no doubt therefore that Section 5 was designed as an expansion joint in the U.S. antitrust system. It seems unlikely to us, nonetheless, that a majority of FTC’s current members will be minded to use it in this way. Further, even if they were to be, the reality is that such an application may encounter difficulties. Since its creation in 1914, the FTC has never prevailed before the Supreme Court in any case challenging dominant firm misconduct, whether premised on Section 2 of the Sherman Act or purely on Section 5 of the FTC Act.96 The last FTC success in federal court in a case predicated solely on Section 5 occurred in the late 1960s.97

The FTC’s record of limited success with Section 5 has not been for want of trying. In the 1970s, the FTC undertook an ambitious program to make the enforcement of claims predicated on the distinctive reach of Section 5, a foundation to develop “competition policy in its broadest sense.”98 The agency’s Section 5 agenda yielded some successes,99 but also a large number of litigation failures involving cases to address subtle forms of coordination in oligopolies, to impose new obligations on dominant firms, and to dissolve shared monopolies.100 The agency’s program elicited powerful legislative backlash from a Congress that once supported FTC’s trailblazing initiatives but turned against it as the Commission’s efforts to obtain dramatic structural remedies unfolded.101

#### No neg fiat --- no “should not” in the resolution, potential CPs are infinite

#### Conditionality is a voter – creates time and strategy skews, not reciprocal – undermines argument responsibility – dispo solves

#### Perm – do the plan and enforce through Section 5 of the FTCA – the counterplan specifies an enforcement mechanism that the aff gets to perm

### Section 5 CP – Federalism – 2AC

#### Doesn’t solve federalism – arg is about Court interpretive precedent allowing states to experiment – Sack and Kobayashi

#### Innovation distinction

### Nb

#### Their trade net benefit is an add-on that only the aff solves – the plan increases the enforcement scope of the FTC that is being blocked by Parker immunity now – the plan’s fiat ensures Court’s uphold but the counterplan is struck down

#### No trade impact.

Joel **Einstein 17**. Australian National University. 01-17-17. “Economic Interdependence and Conflict – The Case of the US and China.” E-International Relations. <http://www.e-ir.info/2017/01/17/economic-interdependence-and-conflict-the-case-of-the-us-and-china/>

In 1913, Norman Angell declared that the use of military force was now economically futile as international finance and trade had become so interconnected that harming the enemy’s property would equate to harming your own.[1] A year later Europe’s economically interconnected states were embroiled in what would later become known as the First World War. Almost a century later Steven Pinker made a similar claim. Pinker argues, “Though the relationship between America and China is far from warm, we are unlikely to declare war on them or vice versa. Morality aside, they make too much of our stuff and we owe them too much money.”[2] His argument rests upon the liberal assumption that high levels of trade and investment between two states, in this case the US and China, will make war unlikely, if not impossible. It is this assumption that this essay seeks to evaluate. This essay is divided into three sections. The first briefly outlines the theory that economic interdependence results in a reduced likelihood of conflict, breaking the theory down into smaller components that can be examined. In the second section, this essay suggests that the premise ‘more trade equals less conflict’ is simplistic. It does not take into account many of the variables that can influence the strength of economic interdependence’s conflict reducing attributes. Within this section, the essay considers: the extent to which conflict cuts off trade, theories arguing that how and what a state trades matters, Copeland’s theory of trade expectations and the differences between status quo and revisionist states. The final section deals with the realist perspective, concentrating on arguments pertaining to the primacy of strategic interests and arguments that economic interdependence will increase the likelihood of conflict owing to a reduction of deterrence credibility. Each section will be related back to the US-China relationship with a view to assessing Pinker’s claim. The essay will conclude that economic interdependence does reduce the likelihood of conflict but is insufficient on its own to completely prevent it. To calculate the likelihood of conflict correctly one would need to factor in the nature of the economic interdependence alongside the strength of the strategic interests at stake. Economic Interdependence and Conflict The theory that increased economic interdependence reduces conflict rests on three observations: trade benefits states in a manner that decision-makers value; conflict will reduce or completely cut-off trade; and that decision-makers will take the previous two observations into account before choosing to go to war. Based on these observations, one should expect that the higher the benefit of trade, the higher the cost of a potential conflict. After a certain point, the value of trade may become so high that the state in question has become economically dependent on another. Proponents of this theory argue that if two states have reached this point of mutual dependence (interdependence), their decision-makers will value the continuation of trade relations higher than any potential gains to be made through war.[3] It is on this argument that Pinker rests his statement that the economic relationship between the US and China precludes war. One can see evidence of this when analysing US views on China as trade rises. A 2014 Chicago Council on Global Affairs survey indicates that only a minority of Americans see China as a critical threat, compared to a majority in the mid-1990s. This number is even higher when analysing Americans who directly benefit from trade with China.[4] As compelling as this argument may be, high levels of economic interdependence have not always resulted in peace. The decades preceding WW1 saw an unprecedented growth in international trade, communication, and interconnectivity but needless to say, war broke out.[5] This instance alone is not enough to disprove Pinker’s logic. War may become very unlikely but began nonetheless.[6] Let us take two hypothetical scenarios, one in which the chances of war is 80% and the other in which trade has reduced the likelihood of war to 10%. Just knowing that war did indeed take place does not tell us which scenario was in play. Similarly, the fact that WW1 took place gives us no information about whether economic interdependence made war unlikely or not. In fact, evidence even exists to suggest that economic linkages prevented a war from breaking out during the sequence of crises that led up to WW1.[7] However, the fact that a war as detrimental as WW1 could break out despite a supposed reduction of the likelihood of conflict gives us an impetus to examine whether this reduction does take place. Additionally, if this is the case, what variables can weaken this pacifying effect? Does Conflict Cut off Trade? Economic interdependence theory makes the assumption that conflict will reduce or cut-off trade. This assumption appears to be logical, as one would expect that the moment two states are officially adversaries, fear of relative gains would ensure that policy makers want to completely cut-off trade. However, there are many historical examples of trade between warring states carrying on during wartime, including strategic goods that directly affect the ability of the enemy to carry out the war.[8] For example, in the Anglo-Dutch Wars, British insurance companies continued to insure enemy ships and paid to replace ships that were being destroyed by their own army.[9] Even during WW2, there are numerous examples of American firms continuing to trade strategic goods with Nazi Germany.[10] Barbieri and Levy argue that these examples and their own statistical analysis suggest that the outbreak of war does not radically reduce trade between enemies, and when it does, it often quickly returns to pre-war levels after the war has concluded.[11] In response to this result, Anderton and Carter conducted an interrupted time-series study on the effect war has on trade in which they analysed 14 major power wars and 13 non-major power wars. Seven of the non-major power wars negatively impacted trade (although only four of these reductions were significant), but in the major war category, all results bar one showed a reduction of trade during wartime and a quick return to pre-war levels at its conclusion.[12] Accompanying this contradictory finding one must take into account that even if war does not radically reduce trade, if a state believes that it does then potential opportunity cost would still figure in their calculations. Variables that Impact the Pacifying Effect of Economic Interdependence The purpose of this section is to demonstrate that the pacifying effect of economic interdependence is not constant. It achieves this via a discussion of the effect of changes in a number of variables pertaining to how and what a state trades. Once it is established that changes in such variables may alter the effect of economic interdependence on the likelihood of conflict, Pinker’s statement (that the level of trade between the US and China makes conflict unlikely) can be considered to be an over-simplification. One variable is the relative levels of economic dependence. Some argue that asymmetry of trade can increase the chances of conflict if the trade is more important to one state than it is to the other; their resolve would not be reduced by the same degree. The less dependent state would be far more willing than its adversary to initiate a conflict.[13] An example is the possibility of the prevalent idea in China that ‘Japan needs China more than China needs Japan’ leading to China becoming more assertive in Senkaku/Diaoyu islands dispute.[14] It is important to recognize that all trade is asymmetric in one fashion or another. It is radical asymmetry that one has to fear, which at the moment does not appear to be the case in the China-Japan or US-China case. Another variable is the specifics of what is being traded. A study by Dorussen suggests that the pacifying effect of trade is less evident if the trade consists of raw materials and agriculture but stronger if the trade consists of manufactured goods. Even within the category of manufactured goods there are differences in effect. Mass consumer goods yield the strongest pacifying results whilst high-technology sectors such as electronics and highly capital-intensive sectors such as transport and metal industries tend to have a relatively weak effect.[15] If it is a sector with alternative trade avenues then embargos and boycotts as a result of conflict will have far less effect.[16] The rule is that the more inelastic the import demand, the higher the opportunity cost and the smaller the probability of conflict.[17] According to these studies, trade still generally reduces the likelihood of conflict however it is by no means homogeneous in its effects. Additionally, the opportunity costs are not the same for importers and exporters. Dorussen’s study suggests that increased trade in oil tends to make the exporters more hostile and the importers friendlier in relations to their foreign policy.[18] Taking this framework into account, in 2014 China’s top five exports to the US (computers, broadcasting equipment, telephones and office machine parts) all fell under the category of electronics,[19] whilst the US’s top five exports to China (air and/or spacecraft, soybeans, cars, integrated circuits and scrap copper) were all either high-capital intensive sectors or raw materials and agriculture.[20] According to Dorussen’s study, these exports should not yield the strongest possible conflict reducing results, which could impact the validity of Pinker’s statement. Copeland presents another variable, namely expectations of trade. Copeland argues that if a highly dependent state expects future trade to be high, decision makers will behave as many liberals predict and treat war as a less appealing option. However if there are low expectations of future trade, then a highly dependent state will attach a low or even negative value to continued peaceful relations and war would become more likely.[21] As an example, he points out that despite high levels of trade in 1914 German leaders believed that rival great powers would attempt to undermine this trade in the future, so a war to secure control over raw materials was in the interests of German long-term security.[22] Via this framework, if the US began to believe that in future years they would be less dependent on China’s economy, or if it became apparent that a US-China trade war was about to take place, there would be a sharp rise in the probability of conflict. The final variable this essay will discuss relates to the differences between status quo and revisionist states. Most empirical analyses of economic interdependence tend to group together states as different as the United States, Pakistan, Australia, Germany and China and assume that variations in their behaviour would be the same.[23] Papayoanou on the other hand, argues that when analysing the effects of economic interdependence it is useful to differentiate the effects on great power states and states with revisionist aspirations.[24] If a status quo power has strong economic ties with revisionist state there will be interest groups who advocate engagement and who believe that confrontational stances will threaten the political foundation of economic links. This will constrain the response of the status quo state.[25] One can see evidence of such an interest group in the US, a group Friedberg describes as the Shanghai coalition, who he argues advocate engagement with China at the expense of balancing.[26] A study by Fordham and Kleinberg backs up this argument as they find that US business elites who benefit from trade with China tend to see little benefit in limiting the growth of Chinese power.[27] A 21st Century revisionist power is far less likely to be a democracy, and therefore, interest groups will influence the leadership far less. This means an authoritarian revisionist power will be working under fewer constraints and will be able to take a more aggressive stance.[28] This appears to be the case in China where rather than having domestic constraints on taking an aggressive stance against Japan, one of their biggest trading partners, grassroots nationalism has made explicit cooperation a domestically risky option.[29] There are many indicators to suggest that China is a revisionist power willing to wage war. Lemke and Werner argue that an extraordinary growth of military expenditures’ reveals when a state is dissatisfied with the status quo.[30] Data provided by the Stockholm International Peace Research Institute certainly indicates that China qualifies as its military expenditure has nominally increased by 1270% between 1995 and 2015.[31] Additionally, the military modernization appears to be aimed at capabilities to contest US primacy in East Asia.[32] Much like German strategists recognized that Britain was operating under significant domestic constraints, China could realize the same of the US.[33] This is not to say that Chinese decision-makers would be cavalier about making a decision that would be to the detriment its economy. A crash in the Chinese economy due to the loss of exports to the US could potentially undermine the legitimacy of the Chinese Communist party and endanger the regime. However, the view that China is a revisionist power indicates that good trade relations alone will not result in a low probability of conflict. Realist Arguments Pertaining to Dominance of Strategic Interests Having established that if the pacifying effect of trade does exist, it can rise or fall depending on changes in a series of variables this essay proceeds to deal with realist theories arguing that trade has a negligible or even negative effect on the likelihood of conflict. Buzan argues that noneconomic factors contribute far more to major phenomena than liberal theorists usually cite to support their theory.[34] There is evidence of the primacy of strategic interests in Masterson’s 2012 study on the relationship between China’s economic interdependence and political relations with its neighbours. The study concluded that as economic interdependence with neighbouring states increased the likelihood of conflict did indeed decrease, but that the impact was minimal when compared to the impact of relative power capabilities. In other words, political and military issues dominated interstate relations. Growth in power disparities were associated with decreases in dyadic political relations that were greater than the increase caused by economic interdependence.[35] If the pacifying effect of trade can rise and fall so can the provocative effect of strategic interests. It is important to distinguish between the existence of a strategic interest and a situation of unbearable strategic vulnerability. China and the US have many opposing strategic interests, but neither is in a strategically vulnerable position. For example, China shares many borders, but none present the same threat of invasion that Tsarist Russia did to Imperial Germany as none of the current maritime tensions between China, Japan, and the US equate to a matter of national survival.[36] This is crucial as some believe that for a crisis to escalate to a major war an actor who is isolated and believes that history is conspiring against them is needed. Only this actor would take an existential risk to try and offset their strategic vulnerability.[37] Imperial Germany fit this description, but neither China nor the US does. This is largely due to the geography of the region. The tension between the US, China and Japan are over maritime regions. Maritime issues still relate to national interests but, as Krause points out, “Land armies are still the only forces that can conquer and hold territory.”[38] Taking this into account one can argue that the benefits of US-China trade are, for each state, currently greater than the benefits of pursing strategic benefits via force, but this situation will only remain as long as the situation does not become one of unbearable strategic vulnerability. Realist Arguments Pertaining to the Undermining of Deterrence Having established that scenarios exist where strategic interests and vulnerabilities have a greater effect on the likelihood of war than economic interdependence, this essay will now evaluate arguments that economic interdependence can increase the likelihood of conflict through the undermining of deterrence. The argument proceeds as follows: if economic interdependence constrains the ability or willingness of a state to use its military, security is lowered as the state now has a weakened ability to engage in deterrence and defensive alliances. Deterrence relies on the ability of a state to make credible threats and defensive alliances rely on credible promises to protect one’s allies.[39] Credibility is defined as the product of the operational capability to follow through with a threat and the communication of resolve to use force.[40] What is at risk here is that if economic interconnectivity interferes with the communication of resolve to use force then states may end up with a way that neither side expected or wanted. Some argue that it was such a failure to communicate resolve that resulted in the beginning of WW1. Indeed, Jolly claims that: “The Austrians had believed that vigorous actions against Serbia and a promise of German support would deter Russia: the Russians had believed that a show of strength against Austria would both check the Austrians and deter Germany. In both cases, the bluff had been called and the three countries were faced with the military consequences of their actions.”[41] The risk in the US-China case would be that the interest groups described earlier would prevent the US from effectively communicating its resolve to use force if China were to cross a redline. The flaw in this argument lies in the fact that whilst interest groups might push back against public statements outlining redlines; the US has many less overt options available to it to communicate resolve. Modern technology and the forms of interconnectivity have resulted in many more lines of communication between China and the US than adversaries had access to in 1914. Private meetings, electronic communication and numerous other methods of communication have the capability to be candid without being visible to interest groups. It is for this reason that this essay discounts the theory that Sino-American economic interdependence results in a reduction of deterrence and therefore increases the likelihood of conflict. Conclusion This essay has shown that the strength of the pacifying effect of economic interdependence is subject to change depending on a series of dynamic variables. It has also demonstrated that the strength of the conflict provoking effects of strategic interests can change depending on whether the strategic interest amounts to a situation of unbearable strategic vulnerability. It has discounted the theory that interdependence leads to a higher chance of conflict through an erosion of credibility. To sum up, trade does seem to reduce the likelihood of conflict but should not be seen as a deterministic factor as strategic interests, and vulnerabilities also have a large effect. There is no hard rule as to what will be the driving factor as the nature of economic interdependence and of strategic factors impact their relative values. Accordingly, Pinker’s statement that the trade between the US and China makes war exceptionally unlikely is simplistic and misleading because it fails to account for a wide array of variables that can radically change the likelihood of a Sino-American war. An intellectually honest thesis would insist upon a comprehensive approach in which the level of economic activity is simply one of many variables that is required.

## experimentation cp

### Extra

#### No link – no private enforcement and litigation now

Cooper 17 [James C. Cooper, Associate Professor of Law and Director, Program on Economics & Privacy, Antonin Scalia Law School, George Mason University 11-13- 2017, <https://regproject.org/wp-content/uploads/RTP-Antitrust-Consumer-Protection-Working-Group-Paper-Occupational-Licensing.pdf>]

One approach is for the FTC to work within the broader framework established by Parker v. Brown to narrow the sphere of immunity conferred by the two-part test established in Midcal. The FTC’s enforcement actions in Phoebe Putney and NC Dental can be seen as efforts by the Commission to narrow the scope of the clear articulation and active supervision requirements, making it relatively more difficult for states to establish that state law clearly articulates a purpose of displacing competition and/or that a substate entity is actively supervised by a sovereign state actor. Continuing down this path would — potentially — be an effort by the FTC to argue that the Supreme Court should reverse Town of Hallie and hold that municipalities must be actively supervised by a sovereign state actor when engaging in activity that would otherwise violate the Sherman Act.

A different and more aggressive approach would be for the FTC to argue that Parker v. Brown does not control actions brought by the FTC under its authority to prosecute unfair methods of competition pursuant to Section 5 of the FTC Act. Because the FTC alone has the authority to enforce Section 5, any concern about an explosion in the number of antitrust actions challenging state and local laws would be muted. Moreover, by following this approach, the FTC could shed light directly on the anticompetitive effects of occupational licensing and other restrictions on entry, rather than focusing its efforts on shaping the legal doctrine established by Parker v. Brown.

## occupational licensing cp

### 2ac

#### Perm – do both – solves the link

#### Doesn’t solve federalism – arg is about Court interpretive precedent on Parker immunity allowing states to experiment – Sack and Kobayashi

#### Doesn’t solve innovation or links to the net benefit – the anticompetitive practice is sanctioned by a specific legal doctrine that allows it – the counterplan leaves immunity in place and, if it’s no longer applied, they link to the net benefit – Crane

#### No neg fiat --- no “should not” in the resolution, potential CPs are infinite

#### Perm – do the counterplan – not functionally competitive – wrecks aff ground and justifies worst normal means counterplans like the 9-0 counterplan

Robinhood 20 [Robinhood Financial LLC. “What are Antitrust Laws?”. 10-6-20. https://learn.robinhood.com/articles/4x5oCZOtg43uORfxEnxPRW/what-are-antitrust-laws/]

Antitrust laws are regulations that aim to promote fair business competition in an open market and protect consumers by banning certain predatory practices.

#### Conditionality is a voter – creates time and strategy skews, not reciprocal – undermines argument responsibility – dispo solves

## ftc os

### FTC OS – 2AC

#### Doesn’t force spillover – aff gives FTC the option to pursue immunity cases but doesn’t require burdensome enforcement

#### No link – FTC capacity is high and already closely review state immunity cases

Crane 16 [Daniel A. Crane Frederick Paul Furth Sr. Professor of Law, University of Michigan Law School Adam Hester J.D., May 2016, University of Michigan Law School, 2016, State-Action Immunity and Section 5 of the FTC Act, 115 MICH. L. REV. 365, https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1510&context=mlr]

B. Institutional Constraints and Capacities

Beyond the core concerns about the anti-democratic and pro-laissez faire tendencies of economic substantive due process, there lurk questions about institutional constraints and capacities. Allowing the Sherman Act to become an aggressive anti-regulatory charter would pose considerable risks of unwieldy and excessive challenges to state regulatory regimes and state sovereignty, since the Sherman Act is privately enforceable.251 Further, the federal courts may lack the expertise and fact-finding processes to make well-informed decisions over whether state regulatory decisions reflect exercises of police power in the public interest, or, rather, naked pork-barreling for the benefit of concentrated economic interests. On these scores, FTC enforcement under Section 5 of the FTC Act enjoys a considerable advantage over the Sherman Act.

First, Section 5 of the FTC Act is enforceable only by the FTC, not by private plaintiffs.252 Superior preemption under Section 5 would not lead to a flood of private challenges against state regulations, nor would it injure state interests by forcing the states to constantly defend anti-regulatory actions by private interests. (Recall that Parker itself involved a private challenge to state law, as have many of the important state-action immunity cases since).253 Rather, preemption of state law would depend on an administrative decision by a majority of the FTC commissioners to bring an action or otherwise declare a state law preempted. Preemption would not flow directly from the statute, but from a decision of the FTC to enforce the statute in a particular context. The burden of the intrusion on federalism interests and state sovereignty would therefore be considerably lower than if the Sherman Act were read to directly preempt anticompetitive state laws, permitting private plaintiffs to seek invalidation of state laws whenever the laws infringed on competition.

Second, and relatedly, the FTC enjoys a much greater capacity to evaluate the range of competing interests entailed by state regulations than does a federal court. Not only does the commission employ a large staff of expert economists,254 but it wields broad investigatory powers to investigate trade conditions through mandatory processes such as document requests and depositions.255 The FTC already serves the states in a consultative capacity, giving advice on proposed legislation and engaging in competition advocacy by issuing reports on various competition issues or intervening as amicus curiae in litigation.256 Unlike generalist federal courts, the FTC has the capacity to study the competitive effects and justifications for state regulatory schemes, consult formally or informally with state officials and other interested parties, and bring to bear its economic expertise in mediating competing claims about the effects of regulations on consumers or other interests.

#### Lots of thumpers

Zakrzewski 8-19 (Cat Zakrzewski, technology policy reporter at The Washington Post, covers antitrust, privacy and the debate over regulating social media companies, former reporter for Wall Street Journal Pro Venture Capital, BS Journalism, Northwestern University; **internally citing competition policy director at the consumer group Public Knowledge Charlotte Slaiman, and George Washington University professor and former FTC chair William Kovacic**; “Lina Khan’s first big test as FTC chief: Defining Facebook as a monopoly,” The Washington Post, 8-19-2021, https://www.washingtonpost.com/technology/2021/08/19/ftc-facebook-lawsuit-lina-khan-deadline/)

“There’s multiple signals that FTC is serious about doing their job of investigations and bringing these cases and fighting them hard,” said Charlotte Slaiman, competition policy director at the consumer group Public Knowledge.

Though the most significant, the Facebook case is but one of a wide range of issues on Khan’s plate. A month after she assumed office, the Biden administration issued a sweeping competition executive order, which called for her agency to take a tougher line on concentration throughout the economy.

So far, Khan has taken a series of steps to signal a shake-up has arrived at the FTC. She’s started hosting open meetings to open the agency’s business to the public, and she’s warned that greater scrutiny of mergers is on its way.

But the challenge will be for the agency to remain focused on the most important cases, including Facebook, Kovacic said. “She has a downpour of demands from both ends of the avenue,” he said.

And none of her other efforts will matter if she can’t show that she can win against companies, including Facebook, in court.

“The real measure to business decision-makers of your effectiveness and seriousness is your ability to prosecute and win cases,” Kovacic said.

#### No tradeoff – newest resolution creates more capacity

Gehl 9-24 (Kate, Senior Counsel for Foley and Lardner LLP, Elizabeth A. N. Haas, Partner, Alan D. Rutenberg, Partner, H. Holden Brooks, Partner, Benjamin R. Dryden, Partner, Foley and Lardner LLP“A Divided FTC Approves Omnibus Resolutions to Step Up Enforcement Actions and Votes to Withdraw the 2020 Vertical Merger Guidelines” [https://www.foley.com/en/insights/publications/2021/09/divided-ftc-approves-omnibus-resolutions Published 9-24-2021](https://www.foley.com/en/insights/publications/2021/09/divided-ftc-approves-omnibus-resolutions%20Published%209-24-2021), MSU-MJS)

According to the FTC’s press release, the resolutions are aimed at broadening its ability “to obtain evidence in critical investigations on key areas where the FTC’s work can make the most impact.” The resolutions also will purportedly permit the FTC to “better utilize its limited resources” to quickly investigate potential misconduct. The FTC views the resolutions as one method to increase efficiency at the FTC, which certain Commissioners believe has become necessary due to the “increased volume of investigatory work” caused by a “surge” in merger filings in recent months.

In practice, these resolutions allow a single Commissioner, instead of a majority of sitting Commissioners, to approve compulsory process requests in any investigation within the scope of the resolution for the next 10 years. What practical effect these resolutions will have remains to be seen; however, businesses engaged in conduct that may be implicated by the resolutions should be aware that FTC staff will now have an expedited ability to carry out compulsory process requests, which will very likely increase the number and scope of investigations conducted by the FTC.

#### Funding is normal means – AND boosts are coming

Byers 21 (Dylan Byers, senior media reporter for NBC News; **internally citing George Washington University professor and former FTC chair William Kovacic**; “Is Facebook untouchable? It's complicated,” NBC News, 7-1-2021, https://www.nbcnews.com/tech/tech-news/facebook-untouchable-complicated-rcna1323)

The House Judiciary Committee recently advanced six bills that would bolster the government's ability to regulate Big Tech. They range from simple budgeting measures — one would give more funding to the FTC and the Department of Justice for their antitrust enforcement efforts — to profound reforms — one that would stop platform companies from preferencing their products over those of their competitors and another that would make it illegal for companies to eliminate competitors through acquisitions.

This legislative package faces an arduous road ahead. House Majority Leader Steny Hoyer, who sets the House floor schedule, has said none of the six bills are ready for a vote, which suggests they don't have broad bipartisan support. If and when they do make it through the House, they face an even harder battle in the Senate.

"It's hard to imagine that the larger legislative package is accomplished this year," Kovacic said, though he predicted a few of the less-threatening bills — budgeting, for example — are likely to pass on their own.

"The funding for the FTC and DOJ antitrust divisions, it's nearly 100 percent likely that Congress will pass that law," he said. He said another bill, which would block the tech firms from moving court hearings to more favorable states, was also likely to pass.

#### FTC enforcement high – it’s overstretched and triggers backlash links

Nylen 9-29 [Leah Nylen covers antitrust and investigations for POLITICO Pro, 9-29-2021 https://www.politico.com/news/2021/09/29/lina-khan-war-monopolies-514581]

Under new FTC Chair Lina Khan, the century-old regulatory agency long accustomed to blessing corporate mergers is veering back to its original trustbusting mission and becoming markedly less friendly to the businesses it regulates. The shift has inspired cheers from her fellow progressives while unsettling many GOP lawmakers, the agency’s two Republican commissioners and even some longtime FTC employees, according to interviews with more than 20 FTC employees, commission alumni and people on Capitol Hill.

The 32-year-old law professor’s most prominent target is the tech industry, whose biggest players swelled to behemoth size on the commission’s watch. Nearly a decade after the commission overruled its own attorneys and declined to file an antitrust suit against Google, Khan is trying to prove that the agency is capable of taking on the nation’s wealthiest companies, including in Silicon Valley.

Some executives from other industries, like deSouza, say they’re being caught in the crossfire.

“There is an anti-big-company, anti-tech sentiment,” deSouza said of the FTC’s refusal to meet with him. “We’re the baby in the bathwater.”

Khan: ‘We can deliver’

President Joe Biden’s decision to elevate Khan as the FTC’s chair on June 15 stunned many in D.C. Those included some of the nearly two dozen Republican senators who had voted hours earlier to confirm the outspoken anti-monopolist, thinking she would be just one of the agency’s five commissioners.

The choice elated progressives who say the FTC, an antitrust and consumer agency created during Woodrow Wilson’s administration, has lost its antitrust firepower since the Reagan era.

Khan, a self-described FTC history nerd, has been outspoken in criticizing the agency. For decades, she told Congress this month, commissioners of both parties had pursued a philosophy that “recommended enforcers err on the side of inaction, on the assumption that monopoly power would be disciplined by the free market.”

Those days are over, she said in a memo to her employees last week that laid out her priorities: “American consumers, workers, and honest businesses depend on the Commission to champion a fair and thriving economy for all, and I am confident that we can deliver.” She said her top priority is taking on a massive wave of proposed mergers and other forms of “rampant consolidation.”

The other changes that Khan has pushed target a wide range of corporate behavior, from employee non-compete agreements to warranties that prevent customers from repairing their own electronic devices. Some steps the FTC has approved in 3-2 party-line votes have also enhanced Khan’s own authority. For instance, letting her approve antitrust subpoenas without agreement from the other commissioners.

“With only a few months on the job, Lina Khan has proven she is committed to strengthening competition policy and taking on monopolies,” said Sen. Amy Klobuchar (D-Minn.), who chairs the Senate Judiciary Committee’s antitrust panel. Klobuchar is drafting legislation that could give the FTC more resources to take on anti-competitive behavior.

But GOP critics like Utah Sen. Mike Lee accuse Khan of mounting a “progressive putsch.” Others, including the agency’s two Republican commissioners, say she is risking a repeat of the 1970s when a congressional backlash against alleged FTC overreach hobbled the commission’s authority.

“I am very concerned about giving the agency more power under current leadership,” Republican Commissioner Christine Wilson told the House Judiciary Committee in a hearing Tuesday. Under Khan, she said, “decades of tradition have been thrown out the window to the detriment of our decision making and consumers.”

Facebook and Amazon have demanded — unsuccessfully — that Khan abstain from decisions on their companies, citing her history of work and statements criticizing tech monopolies. The Wall Street Journal has published at least six editorials and four op-eds on Khan since mid-June, including one editorial that dismissed her as “a 32-year-old academic who has no experience running anything.”

“American business should get ready. The Khan FTC is coming after you,” the July opinion piece said.

She is also taking fire from sources closer to home. Even some people in the Biden administration grumbled this month after POLITICO reported that Khan’s newly appointed top antitrust adviser, Shaoul Sussman, had predicted to an Israeli newspaper last spring that Congress will break up Google and Facebook.

Some of the FTC’s 1,100 employees, meanwhile, complain that Khan has largely walled herself from rank-and-file staff and clamped down on decision-making, while limiting what the staff is allowed to say in public.

“She doesn’t care at all what we think,” one longtime staffer said in an interview, requesting anonymity to speak openly about their boss. The person added that during a Zoom meet-and-greet with staff in August, Khan read from a prepared statement and only took one or two questions. “There’s just no respect there.”

The FTC declined a request to interview Khan. The new chair hasn’t done any media interviews — except for a roundtable with reporters in July after her first congressional appearance — nor spoken publicly aside from the commission’s three open meetings so far. After the agency initially said Khan would give her maiden speech at a prominent international antitrust conference that begins Wednesday at Fordham University in New York, the FTC backpedaled and said she would attend the conference to meet with European competition heads but wouldn’t be speaking.

At the same time, Khan has sought to tamp down accusations that she’s politicizing a traditionally bipartisan agency. In her letters to lawmakers in early September, she noted that several of the initiatives she has led, such as investigating and suing big tech platforms like Facebook, “were also priorities identified by the Trump administration.”

Khan’s aim is to revive the FTC’s original role as a zealous enforcer, said Matt Stoller, a friend and former colleague of Khan’s at the antimonopoly group Open Markets. That’s an FTC people haven’t seen in a while, he said.

In the 1980s and ‘90s, FTC chairs “defanged the commission, put economists in charge and made it an agent of monopolists,” said Stoller, now director of research at the anti-monopoly group American Economic Liberties Project. “The Big Tech giants are all creations of those shifts. What Lina is doing is going back to the pre-1980s model.”

‘They want to do everything’

The FTC’s internal changes began soon after Khan moved in.

One was a blanket moratorium on public engagements by FTC employees, causing scheduling headaches for several American Bar Association conferences where the staffers had been slated to speak. That order is still in place three months later. (The FTC clarified to POLITICO on Wednesday that the ban doesn’t prevent economists from publishing their research or presenting it at academic conferences, and does not apply to consumer education events.)

Such a temporary pause on outside communications isn’t unusual when the FTC gets a new chair, allowing the agency to adjust to the new boss’ priorities. But Khan’s chief of staff, Jen Howard, caused internal grumbling by ordering the employees to withdraw even from already-approved engagements. Her rationale was that the agency is too busy.

Khan has also declined to allow staff attorneys to brief her on cases, instead requiring their division managers to attend — a move that some staffers have perceived as a snub, according to two people familiar with the meetings. In a statement late Wednesday, Holly Vedova and Sam Levine, the FTC's top competition and consumer protection staffers, denied that staff haven't briefed Khan, saying that decisions about attendance at meetings is decided by them not the chair's office.

Khan’s predecessor, Trump-nominated Republican Joe Simons, had a reputation for being especially deferential to the staff, making Khan’s reversals appear particularly abrupt.

And for all the talk of bold action, Khan has been slow to hire her own permanent staff, bringing in two advisers — Sussman and long-time FTC staffer Tom Dahdouh — and a paralegal plus naming new competition and consumer protection chiefs so far. Khan has also brought on a chief technologist and deputy.

That shortage of trusted employees, coupled with what former colleagues describe as Khan’s eagerness to delve into the weeds of cases, has led to slow action on rulemakings she has identified as a priority for the agency.

“They don’t have enough people to run the trains,” a former FTC employee said. “They want to do everything but don’t have the personnel and they don’t trust anybody else to do anything.”

## Econ DA

### Econ – 2AC

#### No link – Parker immunity has narrow applicability – zero evidence it broadly collapses certainty

#### Biden FTC makes link inevitable

Clayton 8-10 [E. Steele Clayton, IV Bass, Berry & Sims PLC University of Tennessee College of Law - J.D. 8-10-2021 https://www.jdsupra.com/legalnews/be-prepared-aggressive-antitrust-8939761/]

This summer has seen a flurry of bold antitrust announcements from the Biden administration. By issuing a sweeping executive order calling for numerous changes to antitrust enforcement and by naming progressive favorites and prominent Big Tech critics to head the Federal Trade Commission (FTC) and the Antitrust Division of the U.S. Department of Justice (DOJ), President Biden has signaled that federal antitrust policy is entering a new era.

The FTC has already begun carrying out its mandate to reshape antitrust policy. Under the leadership of new Chairwoman Lina Khan, the FTC has moved quickly to eliminate checks on its antitrust enforcement powers. A majority of the FTC’s commissioners have expressly disavowed the agency’s longstanding approaches to policing antitrust violations and have given the new chair unprecedented authority over investigations and rulemakings.

Collectively, the Biden administration and the FTC have sent a clear message to the business community: aggressive antitrust enforcement is back. Companies should expect to see an increase in antitrust investigations, stiffer penalties for violations, more burdensome merger reviews, and new rules targeting a range of industry practices. In this environment, effective antitrust counseling and compliance programs are more important than ever.

#### COVID wrecks certainty links

#### Turn – aff reduces harmful state regulation

Meese 15 [Alan J. Meese, Ball Professor of Law and Cabell Research Professor, William and Mary Law School, 2015 https://ilr.law.uiowa.edu/assets/Uploads/ILR-100-5-Meese.pdf]

Like Professor Hovenkamp, I too am uncomfortable with the Parker, Exxon, and ARC America trio. As others have noted, Parker arose when serious people believed that state-enforced cartelization or monopolization could help stabilize the macro economy—a claim that only politicians make today. All three decisions countenance some regulation by political entities that do not internalize the full costs of their actions. The predictable result will be too many state-imposed restraints and too much state antitrust regulation. Such overregulation, of course, will distort the allocation of resources and reduce national wealth. Moreover, to the extent that such regulation reduces price flexibility, Parker and its progeny interfere with the process of natural economic adjustment and thus exacerbate recessions. Far from destroying the ability of states to engage in regulation, reversal of such decisions would simply confine states to “reasonable” regulation, just as the Sherman Act confines private parties to reasonable restraints of trade. Federal preemption of state-imposed cartels, for instance, would leave states perfectly free to combat externalities, produce public goods, and redistribute income via taxing and spending.

#### NC Dental litigation causes confusion – only a risk the aff solves

Hittinger 19 [Carl W Hittinger, BakerHostetler’s antitrust and competition practice national team leader, J.D., Temple University Beasley School of Law, September 2019 https://www.bakerlaw.com/webfiles/Litigation/2019/Alerts/GCR-Private-Antitrust-Litigation.pdf]

As for private litigation, multiple cases following North Carolina Dental have identified open issues and emerging trends for antitrust actions involving government bodies. One important threshold issue confronted by private litigants is whether claims may be dismissed at the very onset of litigation due to application of state action immunity. Some courts have denied motions to dismiss claims pursuant to Federal Rule of Civil Procedure 12(b)(6), as long as the complaints plausibly allege the immunity is not established. In a case similar to North Carolina Dental, for example, a district court recently ruled it would be ‘premature’ to dismiss an antitrust claim against the Board of Dental Examiners of Alabama where the complaint plausibly alleged that the board was not actively supervised by the state.34 Other courts have implicitly rejected the notion that parties can plead away application of the immunity. In one such recent case, a district court dismissed an antitrust claim against a public utilities body based on South Carolina’s statutes reflecting a clearly articulated policy of displacing competition in and active supervision of the sale of electricity, notwithstanding complaint allegations that the body had exceeded its authority and was inadequately supervised by the state.35

Courts have also diverged on whether rulings on the dismissal of claims under state action immunity are immediately appealable. After North Carolina Dental, the Ninth Circuit held that a lower court order denying a dismissal motion based on state action immunity is not immediately appealable.36 The Ninth Circuit accepted that the Fifth and Eleventh Circuits ‘have reached the opposite conclusion’, but explained that disallowing immediate appeals of the rejection of the immunity defence is ‘the better view’ given, among other reasons, the Supreme Court’s caution against broad assertions of immunity against suits.37 Similarly, the DOJ has submitted an amicus brief arguing that refusing to dismiss under state action immunity is not immediately appealable.38

The most challenging issue since North Carolina Dental may continue to be whether the particular facts of individual cases can satisfy the application of state action immunity to government bodies with private actors. The Supreme Court implicitly acknowledged there would be uncertainty when recognising that application of the doctrine requires a ‘flexible and contextspecific’ analysis. Justice Samuel Alito’s dissent put a finer point on the uncertainty, identifying the lack of clarity on what constitutes ‘active market participants’ or how to define the markets in which they participate.39 One FTC commissioner agreed that these are ‘key questions that need to be addressed’.40 And they have been, somewhat, in recent years.

As Justice Alito forecasted, litigants and courts have laboured with determining whether government entities include sufficient private participants to require such entities to prove satisfaction of both the ‘clearly articulated state policy’ and ‘active state supervision’ state action immunity prongs (as opposed to only the first).41 A developing approach to this issue among courts focuses on whether the private participants actually exercised control over the governmental entities in question. For instance, following North Carolina Dental, the Third Circuit reasoned that a state university does not need to satisfy the active state supervision prong because the private party with which the university allegedly conspired in real estate dealings had not dominated the university’s real estate decisions.42 More recently, a district court determined that a state agency tasked with overseeing certain healthcare programmes, with a board consisting of five healthcare providers and six members who were not healthcare providers, was excused from satisfying the active state supervision prong because the board was not ‘controlled’ by the private participants who comprised ‘only a minority’ of the agency board.43

A related issue that has proven to be equally challenging is whether the state itself must provide the required active supervision. To illustrate, the Ninth Circuit recently held that ‘active supervision must be “by the State itself ”’ and, consequently, the court ruled that Seattle’s ordinance regulating ride-hailing services (eg, Uber) was not eligible for state action immunity because the city of Seattle, rather than the state of Washington, supervised and enforced the ordinance.44 At the same time, other courts have found active supervision satisfied where provided by municipalities alone.45 As these and similar cases progress through the courts, further clarity on areas of uncertainty about state action immunity should be realised.

Conclusion

The Supreme Court’s decision in North Carolina Dental not only provides valuable guidance for the application of state action immunity, it also sets the stage for continued development of the doctrine. In the nearly five years since the decision, government antitrust enforcers have relied on it for broadening their enforcement of the federal antitrust laws against quasi-government actors. Private litigants have also relied on it in pursuing cases that portend widespread impact on state and local government operations. All who believe they operate with state action immunity should proceed with caution and consider reviewing their conformity with the principles explained by the Supreme Court, in addition to assessing whether they remain eligible for immunity

#### Antitrust increases business confidence and growth broadly

OECD 14, Organization for Economic Cooperation and Development, “Factsheet on how competition policy affects macro-economic outcomes”, OECD, October 2014, https://www.oecd.org/daf/competition/2014-competition-factsheet-iv-en.pdf

Most importantly, it is clear that industries where there is greater competition experience faster productivity growth. This has been confirmed in a wide variety of empirical studies, on an industry-by-industry, or even firm-by-firm, basis. Some studies seek to explain differences in productivity growth between industries using measures of the intensity of competition they face. Others look at the effects of specific pro-competitive interventions, particularly trade liberalisation or the introduction of competition into a previously regulated, monopoly sector (such as electricity).

This finding is not confined to “Western” economies, but emerges from studies of the Japanese and South Korean experiences, as well as from developing countries.

The effects of stronger competition can be felt in sectors other than those in which the competition occurs. In particular, vigorous competition in upstream sectors can ‘cascade’ to improve productivity and employment in downstream sectors and so through the economy more widely.

The main reason seems to be that competition leads to an improvement in allocative efficiency by allowing more efficient firms to enter and gain market share, at the expense of less efficient firms (the so called between-firms effect). Regulations, or anti-competitive behaviour preventing entry and expansion, may therefore be particularly damaging for economic growth. Competition also improves the productive efficiency of firms (the so called within-firms effects), as firms facing competition seem to be better managed. This can even apply in sectors with important social as well as economic outcomes: for example, there is increasing evidence that competition in the provision of healthcare can improve quality outcomes.

There is also evidence that intervening to promote competition will increase innovation. Firms facing competitive rivals innovate more than monopolies (although after such competition a firm may of course end up with a monopoly through a patent). The relationship is not simple: it is possible that moderately competitive markets innovate the most, with both monopoly and highly competitive markets showing weaker innovation. However, as competition policy does not focus on making moderately competitive markets hyper-competitive, but rather on introducing or strengthening competition in markets where it does not work well, this would still imply that most competition policies serve to promote innovation.

Because more competitive markets result in higher productivity growth, policies that lead to markets operating more competitively, such as enforcement of competition law and removal of regulations that hinder competition, will result in faster economic growth.

Is there evidence that pro-competitive policies are effective?

In addition to this evidence that competition promotes growth, there have been studies directly of the effects of competition law itself, and of product market deregulation. Although it is difficult to distinguish the effects of individual policy changes, there are some studies showing that introducing competition law raises productivity. Conversely, the selective suspension of antitrust laws in the USA during the 1930s seems to have delayed recovery.

Many studies of the effect of competition law use international comparisons of different countries’ experiences, to assess whether countries with competition laws (or longer-standing, or more effective competition laws) achieve faster economic growth. The task is a difficult one because of many other factors that affect the overall economic growth rate, including other policies introduced at the same time (e.g. Eastern Europe’s transformation after 1989). Some studies find no effect, but the overwhelming majority of such studies do find a positive effect of competition law on economic growth. Most ascribe this effect to increased productivity, although there may also be an effect on investment, especially in developing countries, perhaps because competition laws boost business confidence and reduce corruption.

## cap

### 2AC – SAI – Short

#### Framework—debate is about the plan’s desirability—key to fairness because the plan is the locus of aff offense and there are infinite arbitrary neg frameworks

#### Perm – do plan and all non-competitive parts of the alt

#### Link is reductionist and can’t explain US-EU divergences

Foster 19 [Chase Michael Foster was a Doctoral Candidate at Harvard University at the time of this dissertation. The author has served as a Election Observer (OSCE, ODIHR) in Moldova, Belarus, Russia, Georgia and as a Teaching Assistant at the Harvard Kennedy School of Government. At the time of this writing, the author held a MPP (Democracy, Politics, and Institutions) from the Harvard Kennedy School of Government. “The Politics of Delegation: Constitutional Structure, Bureaucratic Discretion, and the Development of Competition Policy in the United States and the European Union, 1890-2017” – Doctoral dissertation to The Department of Government, Harvard University, Graduate School of Arts & Sciences. In partial fulfillment of the requirements for the degree of Doctor of Philosophy in the subject of Government - January 2019 - #E&F –https://dash.harvard.edu/bitstream/handle/1/41121359/FOSTER-DISSERTATION-2019.pdf?sequence=1]

Ideational Theories

Any analysis of the change in antitrust enforcement over time must begin with a consideration of ideas. Most of the existing social scientific scholarship on competition policy emphasizes the role of changing economic paradigms in spurring the transformation of European and American competition policy. A number of scholars of American antitrust have explained the dramatic decrease in antitrust enforcement as stemming from the shift in authority from lawyers to economists at the antitrust agencies (Eisner 1991). Others have emphasized the institutionalization of Chicago School-inspired economic ideas within antitrust jurisprudence (Ergen and Kohl 2017; Davies 2010; Pitofsky 2008). Both of these sets of accounts capture an important component of the shift. As theories of economic efficiency changed in the US academy during the 1960's and 1970's, much of the postwar enforcement program was delegitimized. Beginning in the early 1970's, both the prevailing judicial opinion on antitrust and the enforcement program of the antitrust agencies dramatically shift, leading to a precipitous drop in enforcement output, especially in areas such as vertical restraints, monopolies, and exclusionary practices.

The increase in the intensity of European enforcement has also been explained as the result of ideational change. Some EU scholars have argued that the institutionalization of neoliberal economic ideas in European regulatory law has led to the intensification of regulatory enforcement (Thatcher 2013; Buch-Hansen and Wigger 2010; Wigger 2008). Concomitant to the Single European Act, the European competition directorate began to more intensely apply competition rules, and to shift its enforcement focus to state aid, publicly-owned companies, and the promotion of competition in previously protected network industries (Quack and Djelic 2005). During the late 1990's, competition law modernization led to a more neoliberal approach to the evaluation of market competition, while also expanding the breadth and intensity of enforcement (Wigger and Nolke 2007).

While each of these accounts points to some of the real ways that ideational change affected competition policy in each system, there are problems with explaining opposite trends as the result of the same paradigm shift. An ideas-only approach leaves us in the awkward position of explaining both the increase in the intensity of competition enforcement in the EU and the decrease in antitrust enforcement in the US as resulting from the same (or similar) neoliberal policy paradigm. While any analysis of competition policy developments must account for ideational change, we need to understand why the same set of ideas has produced different patterns of enforcement in Europe and the United States.

Additionally, there are empirical gaps in the ideational explanation. Certainly, the influence of the Chicago School cannot account for why US regulators have failed to follow much of the neoliberal prescription for liberalization and industrial policy. Chicago School economists, after all, have long supported the application of antitrust in these areas (Van I lorn 2015; McChesney 1986; Bork 1978). Moreover, there is no shortage of classically-trained economists in the European competition system.

#### Alt’s vague---no actor or mechanism---voting issue: jacks ground and means the alt doesn’t solve

#### No impact---it’s empirically denied, long time-frame, and perm solves

#### Alt fails---transition is impossible and causes conflict. Even if transition occurs, it doesn’t solve

Smith 19 [Noah; 4/5/19; Bloomberg Opinion columnist, former assistant professor of finance at Stony Brook University; "Dumping Capitalism Won’t Save the Planet," https://www.bloomberg.com/opinion/articles/2019-04-05/capitalism-is-more-likely-to-limit-climate-change-than-socialism]

It has become fashionable on social media and in certain publications to argue that capitalism is killing the planet. Even renowned investor Jeremy Grantham, hardly a radical, made that assertion last year. The basic idea is that the profit motive drives the private sector to spew carbon into the air with reckless abandon. Though many economists and some climate activists believe that the problem is best addressed by modifying market incentives with a carbon tax, many activists believe that the problem can’t be addressed without rebuilding the economy along centrally planned lines.

The climate threat is certainly dire, and carbon taxes are unlikely to be enough to solve the problem. But eco-socialism is probably not going to be an effective method of addressing that threat. Dismantling an entire economic system is never easy, and probably would touch off armed conflict and major asdasd upheaval. In the scramble to win those battles, even the socialists would almost certainly abandon their limitation on fossil-fuel use — either to support military efforts, or to keep the population from turning against them. The precedent here is the Soviet Union, whose multidecade effort to reshape its economy by force amid confrontation with the West led to profound environmental degradation. The world's climate does not have several decades to spare.

Even without international conflict, there’s little guarantee that moving away from capitalism would mitigate our impact on the environment. Since socialist leader Evo Morales took power in Bolivia, living standards have improved substantially for the average Bolivian, which is great. But this has come at the cost of higher emissions. Meanwhile, the capitalist U.S managed to decrease its per capita emissions a bit during this same period (though since the U.S. is a rich country, its absolute level of emissions is much higher).

In other words, in terms of economic growth and carbon emissions, Bolivia looks similar to more capitalist developing countries. That suggests that faced with a choice of enriching their people or helping to save the climate, even socialist leaders will often choose the former. And that same political calculus will probably hold in China and the U.S., the world’s top carbon emitters — leaders who demand draconian cuts in living standards in pursuit of environmental goals will have trouble staying in power.

The best hope for the climate therefore lies in reducing the tradeoff between material prosperity and carbon emissions. That requires technology — solar, wind and nuclear power, energy storage, electric cars and other vehicles, carbon-free cement production and so on. The best climate policy plans all involve technological improvement as a key feature.

#### Conditionality is a voter---creates time and strategy skews, argumentative irresponsibility---dispo solves

#### Cap’s sustainable and ensures global prosperity and environmental protection

Rhonheimer 20—teaching professor at the Pontifical University of the Holy Cross (Martin, “Capitalism is Good for the Poor – and for the Environment,” <https://austrian-institute.org/en/subjects-en/catholic-social-doctrine-2/capitalism-is-good-for-the-poor-and-for-the-environment/>, dml)

It is not social policy but capitalism that has created today’s prosperity.

What is important is that what made today’s mass prosperity possible – a phenomenon unprecedented in history – was not social policy or social legislation, organised trade union pressure, or corrective interventions in the capitalist economy, but rather market capitalism itself, due to its enormous potential for innovation and the ever-increasing productivity of human labour that resulted from it.

Increasing prosperity and quality of life are always the result of increasing labour productivity. Only increased productivity enabled higher social standards, better working conditions, the overcoming of child labour, a higher level of education, and the emergence of human capital. This process of increasing triumph over poverty and the constantly rising living standards of the general masses is taking place on a global scale – but only where the market economy and capitalist entrepreneurship are able to spread.

From industrial overexploitation of nature to ecological awareness

The first phase of industrialisation and capitalism was characterised by an enormous consumption of resources and frequent overexploitation of nature, which soon gave the impression that this process could not be sustainable. Since the end of the 19th century, disaster and doom scenarios have repeatedly been put forward, but in retrospect they have proved to be wrong: The combination of technological innovation, market competition, and entrepreneurial profit-seeking (with the compulsion to constantly minimise costs) have meant that these scenarios never occurred. The ever-increasing population has been increasingly better supplied thanks to innovative technologies, ever-increasing output with lower consumption of resources less harmful to the environment – e.g. less arable land in agriculture, or oil and electricity instead of coal for rapidly increasing mobility. More recent disaster scenarios, such as those spread by reputable scientists since the late 1960s and in the 1970s, have also proved to be inaccurate.

The reason things developed differently was the always underestimated innovative dynamism of the capitalist market economy, a growing ecological awareness and, as a result, legislative intervention that took advantage of the logic of market capitalism: As a result of the ecological movement that had come out of the United States since 1970, wise legislation began to use the price mechanism to apply market incentives to internalize negative externalities. Environmental pollution was given a price-tag.

This led to an enormous decrease in air pollution and other ecological consequences of growth, which is only possible in free, market-based societies, because the production process here is characterized by competition and constant pressure to reduce costs, i.e. to the most profitable use of resources. On the other hand, all forms of socialism, i.e. a state-controlled economy, have proved to be ecological disasters and have left behind destruction of gigantic proportions, without providing the population with anything that is near comparable in prosperity, often even by destroying existing prosperity, such as happened in Venezuela.

Capitalist profit motive combined with digitalization as a solution: Increasing decoupling of growth and resource consumption

Moreover, technological innovations combined with capitalist profit-seeking and market competition have led to a new and surprising phenomenon over the past decades, which is still hardly noticed in the public debate: the decoupling of growth and resource consumption (“dematerialization”). In a wide variety of industrial sectors, the developed countries, above all the U.S., are now achieving ever greater productive output with increasingly fewer resources. This has a lot to do with technology, especially the digitalization of the economy and of our entire lives.

As the well-known MIT professor Andrew McAfee shows in his book More from Less, published in October 2019, this process also follows the logic of capitalist profit maximization. To get it going, we do not need politics, even though wise, properly incentivizing legislation can be helpful and sometimes necessary. Above all, however, it is the combination of technological innovation, capitalist profit-seeking, and market-based entrepreneurial competition that will also solve the problem of man-made global warming.

In addition, property rights and their protection are decisive for the careful use of natural resources. And where this is not possible, legal support for collective self-governing structures, in accordance with the principle of subsidiarity, are important—as is analysed by Nobel Economic Prize winner Elinor Ostrom. By contrast, the growing ideologically motivated anti-capitalist eco-activism, and the policies influenced by it, are leading in the wrong direction, distracting precisely from what would be best for the climate and the environment—and distracting us from what could help protect us against the inevitable consequences of global warming.

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#### ‘Prohibitions’ means hinder and can contain exceptions---it doesn’t have to be all

Sandra L. Lynch 2, Judge on the United States Court of Appeals, First Circuit, “Second Generation Props., L.P. v. Town of Pelham”, 313 F.3d 620, 634, 2002 U.S. App. LEXIS 25904, 12/17/2002, Lexis

§ 332(c)(7)(B). We start with the fact that Congress used "services" and not "service." A straightforward reading is that "services" refers to more than one carrier. Congress contemplated that there be multiple carriers competing to provide services to consumers. That one carrier provides some service in a geographic gap should not lead to abandonment of examination of the effect on wireless services for other carriers and their customers. Next, the phrase "have the effect of prohibiting" may well refer to actions that mostly prohibit. For example, B.A. Garner, A Dictionary of Modern Legal Usage 256 (2d ed., 1995), gives as the first definition of effective "having a high degree of effect." (emphasis added). Accord B.A. Garner, A Dictionary of Modern American Usage 237-38 (1998). Moreover, a common reading of the word "prohibition" standing alone would apply to a situation of denial of services to the vast majority of users. See, e.g., Oxford English Dictionary (2d ed. 1989) (defining [\*\*33] "prohibit" as "to prevent, preclude, hinder") (emphasis added). Thus Congress may well have meant the effective prohibition clause to reach certain situations in which there is some coverage in a gap.

#### Prohibitions common usage includes “hinder”

Prelogar 21 [Elizabeth B. Prelogar Acting Solicitor General Counsel of Record, March 2021, https://www.supremecourt.gov/DocketPDF/20/20-836/172912/20210324190405385\_20-836%20Broadway.pdf

For the reasons stated in the government’s brief in opposition to the petition for a writ of certiorari in Tabb v. United States, No. 20-579 (Feb. 16, 2021), Application Note 1’s interpretation of the career-offender guideline as including attempt and conspiracy offenses, including attempted drug distribution, is firmly grounded in the guideline’s text. See Br. in Opp. at 9-10, Tabb, supra (No. 20-579) (Tabb Opp.). 3 Unlike an adjacent provision stating that a “crime of violence \* \* \* is murder” or a list of other specified offenses, Sentencing Guidelines § 4B1.2(a)(2) (emphasis added), the definition of “controlled substance offense” extends to any felony offense that “prohibits the manufacture, import, export, distribution, or dispensing of a controlled substance,” id. § 4B1.2(b) (emphasis added). The term “prohibit” can mean “prevent from doing or accomplishing something,” Webster’s Third New International Dictionary of the English Language Unabridged 1813 (1986), and in that sense is synonymous with “hinder” or “preclude,” Black’s Law Dictionary 1465 (11th ed. 2019). Application Note 1 confirms that Section 4B1.2(b) uses the term “prohibit” in that sense. See United States v. Lange, 862 F.3d 1290, 1295 (11th Cir.) (explaining that Application Note 1 indicates that “‘[c]ontrolled substance offense’ cannot mean only offenses that forbid conduct outright, but must also include related inchoate offenses that aim toward that conduct”), cert. denied, 138 S. Ct. 488 (2017). The context, purpose, and history of the Guidelines further confirm that the definition of “controlled substance offense” is best understood to include inchoate offenses. Tabb Opp. 11-13

### Judiciary

#### Scope refers to BOTH the letter of the law and the application --- topical affs can expand EITHER

Surden 11 --- Harry Surden, Associate Professor of Law, University of Colorado Law School, “Efficient Uncertainty in Patent Interpretation”, 2011 https://scholar.law.colorado.edu/cgi/viewcontent.cgi?article=1185&context=articles

One can understand scope-of-law issues through at least two distinct analytical frameworks: one oriented upon boundaries and the other upon function. In one sense, the scope of any legal right, including a patent claim, concerns the demarcation of legal boundaries. Within law the term "legal scope" refers to both the coverage and non-coverage of a given law.96 The concept of scope suggests that application of a given legal rule will be, in some sense, limited. To reference a law’s scope is to imply that a law will not apply to all future entities, objects, and behaviors, but to some limited subset.97 From that perspective, legal scope is related to the substantive criteria by which we differentiate, ex ante, the subset of legal actors, objects, behaviors, and states that will be subject to a law’s differential treatment or legal consequences.98 A scope boundary is the "line" distinguishing that which is covered by a law from that which is not. In this sense, critiques of legal scope generally tend to focus upon demarcation of legal boundaries via the legal criteria chosen ex ante.

Within the patent claim context, questions of literal scope are, in many respects, similarly concerned with boundary-defining criteria. A primary emphasis is on the claim words and interpretive information upon which a lay observer must rely to distinguish infringing products from noninfringing products.99

Legal scope can also be understood through a related but distinct functional definition. In this orientation, we are not so concerned with legal boundaries for their own sake; rather we ask how well those boundaries perform their functional role of distinguishing specific identifiable entities or behaviors that violate a given law and are accordingly subject to its differential legal consequences. This approach to scope directs us to decompose our abstract legal categories into particular legal entities and to make specific determinations as to whether they do or do not "violate" the criteria of the law. Under this functional conception, one can characterize formal notice about patent scope by the extent to which the words of the patent claim establish boundaries that distinguish real-world objects covered by a patent claim from those that are not.

This functional framing of patent claim scope highlights a key point— claim scope is a relative formulation. It is not sufficient to simply focus on the inadequacy of the claim-word boundaries in the abstract. Rather, we must evaluate the scope of a patent claim by its ability to effectively classify the relevant universe of potentially accused products and to do so in a way that is not over- or underbroad. Any inquiry into the sufficiency of the delineation of the patent claim’s scope should be considered relative to the class of accused devices potentially inside or outside its scope. If we aim to critique a claim for having an uncertain scope, we should do so in relation to the class of products that may or may not potentially infringe. The heart of the scope inquiry is functional—to delineate and distinguish those products that literally infringe from those that do not. The import of this functional and relational component of patent scope will be apparent later when exploring strategies for improving ex ante scope certainty.

**The “core” antitrust statutes are the Sherman Act, Clayton Act, and FTC Act**

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U.S. antitrust law is defined by federal and state statutes, as interpreted by the courts. The **core federal statutes** are the Sherman Act,1 passed by Congress in 1890, and the **F**ederal **T**rade **C**ommission2 and Clayton Acts,3 both passed in 1914. The United States Department of Justice (“DOJ”) and the Federal Trade Commission (“FTC” or “Commission”) (together the “agencies”) share enforcement of most areas of federal antitrust law but with some differences in the scope of their authority. The FTC has sole authority to enforce Section 5 of FTC Act, which prohibits (1) unfair methods of competition and (2) unfair or deceptive acts or practices. The FTC almost always pursues claims for anticompetitive conduct as unfair methods of competition and reserves charges of unfair or deceptive acts or practices for consumer protection violations. Though the FTC's authority to challenge unfair methods of competition goes beyond conduct prohibited by the Sherman and Clayton Acts, in practice the FTC brings most unfair methods of competition cases under the same standards that courts apply to Sherman Act claims. The most prominent exception is the invitation to collude offense, which falls outside the scope of the Sherman Act (if the invitation is not accepted, there is no agreement). The FTC challenges invitations to collude as so-called “standalone” violations of Section 5.4 The DOJ has sole authority to pursue **criminal violations** of the antitrust laws. Most states have their own state antitrust and unfair competition statutes. State law follows federal law to some extent, though as discussed below, may differ from federal law in meaningful ways that vary state to state. State attorneys general and private parties can also typically file suit to enforce both federal and state antitrust law.