## 1AC – NU

### 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.

#### 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.

#### 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 limiting 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.

#### 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.

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### FTC OS Da

#### 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.

#### 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.

#### States fill-in

Wisking et al 20 (Stephen Wisking, Kyriakos Fountoukakos and Marcel Nuys, Herbert Smith Freehills LLP, “Digital Competition 2021,” Law Business Research Ltd., October 2020, https://docplayer.net/201129322-Digital-competition-2021.html)

There is a clear trend towards increased antitrust scrutiny of digital markets by federal and state antitrust enforcers and the US Congress. In July 2019, the DOJ announced it was reviewing the practices of market-leading online platforms and in October 2020 filed suit against Google. The FTC formed a Technology Enforcement Division in 2019 that is actively conducting investigations and the agency is reportedly on the verge of bringing a suit against Facebook. State Attorneys General of all or nearly all 50 states have had active investigations of Google and of Facebook, and investigations of other technology firms have recently been initiated. Eleven states joined the DOJ in its suit against Google, while other states indicated that they may pursue other claims against Google, and still others are reportedly considering a suit with or without the FTC against Facebook. In Congress, both the House Judiciary Subcommittee on Antitrust, Commercial and Administrative Law and the Senate Judiciary Subcommittee on Antitrust, Competition Policy and Consumer Rights have held antitrust hearings on digital markets. And in October 2020, the majority staff of the House Judiciary Subcommittee on Antitrust, Commercial and Administrative Law issued a digital markets report recommending numerous proposals to restore competition in digital markets and to strengthen antitrust law and enforcement generally. Legislators have proposed legislation aimed at strengthening antitrust enforcement. Developments among litigated cases before courts are mixed. In 2020, the DOJ lost its effort to block Sabre’s acquisition of an allegedly nascent competitor, Farelogix, but the DOJ later had the decision vacated on appeal after the parties abandoned their transaction. In 2019, the Supreme Court ruled against Apple, finding that iPhone owners had standing to sue Apple for federal antitrust violations regarding the App Store. Individual companies are increasingly filing private litigation against some of the largest technology firms as well.

#### FTC losing Facebook case and doesn’t solve – too complex, not enough resources, integration blocks success

Chakravorti 7-7 [Bhaskar Chakravorti is the dean of global business at Tufts University’s Fletcher School of Law and Diplomacy, 7-7-2021 https://foreignpolicy.com/2021/07/07/ftc-lina-khan-regulate-tech-congress/]

Although Khan can reframe the fundamentals of the antitrust complaint, without adequate regulatory infrastructure—something only Congress can provide—there are likely to be unsurmountable obstacles as the chess game between the law and Facebook unfolds. No matter how brilliantly Khan’s FTC rewrites the case against Facebook, the agency’s powers, budget, and resources are still limited. Ad hoc adjustments to the FTC’s budget, as envisioned in one of the bills in Congress, and stopgap measures to expand its powers do not get around the fundamental fact that the FTC was not set up to pursue the breadth of novel issues and policy trade-offs that digital industries create.

Antitrust in digital industries cannot be considered in isolation. It is also quite different from antitrust in other industries because there are issues unique to the industry. A holistic view of digital antitrust means tying antitrust concerns with numerous broader questions, such as securing users’ data rights, the responsibilities platforms ought to have for the content they host, and criteria that helps demarcate the benefits of network effects from the abuses of network power. The FTC is too much of a general purpose entity to dive into these complexities. As former Federal Communications Commission chair Tom Wheeler observed: “The vast scope of the FTC’s present responsibilities—as diverse as funeral director practices, robocalls, and labeling hockey pucks—means that the oversight of digital platform regulation must compete with the agency’s existing diverse responsibilities and limited resources.”

Meanwhile, Facebook is shoring up its defenses. Even as the FTC gets its act together and its complaint is reconsidered, Facebook is busy integrating the backend infrastructure that supports its popular apps: Facebook Messenger, Instagram, and WhatsApp. This is likely to make it impossible to tear the apps apart. In addition to the integration’s technical aspects, which offer the company many benefits, Facebook is making the case that consumers benefit from it as well. It is testing a unified “accounts center” that shows the user all the apps the user has open; Facebook Messenger and Instagram users can send messages and get access to features across apps as well. Most significantly, this could also enable end-to-end encryption across all the apps, which would be an enormous boost to Facebook’s argument that its changes are meant to enhance users’ privacy.

It is conceivable that even if the FTC’s rewritten complaint is accepted, an antitrust case would take a long time to prosecute. In the meantime, Facebook will have already accomplished a fait accompli, making it hard to push further with the current, narrow complaint’s core. In fact, Khan’s predecessor, Joseph Simons, acknowledged that Facebook’s plan to integrate its apps would pose challenges to any move to break up the company.

#### Breakup and collapse inevitable – whole government pressure, scandals, collapsing users, competitors

Liss 8-29 [Daniel Liss is the founder and CEO of Dispo, the digital disposable camera social network. 8-29-2021 https://techcrunch.com/2021/08/29/move-fast-and-break-facebook-a-bull-case-for-antitrust-enforcement/]

The government will break up Facebook

It is not a matter of if; it is a matter of when.

In a speech on the floor of Congress in 1890, Senator John Sherman, the founding father of the modern American antitrust movement, famously said, “If we will not endure a king as a political power, we should not endure a king over the production, transportation and sale of any of the necessities of life. If we would not submit to an emperor, we should not submit to an autocrat of trade with power to prevent competition and to fix the price of any commodity.”

This is the sentiment driving the building resistance to Facebook’s monopoly, and it shows no sign of abating. Zuckerberg has proudly called Facebook the fifth estate. In the U.S., we only have four estates.

All three branches of the federal government are heating up their pursuit. In the Senate, an unusual bipartisan coalition is emerging, with Senators Amy Klobuchar (D-MN), Mark Warner (D-VA), Elizabeth Warren (D-MA) and Josh Hawley (R-MO) each waging a war from multiple fronts.

In the House, Speaker Nancy Pelosi (D-CA) has called Facebook “part of the problem.” Lina Khan’s FTC is likewise only getting started, with unequivocal support from the White House that feels burned by Facebook’s disingenuous lobbying. The Department of Justice will join, too, aided by state attorneys general. And the courts will continue to turn the wheels of justice, slowly but surely.

In the wake of Facebook co-founder Chris Hughes’ scathing 2019 New York Times op-ed, Zuckerberg said that Facebook’s immense size allows it to spend more on trust and safety than Twitter makes in revenue.

“If what you care about is democracy and elections, then you want a company like us to be able to invest billions of dollars per year like we are in building up really advanced tools to fight election interference,” Zuckerberg said.

This could be true, but it does not prove that the concentration of such power in one man’s hands is consistent with U.S. public policy. And the centralized operations could be rebuilt easily in standalone entities.

Time and time again, whether on Holocaust denial, election propaganda or vaccine misinformation, Zuckerberg has struggled to make quick judgments when presented with the information his trust and safety team uncovers. And even before a decision is made, the structure of the team disincentivizes it from even measuring anything that could harm Facebook’s brand. This is inherently inconsistent with U.S. democracy. The New York Times’ army of reporters will not stop uncovering scandal after scandal, contradicting Zuckerberg’s narrative. The writing is on the wall.

Facebook is losing

Facebook Blue, Instagram and WhatsApp all face existential threats. Pressure from the government will stifle Facebook’s efforts to right the ship.

For so long, Facebook has dominated the social media industry. But if you ask Chinese technology executives about Facebook today, they quote Tencent founder Pony Ma: “When a giant falls, his corpse will still be warm for a while.”

Facebook’s recent demise begins with its brand. The endless, cascading scandals of the last decade have irreparably harmed its image. Younger users refuse to adopt the flagship Facebook Blue. The company’s internal polling on two key metrics — good for the world (GFW) and cares about users (CAU) — shows Facebook’s reputation is in tatters. Talent is fleeing, too; Instacart alone recently poached 55 Facebook executives.

In 2012 and 2014, Instagram and WhatsApp were real dangers. Facebook extinguished both through acquisition. Yet today they represent the company’s two most promising, underutilized assets. They are the underinvested telephone networks of our time.

Weeks ago, Instagram head Adam Mosseri announced that the company no longer considers itself a photo-sharing app. Instead, its focus is entertainment. In other words, as the media widely reported, Instagram is changing to compete with TikTok.

TikTok’s strength represents an existential threat. U.S. children 4 to 15 already spend over 80 minutes a day on ByteDance’s TikTok, and it’s just getting started. The demographics are quickly expanding way beyond teenagers, as social products always have. For Instagram, it could be too little too late — as a part of Facebook, Instagram cannot acquire the technology and retain the talent it needs to compete with TikTok.

#### US regulation of Facebook greenlights global authoritarianism

Sharma 21 (Mihir S. Sharma, senior fellow at the Observer Research Foundation in New Delhi and head of its Economy and Growth Programme, Bloomberg Opinion columnist, “Facebook, Twitter critics in US are gifting ammo to authoritarian regimes,” Business Standard, 6-23-2021, <https://www.business-standard.com/article/economy-policy/facebook-twitter-critics-in-us-are-gifting-ammo-to-authoritarian-regimes-121062300139_1.html>)

Nigerians angry about their government’s recent banning of Twitter Inc. have understandably focused their ire on President Muhammadu Buhari: It was Twitter’s decision to take down his tweet implicitly warning separatists that they could suffer the same violent end as former Biafran rebels that prompted the crackdown.

But the Nigerian ban should be a warning to U.S. lawmakers and activists, too. Their efforts to rein in U.S.-based social media giants such as Twitter and Facebook Inc. risk restricting democratic freedoms worldwide.

Antipathy toward the big platforms is rising across the U.S. political spectrum. Democrats blame them for allowing misinformation to flourish; Republicans, for allegedly censoring right-wing voices. Both agree they should be cut down to size: The Democratic chair of the House Consumer Protection & Commerce subcommittee has said “there is a bipartisan agreement that the status quo is just not working.”

The U.S. consensus has now begun to equate the tech companies’ attempts to maintain the integrity of their platforms through content management with infringements by powerful corporate monopolies on state power. Congress has taken up harsh new bills that are a first step toward using antitrust laws against tech companies.

This backlash is a gift to authoritarian governments around the world, who have been looking for a stick with which to beat Twitter and Facebook among others. Illiberal leaders have adopted the language and legal tools being wielded by activists and politicians in the US.

Nigeria’s information minister has complained, “Twitter's mission in Nigeria is very suspect, they have an agenda.” Russia, which has started choking Twitter’s bandwidth, last week fined Google and Facebook for “banned content.” Moscow also wants to force the companies to open offices in Russia, so executives and employees can be held hostage to an increasingly arbitrary legal system.

India, meanwhile, reportedly decided last week that Twitter is no longer an “intermediary” but a publisher — and so can be held criminally liable for anything anyone says on it. Police in the northern Indian state of Uttar Pradesh swiftly registered a criminal complaint against Twitter and seven journalists, all of them Muslim.

The reason? A viral video in which an elderly Muslim man claimed to have been attacked because of his religion. (The state police, which answers to a government run by the Hindu nationalist Bharatiya Janata Party, has insisted that there was “no communal angle” to the assault and that both Hindus and Muslims attacked the man.) In response, India’s information minister said, “What happened in UP was illustrative of Twitter’s arbitrariness in fighting fake news.”

What global authoritarians want is for the big U.S.-based social media networks to fall into line with the rest of the local media--which are already, more or less, subject to state control and intimidation. U.S. action to constrain the tech companies provides those leaders with a toolkit of controls that they can justify internationally. Companies that resist leave themselves open to accusations of hypocrisy if they reject state diktats in the rest of the world but accept them in the U.S.

Many struggling activists in backsliding democracies may not be happy at depending upon the faceless bureaucracies of Big Tech to have their voices heard. Yet not one of them would want that power to devolve instead to the functionaries of their own states, most of whom are eager to silence all dissenters. A U.S. that sets out to subordinate social networks to the government only empowers authoritarian leaders that have wanted to do the same for years.

### Court Politics DA

#### Shadow docket and death penalty case thumps

Stern 9-10 [Mark Joseph Stern covers courts and the law for Slate 9-10-2021 https://slate.com/news-and-politics/2021/09/supreme-court-shadow-docket-death-penalty-religious-freedom.html]

On Wednesday night, the Supreme Court did something surprisingly sensible. Rather than resolve yet another dispute over the death penalty on its shadow docket, the Supreme Court blocked an execution and set the case for oral arguments. For more than two years, the justices have been furiously arguing about the question presented in this case: whether religious prisoners have a right to bring their faith advisers into the death chamber and, to varying degrees, communicate with them during the execution. This debate has occurred almost exclusively through concurring and dissenting opinions accompanying rushed, late-night orders with no majority opinion. It has deprived lower courts of any authoritative ruling, forcing them to scour cryptic, threadbare decisions for guidance.

Now, at long last, SCOTUS will squarely consider the rights of these condemned people. Its latest move may well be a response to criticism of the court’s shadow docket—those unsigned emergency orders often issued late at night after minimal briefing and no oral argument. This criticism has been building for years, but it exploded last week after five Republican-appointed justices functionally overturned Roe v. Wade in an unsigned, one-paragraph order released at midnight.

#### Won’t be inter-issue spillover

Redish 91 MARTIN H., Louis and Harriet Ancel Professor of Law and Public Policy, Northwestern University. ELIZABETH J., Law Clerk to Chief Judge William Bauer, United States Court of Appeals, Seventh Circuit. “CONSTITUTIONAL PERSPECTIVES: ARTICLE: "IF ANGELS WERE TO GOVERN": THE NEED FOR PRAGMATIC FORMALISM IN SEPARATION OF POWERS THEORY.”Duke Law Journal, 41 Duke L.J. 449, Lexis

Choper's assumption that the judiciary's institutional capital is transferable from structural cases to individual rights cases is no more credible. Common sense should tell us that the public's reaction to controversial individual rights cases -- for example, cases concerning abortion, n240 school prayer, n241 busing, n242 or criminal defendants' rights n243 -- will be based largely, if not exclusively, on the basis of its feelings concerning those particular issues. It is unreasonable to assume that the public's acceptance or rejection of these individual rights rulings would somehow be affected by anything the Court says about wholly unrelated structural issues.

#### The Court ignores PC – they’ll deflect pressure or backlash

\*The media/GOP shield Court decisions – their ev is written by bad faith actors playing defense for right-wing justices

\*Court uses proceduralism to shield backlash – both to consequences of appearing too far right – also means the the link is false

Sewer 9-10 (Adam, staff writer @ the Atlantic, “A Strategy of Confusion,” 9/10/21, <https://www.theatlantic.com/ideas/archive/2021/09/republicans-strategy-confusion/620029/)//NRG> \*edit in brackets [] to clarify the noun

“If this were New York passing a law creating a private right for citizens to sue someone for having a gun, the Court would step in in a heartbeat,” Adam Winkler, a law professor at UCLA, told me. “I don't think there's any doubt that the Court’s decison to allow Texas’s law to stand was a reflection of the justices’ belief that abortion is not a constitutionally protected right.” The notion that no harm was done here is risible—it is simply that the Texas law’s defenders are pleased with the outcome. Patients are already being turned away from clinics; those with the means to do so are going to other states for treatment, even though it is unclear whether the law allows the people who help them to be sued regardless. The Court’s supposedly narrow ruling also dissuades abortion providers from setting up a legal challenge to a law that is plainly unconstitutional under current precedent. These providers could just keep providing services and wait to be sued—mooting the weak procedural rationale on which the current majority opinion relies. But now that a majority of the Court has indicated that it no longer considers abortion a constitutional right, doing so would risk validating the Texas law rather than overturning it. “The Court's pretense that it's not sure it could do anything … is akin to someone pretending they're locked in a room while they themselves are holding the key all along,” Aderson Francois, a law professor at Georgetown University, told me. “It seems to me we've reached a point where we don't have to pretend that the Court is intellectually honest. It's not.” The Texas law’s critics have seized on its perverse social incentive—bribing Texans to inform on one another—as potentially creating a nightmare scenario, a kind of privatized surveillance state. But if no one ever sued, the law might avoid challenge and still achieve its objective, with the added reward of the law’s supporters being able to again characterize its critics as hysterical for accurately describing their means and ends. Of course, once you deputize the citizenry to seek bounties on one another, you can’t control who takes you up on the offer. The point of hiding behind proceduralism is to minimize political backlash by drawing muddled coverage of the decision. As Irin Carmon writes at New York magazine, the justices have “decided to confuse us with process.” Their political allies in the Republican establishment got the message, and are dutifully repeating it. This does not mean that Republicans are necessarily fearful of the political consequences of overturning Roe. The long-term Republican strategy—as opposed to that of the anti-abortion movement—has always involved cultivating a degree of uncertainty about the party’s objectives in order to minimize the political backlash. Few Americans support allowing abortions with no restrictions, but even fewer support outlawing the procedure entirely. In that environment, the Republican Party has pursued a balancing act—harnessing the commitment and passion of the anti-abortion movement while assuring centrist voters of a more moderate approach. The Trump era showed how easily media standards toward fairness could be manipulated to maximize uncertainty, and leave the public confused about the significance of any given development. As Laura Bassett wrote last week, Republican politicians have repeatedly insisted that their nominees to the bench would not seek to overturn Roe, and characterized critics as paranoid. Both Justice Brett Kavanaugh and Justice Amy Coney Barrett, whose defenders insisted that they were agnostic on the question, were in the majority last week. But the charade goes back decades. During his confirmation hearings, Justice Clarence Thomas insisted, “No judge worth his or her salt will prejudge a case,” and then he called Roe “plainly wrong” after less than a year on the bench. Donald Trump, with his characteristic subtlety, simply said that his appointees would overturn Roe, and they’ve given Americans little reason to believe otherwise. An upcoming case before the Court offers the justices the opportunity to overturn Roe formally, rather than by increment. Even if they do so, I am skeptical that a massive political backlash is necessarily in the offing—the era of social media has amplified the ability of committed propagandists to confuse masses of people about what is happening in their own country. The muddled media reaction to this [Texas] ruling is a case in point. Nor does the logical extension of the majority’s decision, that the entire Constitution can be nullified by states outsourcing enforcement of unconstitutional laws to private actors, mean that blue states will prevail if they, say, adopted a similar scheme to curtail gun rights. But the Republican appointees now have a majority even when they lose the vote of Chief Justice John Roberts, whose commitment to managing the Court’s reputation has occasionally placed him on the side of the Democratic-appointed justices. The conservative justices don’t fear the nullification of rights they recognize, because they know they have the power to do whatever they want. On Thursday, as the Justice Department filed suit to block the law, Attorney General Merrick Garland argued that “this kind of scheme to nullify the Constitution of the United States is one that all Americans—whatever their politics or party—should fear.” Under different circumstances, that would be true. It should be true. But the superficial proceduralism and ideological fanaticism of the Court’s unaccountable majority enable the conservative justices to allow what they want and bar what they don’t, while claiming that some legal technicality has dictated the result. The Court’s approach is ideal for hiding a radical result behind a veneer of propriety. But there’s no need for the public to be confused about what’s happening here.

#### Tons of thumpers

Gorod 9-9 [Brianne Gorod is chief counsel for the Constitutional Accountability Center. 9-9-2021https://newrepublic.com/article/163519/roe-wade-supreme-court-fall-term]

The new Supreme Court term is about to begin, and it promises to be a blockbuster. With cases involving abortion and guns already on the docket, and the possibility that an affirmative action case may be added as well, this term will present the court’s new six-member conservative supermajority with the opportunity to usher in major shifts in the law. What the justices do with those opportunities will be a test of their commitment to precedent and, for many of them, their self-professed commitment to originalism.

Perhaps the biggest issue on the court’s docket this term will be abortion. A little over a year ago, in a case called June Medical Services LLC v. Russo, the Supreme Court gave abortion rights advocates a win when it held unconstitutional a Louisiana law that required physicians who perform abortions to have admitting privileges at a nearby hospital. In his opinion concurring in the ruling, with which he joined the court’s (then) four liberal members, Chief Justice John Roberts extolled the importance of precedent, observing that “for precedent to mean anything, the doctrine must give way only to a rationale that goes beyond whether the case was decided correctly.” Because the Louisiana law was identical to a Texas law the court had previously struck down, the chief justice voted to strike down the Louisiana law.

But with the replacement of Justice Ruth Bader Ginsburg by Justice Amy Coney Barrett, the chief justice’s vote will not be dispositive when the court hears Dobbs v. Jackson Women’s Health Organization this term. In Dobbs, the court will be considering a challenge to the constitutionality of a Mississippi law that, with limited exceptions, bans abortions after the fifteenth week of pregnancy. The lower courts rightly concluded that this pre-viability ban on abortion was unconstitutional under the Supreme Court’s precedents, and Mississippi now asks the court to overrule those precedents.

According to Monica Simpson, executive director of SisterSong, a Southern-based, national reproductive justice organization that works to improve policies that affect the reproductive lives of women of color, “If the Supreme Court decides to overturn ... precedent under Roe v. Wade, the consequences will be devastating for communities like mine in Georgia, where we are currently fighting against a six-week abortion ban in court.” As she further explained, “The right to access abortion care is a crucial aspect of bodily autonomy, which is too often denied to Black people and others from marginalized backgrounds.”

This case is a huge test for the court and its newest justices, all three of whom—Barrett, Brett Kavanaugh, and Neil Gorsuch—professed a commitment to precedent at their confirmation hearings. Repeatedly, the Supreme Court has been asked to overrule Roe, and repeatedly it has reaffirmed that decision. But in an ominous sign, the court, over the dissents of Chief Justice John Roberts and Justices Breyer, Sotomayor, and Kagan, recently refused an emergency request to block Texas’s six-week abortion ban from going into effect, thus functionally gutting Roe. In doing so, the court not only undermined the right to abortion, but also its own legitimacy. If the new conservative supermajority does, in fact, vote in Dobbs to fully jettison Roe and the other long-standing precedents that recognize a constitutional right to access abortion simply because they were not, in the views of those justices, “decided correctly,” it will deliver an even more significant blow not only to the right to abortion, but also to the legitimacy of the court.

It should also deliver a blow to the claims by many members of the court that they follow the text and history of the Constitution, wherever it leads. When the Reconstruction framers drafted the Fourteenth Amendment, they chose sweeping language to protect the full panoply of fundamental rights for all, and they viewed both personal liberty and control over one’s body as among those fundamental rights. The Fourteenth Amendment thus guarantees the right to access abortion, and the court’s originalists should recognize that.

Dobbs is not the only blockbuster case on the court’s docket. In New York State Rifle & Pistol Association Inc. v. Bruen, the court will be considering whether New York’s denial of two individuals’ applications for concealed-carry licenses for self-defense violates the Second Amendment. In 2008, in a case called District of Columbia v. Heller, the Supreme Court held that the Second Amendment protects an individual right to own guns for self-defense, but also made clear that “[l]ike most rights, the right secured by the Second Amendment is not unlimited.”

In the years since Heller, it has fallen to the lower courts to determine what gun regulations are constitutional, with very little guidance from the Supreme Court. The Second Circuit Court of Appeals concluded that the New York law was constitutional, explaining that because “our tradition so clearly indicates a substantial role for state regulation of the carrying of firearms in public, ... [the law] passes constitutional muster if it is substantially related to the achievement of an important governmental interest.” The circuit court went on to conclude that “New York has substantial, indeed compelling, governmental interests in public safety and crime prevention,” and the law is “substantially related” to those interests. When the Supreme Court decides Bruen, how it rules may ultimately be as important as what it rules, because the guidance it provides about how courts should decide the constitutionality of gun regulations could have ramifications that extend far beyond the New York law at issue in the case.

As if these two huge cases were not enough, the court may add another big issue to the docket before the term ends: affirmative action. And as in the abortion case, the court is being asked to overrule a long-standing precedent: Grutter v. Bollinger, the 2003 case that held that universities may consider race as a factor in admissions. In Students for Fair Admissions Inc. v. President & Fellows of Harvard College, an organization called Students for Fair Admissions sued Harvard under a federal law that prohibits entities that accept federal funds from discriminating on the basis of, among other factors, race. The lower courts rejected the challenge, concluding that Harvard’s “limited use of race in its admissions process in order to achieve diversity ... is consistent with the requirements of Supreme Court precedent.” The group challenging Harvard’s admissions policy has asked the court to hear the case, and the court has called for the views of the solicitor general.

Here, as in Dobbs, both constitutional text and history, as well as the court’s own precedent, require the same result—upholding the lower court decision. After all, at the same time the framers of the Fourteenth Amendment drafted that amendment, they also enacted a long list of race-conscious legislation designed to guarantee equality of opportunity for all persons regardless of race. The Supreme Court’s repeated rulings upholding universities’ use of race as one factor in admissions decisions are entirely consistent with that history. In other words, if the court ultimately decides to take up this case, it—no less than Dobbs—will be a real test of the justices’ commitment to the text and history of the Constitution, as well as to the court’s own precedent.

While those three cases are likely to dominate headlines about the court this term, they’re hardly the only important ones on the docket. The court will also be deciding, among many other matters, whether individuals can challenge conduct that has a disparate impact on the basis of disability, whether an important federal civil rights law allows plaintiffs to recover damages for emotional distress, and whether it is constitutional for a state to provide students with funding for private schools but prohibit them from attending schools that provide religious instruction.

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#### Justices don’t think that way

Chemerinsky 99 – Erwin Chemerinsky, Alston & Bird Professor of Law and Professor of Political Science, Fall 1999, South Texas Law Review, 40 S. Tex. L. Rev. 943, p. 948

Choper, for example, concludes from this premise that the Court should not rule on federalism or separation of powers issues so as to not squander its political capital in these areas that he sees as less important than individual rights cases. Bickel argued that the Court should practice the "passive virtues" and use justiciability doctrines to avoid highly controversial matters so as to preserve its political capital. [19](http://web.lexis-nexis.com/universe/document?_m=e251872a6c6be190b8939629a1cff9d2&_docnum=1&wchp=dGLbVzb-zSkVA&_md5=f2e9151e48096b32cfe55e6fc38a5a93#n19) Other scholars reason from the same assumption. Daniel Conkle, for example, speaks of the "fragile legitimacy that attaches to Supreme Court pronouncements of constitutional law." [20](http://web.lexis-nexis.com/universe/document?_m=e251872a6c6be190b8939629a1cff9d2&_docnum=1&wchp=dGLbVzb-zSkVA&_md5=f2e9151e48096b32cfe55e6fc38a5a93#n20) I am convinced that these scholars are wrong and that the public image of the Court is not easily tarnished, and preserving it need not be a preoccupation of the Court or constitutional theorists. There is no evidence to support their assertion of fragile public legitimacy and almost 200 years of judicial review refute it.

#### June announcement solves the link

Mondak 92 Jeffery J., assistant professor of political science @ the University of Pittsburgh. “Institutional legitimacy, policy legitimacy, and the Supreme Court.” American Politics Quarterly, Vol. 20, No. 4, Lexis

The process described by the political capital hypothesis acts as expected in the laboratory, and the logic of the link between institutional and policy legitimacy has thus gained strong empirical corroboration. However, the dynamic's pervasiveness defies precise estimation due to the limitations of available public opinion data. Still, the results reported here are provocative. First, this view of legitimation may apply to institutions beyond the Supreme Court. Consequently, efforts to use this theory in the study of other institutions may yield evidence supportive of a general process. A second concern is how the Court responds to its institutional limits. Specifically, strategy within the Court can be considered from the context of legitimacy. For example, what tactics may the Court employ to reduce the erosion of political capital? By releasing controversial rulings at the end of a term, for instance, the Court may afford itself a healing period, a time to repair damaged credibility prior to the next round of efforts at conferring policy legitimacy. This suggests a third issue, the manner in which institutional approval is replenished. Does institutional support return to some equilibrium once dispute surrounding a particular ruling fades, or must the Court release popular edicts to offset the effects of its controversial actions?

#### Dobbs dooms Roe – Court will use it to overrule Roe and, even if they don’t, they’ll eliminate the viability standard which will greenlight aggressive state regs and set the stage for inevitable Roe overturn

Ziegler 21 [Mary Ziegler is a professor at the Florida State University College of Law, 5-18-2021 https://www.cnn.com/2021/05/17/opinions/abortion-mississippi-supreme-court-dobbs-v-jackson-womens-health-ziegler]

If the justices had wanted to avoid controversy, they could have agreed to hear the appeal only on that question, concluded that Roberts' standard should apply and given states more latitude to regulate abortion. But the court bypassed that question for a direct hit: could states ban elective abortions outright before viability -- the point at which it is possible for the fetus to survive outside the womb. In the Roe v. Wade decision, the majority on the court said that government only had a valid interest in prohibiting abortion in circumstances where the fetus would be viable; in 1973, the court pronounced, that point was around 24 weeks of pregnancy.

Many advocates and Americans in general will likely see Monday's development as a sign that the writing is on the wall -- that Roe v. Wade may well be doomed. They will not be wrong. A court eager to take on abortion bans early in pregnancy seems unlikely to hesitate when the moment comes to eliminate abortion rights altogether.

Indeed, there is some reason to believe that Dobbs may be that moment. To uphold Mississippi's law, the justices would need to undo a core part of the rules that have governed abortion since 1973: the idea that states cannot criminalize abortion outright until viability. If the court is willing to jettison a key ingredient of the Roe case, there is no reason to think the justices won't be ready to ditch the rest.

But even if Dobbs does not mark the moment when the court eliminates a right to choose, the damage this case could do to Roe is hard to overstate. In theory, the court could preserve the idea of a right to choose while saying that viability as a limit makes no sense. Bioethicists and philosophers have criticized the logic of the court's viability line for some time. Conservative justices have mocked the viability line since the 1980s. After all, viability changes as technology improves. Some have questioned whether courts can or should keep up with evolving medical standards in interpreting fundamental rights. Others don't see why fetal life takes on meaning only at viability.

But the shortcomings of the 1973 rule aside, viability has been central to the court's abortion rights jurisprudence from the beginning. That fact isn't lost on antiabortion leaders. Look closely at the grab bag of abortion restrictions proposed in 2021: Arkansas's ban on abortion in cases of Down syndrome, prohibitions on common methods like Texas's law on dilation and evacuation, the most common procedure after the first trimester, heartbeat bills (which outlaw abortion after a fetal heartbeat can be detected) like the ones from South Carolina or Texas or absolute bans like the one from Alabama. Most of them have one thing in common: an aim to invalidate viability as the standard for abortion rights (and thus roll back Roe v. Wade).

That's because neither the court nor the pro-choice movement have ever offered a real alternative to fetal viability as the point at which states can criminalize all abortions. That's one reason why heartbeat bans have caught fire in so many red states. Anti-abortion activist Janet Folger Porter, the architect of many of these bills, pitches a fetal heartbeat as a more scientific, certain alternative to viability.

In practical terms, there is a world of difference between allowing bans at six weeks, when physicians can often detect fetal cardiac activity, and allowing criminalization at viability (often marked at 24 weeks gestation). By taking this case, the court may be opening the door to laws that criminalize abortion before many women know they are pregnant. But there is no guarantee that six weeks will be the limit if the court abandons the viability benchmark. There is no guarantee there will be a limit at all.

The elimination of the viability standard would also upend progressives' best argument to preserve abortion rights -- one based on respect for judicial precedent.

The court's six conservative members all have clearly expressed views against abortion rights. For that reason, it seems far-fetched to think that any of the court's conservatives really believe the Constitution protects a right to choose. So, instead, pro-choice leaders have zeroed in on stare decisis, the doctrine of respect for past precedent. From a legal standpoint, the court may take precedent seriously. From the standpoint of optics, the court knows that when it comes to Roe, the world is watching. Moving too fast, or willfully ignoring precedent, could damage the court's reputation.

Abortion foes have a solution: pick apart a precedent piece by piece, until there the right to choose is unrecognizable. If the court saves Roe but gets rid of the viability standard, it will be much harder to say that the precedent has commanded respect.

So, when the court hands down a decision in Dobbs, keep your eye on viability. If it is usurped as a standard, this case may not be the one that takes down Roe v. Wade, but it will quite likely set the stage for the one that does.

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#### No war or root cause

Geras 5 (Norman, Emeritus Professor of Politics at the University of Manchester, "The Reductions of the Left," Dissent, 52:1, Winter, p. 57-58)

THE SECOND PART of the answer- to which I now turn—is a seeming lack of ability, of the imagination, to digest the meaning of the great moral and political evils of the world and to look at them unflinchingly. This is a complementary failure. Elsewhere I have argued that Marxism is as familiar as any other intellectual tradition with the realities of human violence and oppression and the more negative traits and potentialities in the makeup of human beings. At the same time, because of its Utopian aspiration—-which I do not mean in any pejorative sense—because of its progressive and meliorative impulse, there has always been a tendency within this tradi¬tion to minimize, or sometimes just deny, the independent force of such negative character¬istics. They come to be treated, genericallv, as the product of class societies and, today, as the product of capitalism. The affinity between this overall intellectual tendency within Marxist and other left thinking, and the practical reductionism I have just described—in which America is identified as the source of all worldly wrongs—should be transparent. The effect of the tendency, however, is, to denature what one is looking at when one looks at the horrors of the world: a massacre of in- nocents; a woman being beaten in a public place or hanged in a football stadium; a place in which a man can have his ears surgically re¬moved or his tongue cut out, or be broken and destroyed, to be followed by the next such vic-tim, and the next, in a continuous sequence ol atrocity; or a place in which a parent can be forced to watch her child tortured and mur¬dered in front of her; or a place in which a hus¬band can be forced to watch his wife repeat-edly raped; an "ethnic^leansing" or a genocide in progress, in which entire communities are pulled up by the roots-arid people are shot or hacked or starved to death by the thousands or the tens of thousands; mass graves opened to yield up their terrible story. The list, as anyone knows who keeps read¬ing when the overwhelming temptation is to look away, could be much extended. The items on it are moral and political realities in their own right. They need to be registered and fully recognized as such. To collapse them too quickly into their putative original causes, to' refer them immediately, or refer from them, to other things that have preceded them is not to give them their due as the specific phenomena they are, the horrors, tor those destroyed by them or enduring them, for those whose lives are torn and wrecked and filled with grief by them, are in a double sense reduced by this quick and easy reference back to something else, putatively their real cause or origin. Furthermore, not all the contributory causes of such grim events are of the type that the section of the left under discussion here likes to invoke—that is, causes arising else- where, either geographically (in the United States) or societally (in the dynamics of capi- talism). Moral and political evils of this order and I make no apology for calling them that— can and generally do have causes that are more local in a spatial sense; and they are governed or influenced by political, ideological, and moral specificities every bit as real as the capitalist economy. Not everything is systemic, in the sense of being an effect of pressures or ten¬dencies of economic provenance, whether from the global economy or from some more par¬ticular region of it. There are independent patterns of coercion and cruelty, both interper¬sonal and embedded within political structures; forms of authoritarian imposition; types of invasive assault and violence, at the micro-level and at the macro-level, involving large social forces.

#### Cap’s sustainable and the alt causes transition wars

Mead, 12 -- Professor of Foreign Affairs and Humanities at Bard College [7/28/2012, Walter Russell, The American Interest, “The Energy Revolution 4: Hot Planet?” <http://blogs.the-american-interest.com/wrm/2012/07/28/the-energy-revolution-4-hot-planet/>]

Capitalism is not, Monbiot is forced to admit, a fragile system that will easily be replaced. Bolstered by huge supplies of oil, it is here to stay. Industrial civilization is, as far as he can now see, unstoppable. Gaia, that treacherous slut, has made so much oil and gas that her faithful acolytes today cannot protect her from the consequences of her own folly. Welcome to the New Green Doom: an overabundance of oil and gas is going to release so much greenhouse gas that the world is going to fry. The exploitation of the oil sands in Alberta, warn leading environmentalists, is a tipping point. William McKibben put it this way in an interview with Wired magazine in the fall of 2011: I think if we go whole-hog in the tar sands, we’re out of luck. Especially since that would doubtless mean we’re going whole-hog at all the other unconventional energy sources we can think of: Deepwater drilling, fracking every rock on the face of the Earth, and so forth. Here’s why the tar sands are important: It’s a decision point about whether, now that we’re running out of the easy stuff, we’re going to go after the hard stuff. The Saudi Arabian liquor store is running out of bottles. Do we sober up, or do we find another liquor store, full of really crappy booze, to break into? A year later, despite the success of environmentalists like McKibben at persuading the Obama administration to block a pipeline intended to ship this oil to refineries in the US, it’s clear (as it was crystal clear all along to anyone with eyes to see) that the world has every intention of making use of the “crappy liquor.” Again, for people who base their claim to world leadership on their superior understanding of the dynamics of complex systems, greens prove over and over again that they are surprisingly naive and crude in their ability to model and to shape the behavior of the political and economic systems they seek to control. If their understanding of the future of the earth’s climate is anything like as wish-driven, fact-averse and intellectually crude as their approach to international affairs, democratic politics and the energy market, the greens are in trouble indeed. And as I’ve written in the past, the contrast between green claims to understand climate and to be able to manage the largest and most complex set of policy changes ever undertaken, and the evident incompetence of greens at managing small (Solyndra) and large (Kyoto, EU cap and trade, global climate treaty) political projects today has more to do with climate skepticism than greens have yet understood. Many people aren’t rejecting science; they are rejecting green claims of policy competence. In doing so, they are entirely justified by the record. Nevertheless, the future of the environment is not nearly as dim as greens think. Despairing environmentalists like McKibben and Monbiot are as wrong about what the new era of abundance means as green energy analysts were about how much oil the planet had. The problem is the original sin of much environmental thought: Malthusianism. If greens weren’t so addicted to Malthusian horror narratives they would be able to see that the new era of abundance is going to make this a cleaner planet faster than if the new gas and oil had never been found. Let’s be honest. It has long been clear to students of history, and has more recently begun to dawn on many environmentalists, that all that happy-clappy carbon treaty stuff was a pipe dream and that nothing like that is going to happen. A humanity that hasn’t been able to ban the bomb despite the clear and present dangers that nuclear weapons pose isn’t going to ban or even seriously restrict the internal combustion engine and the generator. The political efforts of the green movement to limit greenhouse gasses have had very little effect so far, and it is highly unlikely that they will have more success in the future. The green movement has been more of a group hug than a curve bending exercise, and that is unlikely to change. If the climate curve bends, it will bend the way the population curve did: as the result of lots of small human decisions driven by short term interest calculations rather than as the result of a grand global plan. The shale boom hasn’t turned green success into green failure. It’s prevented green failure from turning into something much worse. Monbiot understands this better than McKibben; there was never any real doubt that we’d keep going to the liquor store. If we hadn’t found ways to use all this oil and gas, we wouldn’t have embraced the economics of less. True, as oil and gas prices rose, there would be more room for wind and solar power, but the real winner of an oil and gas shortage is… coal. To use McKibben’s metaphor, there is a much dirtier liquor store just down the road from the shale emporium, and it’s one we’ve been patronizing for centuries. The US and China have oodles of coal, and rather than walk to work from our cold and dark houses all winter, we’d use it. Furthermore, when and if the oil runs out, the technology exists to get liquid fuel out of coal. It isn’t cheap and it isn’t clean, but it works. The newly bright oil and gas future means that we aren’t entering a new Age of Coal. For this, every green on the planet should give thanks. The second reason why greens should give thanks for shale is that environmentalism is a luxury good. People must survive and they will survive by any means necessary. But they would much rather thrive than merely survive, and if they can arrange matters better, they will. A poor society near the edge of survival will dump the industrial waste in the river without a second thought. It will burn coal and choke in the resulting smog if it has nothing else to burn. Politics in an age of survival is ugly and practical. It has to be. The best leader is the one who can cut out all the fluff and the folderol and keep you alive through the winter. During the Battle of Leningrad, people burned priceless antiques to stay alive for just one more night. An age of energy shortages and high prices translates into an age of radical food and economic insecurity for billions of people. Those billions of hungry, frightened, angry people won’t fold their hands and meditate on the ineffable wonders of Gaia and her mystic web of life as they pass peacefully away. Nor will they vote George Monbiot and Bill McKibben into power. They will butcher every panda in the zoo before they see their children starve, they will torch every forest on earth before they freeze to death, and the cheaper and the meaner their lives are, the less energy or thought they will spare to the perishing world around them.But, thanks to shale and other unconventional energy sources, that isn’t where we are headed. We are heading into a world in which energy is abundant and horizons are open even as humanity’s grasp of science and technology grows more secure. A world where more and more basic human needs are met is a world that has time to think about other goals and the money to spend on them. As China gets richer, the Chinese want cleaner air, cleaner water, purer food — and they are ready and able to pay for them. A Brazil whose economic future is secure can afford to treasure and conserve its rain forests. A Central America where the people are doing all right is more willing and able to preserve its biodiversity. And a world in which people know where their next meal is coming from is a world that can and will take thought for things like the sustainability of the fisheries and the protection of the coral reefs. A world that is more relaxed about the security of its energy sources is going to be able to do more about improving the quality of those sources and about managing the impact of its energy consumption on the global commons. A rich, energy secure world is going to spend more money developing solar power and wind power and other sustainable sources than a poor, hardscrabble one. When human beings think their basic problems are solved, they start looking for more elegant solutions. Once Americans had an industrial and modern economy, we started wanting to clean up the rivers and the air. Once people aren’t worried about getting enough calories every day to survive, they start wanting healthier food more elegantly prepared. A world of abundant shale oil and gas is a world that will start imposing more environmental regulations on shale and gas producers. A prosperous world will set money aside for research and development for new technologies that conserve energy or find it in cleaner surroundings. A prosperous world facing climate change will be able to ameliorate the consequences and take thought for the future in ways that a world overwhelmed by energy insecurity and gripped in a permanent economic crisis of scarcity simply can’t and won’t do. Greens should also be glad that the new energy is where it is. For Monbiot and for many others, Gaia’s decision to put so much oil into the United States and Canada seems like her biggest indiscretion of all. Certainly, a United States of America that has, in the Biblical phrase, renewed its youth like an eagle with a large infusion of fresh petro-wealth is going to be even less eager than formerly to sign onto various pie-in-the-sky green carbon treaties. But think how much worse things would be if the new reserves lay in dictatorial kleptocracies. How willing and able would various Central Asia states have been to regulate extraction and limit the damage? How would Nigeria have handled vast new reserves whose extraction required substantially more invasive methods? Instead, the new sources are concentrated in places where environmentalists have more say in policy making and where, for all the shortcomings and limits, governments are less corruptible, more publicly accountable and in fact more competent to develop and enforce effective energy regulations. This won’t satisfy McKibben and Monbiot (nothing that could actually happen would satisfy either of these gentlemen), but it is a lot better than what we could be facing. Additionally, if there are two countries in the world that should worry carbon-focused greens more than any other, they are the United States and China. The two largest, hungriest economies in the world are also home to enormous coal reserves. But based on what we now know, the US and China are among the biggest beneficiaries of the new cornucopia. Gaia put the oil and the gas where, from a carbon point of view, it will do the most good. In a world of energy shortages and insecurity, both the US and China would have gone flat out for coal. Now, that is much less likely. And there’s one more reason why greens should thank Gaia for shale. Wind and solar aren’t ready for prime time now, but by the time the new sources start to run low, humanity will have mastered many more technologies that can used to provide energy and to conserve it. It’s likely that Age of Shale hasn’t just postponed the return of coal: because of this extra time, there likely will never be another age in which coal is the dominant industrial fuel. It’s virtually certain that the total lifetime carbon footprint of the human race is going to be smaller with the new oil and gas sources than it would have been without them. Neither the world’s energy problems nor its climate issues are going away any time soon. Paradise is not beckoning just a few easy steps away. But the new availability of these energy sources is on balance a positive thing for environmentalists as much as for anyone else. Perhaps, and I know this is a heretical thought, but perhaps Gaia is smarter than the greens.

#### Wholesale rejection of neoliberalism is impossible and insisting on theoretical purity dooms crucial short-term measures to avoid violence---it’s better to combine structural approaches with non-reformist reforms that propel mobilization.

Schram 15 – Sanford F. Schram, Visiting Professor of Social Work and Social Research at Bryn Mawr College, Professor of Political Science at Hunter College, PhD and MA in Political Science from St. Lawrence University, The Return of Ordinary Capitalism: Neoliberalism, Precarity, Occupy, p. 178-186 [language modified]

The Movement of Movements: The Occupy Left Versus the Organized Left

In the current era, there is much intellectual, if not political, credibility to be gained by refusing to practice the multilevel mobilizing of an Occupy Left and subsequent efforts like Black Lives Matter. There is a growing consensus that Occupy was a failure and its current extensions just fritter away energy that should be concentrated on building an organized Left that can push successfully for wholesale change.16 Some on the left refuse to work with diverse groups on their different issues in real time. Instead, they insist on taking the long view that says such work is a distraction to the larger and critical cause of organizing for fundamental transformation of the existing political economic system.

A major concern for this faction is maintaining the purity of the Left, striving to remain uncontaminated by the compromises of coalitional politics that are necessary when addressing the myriad of specific issues associated with the inequities of neoliberalism.17 In this way, activism remains true to the tradition of radical politics as it was practiced during the age of revolution and especially the heyday of communist organizing. Sometimes this nostalgia for the history of radical politics can lead to blaming the victim, this time not so much blaming the poor for their own poverty but blaming the subordinated for their failure to organize effectively to enact fundamental change.18 Sometimes, the nostalgia for “one big union” to challenge the capitalist power structure is born of letting historical understanding crowd out the exigencies of the moment. In discussing the problem of combining scholarship and activism among leftist academics in the humanities, Bruce Robbins makes a point that has direct relevance to the academics of the organized Left as I am characterizing it. He asserts: “One trap the Left faces, at least to the extent that that Left is located in the academy, is an overemphasis on making a political program out of what it already does for a living.”19 Robbins is talking about bringing too much history into efforts to mobilize people who are focused on immediate concerns. Knowing about the history of the labor movement surely could help members of the precariat think about how to address their plight; from the perspective of ordinary citizens, they may not be all that open to hearing all that history when they are mostly concerned about landing a job once their unemployment has been cut off and they have had to declare bankruptcy. The bottom-up perspective encourages us to see things the way they do. And that might mean pushing to raise the minimum wage rather than holding out for the demise of capitalism or the adoption of a basic income.

Too much history can be matched with too much theory.20 Too often today, the organized Left is joined by the theoretical Left. An overemphasis on theory produces what John Gunnell calls “epistemic privilege,” that is, the idea that theory comes first and underwrites and authorizes the action that follows. Exercising epistemic privilege involves unquestioned acceptance of the cliché that without a sound theory there can never be effective political action.21 Yet it is questionable to what extent we need to be able to theorize why things are the way they are to be able to do something about them. Theory is undoubtedly important for placing political action in context, deepening meaning, and clarifying the conditions of political possibility.22 Yet an overemphasis on theory can be politically [destructive] ~~paralyzing~~. The preoccupation with theory can undermine the needed focus on strategy,23 especially when theory is concerned with the big picture of understanding the current situation overall and over time, and strategy is more narrowly focused on what will connect with ordinary people’s immediate concerns as they struggle to cope with the effects of a neoliberalizing economy.24

In other words, being an academic can get in the way of being an activist. A preoccupation with theory can distract us from working to achieve modest but worthwhile reforms that directly address people’s immediate concerns. This is doubly unfortunate if those reforms actually work to lay the groundwork for larger, transformational change in the future. Epistemic privilege can lead us away from the radical incrementalism of making small, realistic changes now that can lay the groundwork for larger ones down the road.

In fact, the very idea of modest reform can be dismissed by those seeking more dramatic change because it poses the real possibility that it will defuse anger among the politically diverse precariat and thereby forestall the more dramatic systemic change that is needed to put the inequities of the new normal of neoliberalism safely behind us. While largely limited to the ruminations of bloggers, it seems that many on the left have their own crisis strategy that is premised on the idea that if things get bad enough, spreading from the lower to the middle classes, mass mobilization against the existing structure of power will finally gain traction and political transformation will result. Yet this crisis strategy is indebted to the very same dichotomous thinking that prevents some on the left from appreciating the value, and even the need, to mobilize on multiple levels. It is a crisis strategy that trades off addressing people’s immediate needs in the short run for building up popular support for more dramatic change in the long run. It pits a “politics of survival” against a “politics of social change,” seeing them as mutually exclusive.25

This bloggers’ crisis strategy, however, seems at best an imagined strategy that no one is really actively working to execute (especially since it would impose growing hardship on the very people whom the Left wants to help). Yet even those among the Occupy Left are vulnerable to this type of misplaced crisis thinking. Chris Hayes, in his otherwise thoughtful examination of U.S. politics in the current age of hyperinequality, looks to a radicalized middle class that has become frustrated with its ability to move ahead.26 Hayes writes:

Crisis is not something to be longed for or embraced: as we’ve seen, war, financial crisis, natural disaster visit their most punitive blows upon the weakest, the poorest, the least powerful members of society. But political crises, moments when the keystone of authority of some major governing institution is whisked away like a Jenga block, can produce a tumbling cascade of new forms of politics. We’ve been looking at the tower for so long we forget it’s made of blocks; we forget it can be put back together in a different way.27

Hayes sees the economic malaise spreading upward to the point that the privileged with resources can now be mobilized to redress the situation and push for dramatic change. While the middle classes can indeed be a source of change, especially today (see chapter 2), this type of top-down, elite-driven political mobilization is vulnerable to being defused by concessions for those higher up at the expense of those below them.

Yet a better crisis strategy actually was implemented. It was made famous by Richard Cloward and Frances Fox Piven as the central means of mobilizing support in the 1960s for reform of the welfare system and transition to a guaranteed income.28 It was premised on a win-win that saw a politics of survival and a politics of social change as working synergistically. Piven and Cloward premised their strategy on their research, which estimated that about half of those eligible for welfare nationwide were not receiving it. If everyone who was eligible enrolled it would overload the system, create a crisis, and force elites to consider moving to a better system such as a guaranteed income (now called a basic income). The strategy worked in good part, with millions of people getting public assistance and Congress twice voting on a guaranteed income plan that was proposed by President Richard Nixon. While the plan was never adopted, many people got aid in the process. Signing up people for welfare helped address their immediate needs while growing membership in the cause for welfare rights intensified concern in the public that something had to be done to transform the broken system of aiding the poor. A politics of survival and a politics of social change were not pitted against each other; choosing one over the other was not required. Instead, the real crisis strategy was premised on the idea the two could work together synergistically.

This confusion about what is an effective crisis strategy is premised on overly dichotomous thinking that leads many on the left away from multilevel mobilizing. It also might explain why they are often better at resisting anything less than total transformation to a new society than in finding ways to support improvements that reduce people’s suffering in the here and now. This resistance to reform also reflects nostalgic preoccupations with a lost past, when the revolution by the laboring classes was a real possibility. In contrast today the diverse people whose economic condition is made precarious by the changing economy are less available to be organized for mass mobilization on behalf of a fundamental transformation of the inequitable neoliberal political economy. As a result, many on the left are at risk of passing up on politics as it actually occurs today and instead contenting themselves with perfecting theoretical purity. Even left-leaning alternative political parties, such as the initially quite successful Working Families Party, get dismissed as not deserving of support as soon as the party makes questionable compromises as part of the effort to leverage power within the existing system.29 In the hothouse environment born of frustration over the Left’s inability to make a concerted and effective effort for transformational change, any misstep potentially becomes an excuse for continued inaction. Sometimes it seems the only political action the purists would support is a coup. They long for days when revolution was a real option. In this way, the Left continues to practice one of its more dominant forms of melancholia.

We may, however, come to look nostalgically on the academic Left, regardless of its disabling preoccupations. Today, that group is rapidly being replaced by academics fortunate enough to secure appointments but too insecure in them to dare to think of combining activism and scholarship.30 This new generation is not even positioned to freely protest its own plight in the face of the ongoing corporatization of the academy, let alone start to work with ordinary Americans outside the academy who suffer the worst effects of the inequitable neoliberal economy. Confronting growing professional and institutional pressures from performance measurement schemes to publish in “high-impact” journals (i.e., highly cited, not highly influential politically), many academics now must publish constantly; however, their work is often assiduously theoretical and methodically arcane, as well as apolitical and disconnected from ongoing political struggle. Many of these younger academics are of the Left in their hearts and minds, but not on the printed page or in the streets.

Too often an insistence on organizing only for dramatic change can lead to immobilization on the grounds that proposed actions are less than entirely consistent with some blueprint about what is to be done to produce long-term structural change of society. Instead activism should be more humble, accepting that not all contingencies can be anticipated and social movement mobilization is not entirely predictable and cannot be planned out before it occurs.31 In particular, the Left needs to stop making political action an either/or proposition and begin to think seriously about how political mobilization on multiple levels—protests, parties, policy, and program administration—can be made to work together to bring into being a better world for those suffering on the bottom of the socioeconomic ladder. Radical movement politics in a variety of forms is what is needed today. Efforts focused on dramatic regime change still have their place, especially when there is a gnawing need to call out injustice and identify its structural sources embedded in the very foundations of the existing neoliberalized society. Yet what are we to do in the meantime? Is it possible to help alleviate suffering even while we work for more fundamental change? The ongoing resistance to anything less than wholesale societal change stems from the fact that it poses a falsely stark choice between radical movement politics and more conventional electoral and policy politics. This kind of thinking is overly dichotomous and fails to appreciate that mobilizing for change to redress the injustices of the neoliberalized economy does not always involve seeing the options as mutually exclusive.32

In fact, many activists today appreciate and participate in the diversity of movements involved in creating noteworthy changes in cultural practices, social relations, economics and politics.33 Much of the energy of these movements comes from outside the academy where people are not weighed down with theoretical preoccupations. When big ideas, theory included, get to matter are when ordinary people confronting their difficulties in their everyday lives come to see the relevance of those ideas.34 Today, there is a veritable movement of movements where change efforts take a diversity of forms, with some even working with, rather than against, the market system in ways that create more freedom and less oppression for ordinary people.35 Just as we should not see protest politics and electoral politics as mutually exclusive, so should we learn to appreciate the value of a radical incrementalism that works to address people’s problems in the here and now, while laying the groundwork for larger political transformation in the future. The protest politics of Occupy Wall Street has contributed to creating a context for the electoral successes of candidates such as Bill de Blasio, who became mayor of New York City with the support of the Working Families Party, which has strong ties to Occupy movement participants.36 How de Blasio works with protest groups, including those that have become embroiled in the volatile issue of racialized policing, suggests real challenges but also hope for change.37 Radical incrementalism suggests just this kind of synergy. It combines a politics of survival with a politics of social change to get significant improvements in state policy, following the successful model of welfare mobilization in the 1960s.38

The Road to Radical Incrementalism

Radical incrementalism is not really an option: it is the prevailing reality of politics. It realistically recognizes the economic, social, and political constraints that limit mobilization on behalf of radical change. It also is based on an appreciation often shared by proponents for radical change that efforts at sustained political mobilization are not something that happen overnight. Instead, it works to help people in the short run within existing constraints but in ways that make more dramatic political transformation eventually more likely.

As much as people on the left hope for a radical swing away from neoliberal social welfare programming in the current era, the arc of history under U.S. capitalism suggests a more modest process of incrementalism. Incrementalism is defined in the public policy literature as a process of policymaking where a series of small remedial, corrective steps enable change in existing policy.39 Yet the criticism of incrementalism is that it amounts to no more than tinkering with the existing system in ways that do nothing more than fine-tune the status quo. Perfecting neoliberalism means little more than making the ascendant disciplinary regime more effective in managing the poverty population and by extension everyone else who is made economically precarious by the transformed economy.40 Incremental changes in neoliberal policies can result in nothing more than improving the system for embedding market logic more deeply into society and our daily lives.41 It could amount to no more than perfecting the system for incentivizing market-consonant behavior in ways that end up leaving most people having to make do with the inadequate resources and opportunities afforded them in a changing economy.

Nonetheless, especially in an age of extreme political polarization that begets policy gridlock, incrementalism may be the prevailing reality more than ever. Under these conditions, it may be that ideas about more dramatic change need to be tempered with the reality of working for more limited changes that nonetheless do more than reinforce the existing system.42 The issue then becomes how to practice a radical incrementalism.43 By “radical incrementalism,” I mean a process in which people push for change recognizing it will not necessarily be as large as they might like but also in which small changes can do more than fine-tune the existing system. Radical incrementalism is not about tweaking what is already in place to help perpetuate the status quo and the existing structure of power. It rejects changes that in all likelihood are going to lead to the continuation of the very problems that people are trying to address. Instead, the small changes of radical incrementalism lay the groundwork for further changes that over time can help build to a transformation of the existing structure of power, the source of the problems being attacked.44 The key then is that when pushing for change as activists we must be able to distinguish radical incrementalism from the status-quo-reinforcing incrementalism most often offered by elites. This is often not easy but the goal is to try as much as possible to resist the cooptation elites will seek to gain by making minimal concessions. That is the focus we need today in an era of political gridlock born of polarization that stems in no small part from the wealthy using their wealth to block constructive responses to address the problems extreme inequality creates.

André Gorz highlighted the challenge in distinguishing between status quo incrementalism and radical incrementalism in his own terms when he distinguished what he called “non-reformist reform” from “reformist reform.”45 Gorz recognized that what distinguished progressive reform from statusquo-reinforcing reform was not easy to always identify, but nonreformist reforms are the progressive reforms that are essentially laying the groundwork to get beyond the inequities of capitalism by restructuring power relations. More recently David Harvey has called for appreciating the value of what he calls “revolutionary reforms” that provide the basis for challenging capitalist power over time.46 Radical incrementalism similarly involves making small changes that lay the basis for restructuring embedded power relations that prevent more ambitious changes from happening.47

Radical incrementalism is focused on changing power relationships but it is not against the use of power, and it is focused on finding ways for government and the governance of populations to work to improve the lives of ordinary people. It does not simply resist oppressive state power, it seeks to bend it toward enhancing the conditions under which people live with, participate in, and benefit from state power. Radical incrementalism works to offer constructive answers to such questions as: what type of governance is appropriate for ordinary people today and how can we rework power relations to realize it?48

Radical incrementalism can be practiced on multiple levels and across different dimensions of the policy process. It can involve protest movements adroitly deciding to accept particular concessions elites offer to quell dissent.49 It can also involve participating in electoral campaigns for candidates who resist capitulating to conventional politics as usual. It can involve pushing for changes in public policy that redistribute power and lay the foundation for broader changes in the future. Reallocating resources, such as to improve wages so that people can do more than just survive but also be better positioned to participate in the political process, is but one example.

#### Try or die for sustainable growth – only innovation can solve in time – prefer new IPCC report

King and Lichtenstein 21 (David King, Founder and Chair, Centre for Climate Repair at Cambridge, University of Cambridge; and Jane Lichtenstein, Associate, Centre for Climate Repair at Cambridge, University of Cambridge; “Surviving the next 50 years is an existential crisis – 3 things we must do now,” The Print, 8-14-2021, https://theprint.in/opinion/surviving-the-next-50-years-is-an-existential-crisis-3-things-we-must-do-now/715069/)

The challenge of surviving the next 50 years is now seen as a planet-wide existential crisis; we need to work together urgently, just to secure a short-term future for human civilisation. Global weather patterns are violently disrupted: Greece burns; the south of England floods; Texas has had its coldest weather ever, while California and Australia suffer apocalyptic wild fires. All of these violent, record-breaking events are a direct result of rapid heating in the Arctic – occurring faster than in the rest of the world. A warm Arctic triggers new ocean and air currents that change the weather for everyone. The only way to reverse some of these catastrophic patterns, and to regain a kind of stability in climate and weather systems, is “climate repair” – a strategy we call “reduce, remove, repair” – which demands that we make very rapid progress to net zero global emissions; that there is massive, active removal of greenhouse gases from the atmosphere; and, in the first instance, that we refreeze the Earth’s poles and glaciers to correct the wild weather patterns, slow down ice-melt, stabilise sea level, and break the feedback loops that relentlessly accelerate global warming. There are no either/or options. Reducing emissions About 70% of world economies have net zero emissions commitments over varying timescales, but this has come too late to restore climate stability. The IPCC has asked for accelerated progress on this trajectory, but whatever happens, current emission rates of atmospheric greenhouse gases imply global warming of 1.5℃ by 2030 and well over 2℃ above pre-industrial level by the end of the century – a devastating outcome. In particular, melting ice and thawing permafrost are considered inevitable even if rapid and deep CO2 emissions reductions are achieved, with sea-level rise to continue for centuries as a result. In every area of the world, climate events will become more severe and more frequent, whether flooding, heating, coastal erosion or fires. There are definitely important steps that can still reduce the scale of this devastation, including faster and deeper emissions reductions. However, this is not enough on its own to avert the worst. Together there is real evidence that the massive removal of greenhouse gases from the atmosphere and solutions such as repairing the Earth’s poles and glaciers could help humanity find a survivable way out of this crisis. Removing greenhouse gases Taking CO2 and equivalent greenhouse gases out of the atmosphere, with the aim of getting back to 350ppm (parts per million) by 2100, involves creating new CO2 “sinks” – long-term stores from which CO2 cannot escape. Sinks operate at many scales, with forest planting, mangrove restoration, wetland and peat preservation all crucially important. Very large projects, such as the restoration of the Loess Plateau in China demonstrate scalable CO2 removal, with multiple add-on benefits of food production, bio-diversity enhancement and weather stabilisation. Habitat restoration can also make economic sense. In the Philippines, mangrove is the focus of a cost-benefit analysis. Mangrove captures four times more carbon than the same area of rainforest, provides numerous ecosystem services and protects against flooding, conferring socio-economic benefits and significantly reducing the cost of dealing with extreme weather events. Big new carbon sinks must be created wherever safely possible, including in the oceans. Interventions that mimic natural processes, known to operate safely “in the wild”, are a workable starting point. Promotion of ocean pastures to restore ocean diversity and fish and whale stocks to the levels last seen 300 years ago is one such possibility – offering new sustainable food sources for humans, as well as contributing to climate ecosystem services and carbon sinks. In nature, sprinklings of iron-rich dust blow from deserts or volcanic eruptions, onto the surface of deep oceans, generating – in a matter of months – rich ocean pastures, teeming fish stocks and an array of marine wildlife. Studies of ocean kelp regeneration show the full range of real-life impacts, from increased protein sources for human consumption, to restoration of pre-industrial levels of ocean biodiversity and productivity, and extensive carbon sequestration. Extending the scale and number of ocean pastures could be achieved by systematically scattering iron-rich dust onto target areas in oceans around the world. The approach is intuitively scalable, and could sequester perhaps 30 billion tons per year of CO2 if 3% or so of the world’s deep oceans were to be treated annually. Large-scale carbon-sink creation of this kind is pivotal if the atmosphere is to return to pre-industrial CO2 levels. A billion tons per year of sequestration is the minimum threshold coordinated by the Centre for Climate Repair at Cambridge given the intensity of the climate crisis. While the scale of intervention is sometimes called “geoengineering”, the approach is closer to forest planting or mangrove restoration. The aim is to remove CO2 from the atmosphere using natural means, to return us to pre-industrial levels within a single generation. Repairing the planet The immediate challenge is to stabilise the planet, achieving a manageable equilibrium that gives a last chance to shift to renewable energy and towards a circular global economy, with new norms in urban, rural and ocean management. “Repairing” systematically seeks to draw the Earth back from climate tipping points (which, by definition, cannot happen without direct effort), providing a supporting framework in which “reduce” and “restore” can happen. Political and societal will is needed. The most urgent effort is to refreeze the Arctic, interrupting a bleak spiral of accelerating ice loss, sea-level rise – and the acceleration of climate change and violent global weather changes that they cause. Arctic temperatures have risen much faster (and increasingly so) than global average temperatures, when compared with pre-industrial levels. Figure 1 shows this clearly from 1850 to the present day. Melting Arctic ice embodies a powerful feedback force in climate change. White ice reflects the Sun’s energy away from the Earth before it can heat the surface. This is known as the albedo effect. As ice melts, dark-blue seawater absorbs increasing amounts of the Sun’s energy, warming increases, and ever-larger areas of ice disappear each summer, expanding the acceleration. Arctic temperatures govern winds, ocean currents and weather systems across the globe. A tipping point is passing: sea-ice loss is becoming permanent and accelerating; Greenland ice will follow and will eventually raise global sea-levels by over seven metres. Total loss may take centuries but, decade by decade, there will be relentless incremental impacts. By mid-century the melting will be irreversible, and sea-level rise alone will leave low-lying countries like Vietnam in desperate circumstances, with reductions to global rice production a certainty, many millions of climate refugees and no obvious pathway forward for such nations. Figure 1: comparison between average global temperature change, and change in the Arctic region from 1850 to present day. Provided by Nerilie Abram using IPCC data, ANU, Australia, 2021 The rapid Arctic temperature increase is matched by the rapid and accelerating loss in minimum (summer) sea-ice volume (Figure 2), which further accelerates the temperature rise in a spiral of reinforcing feedback loops. Figure 2: decline in annual minimum Arctic Sea ice volume 1980-2020. Provided by Nerilie Abram using IPCC data, ANU, Australia, 2021 It is vital to pivot the world back from this ice-melt tipping point, and to repair the Arctic as rapidly as possible. Marine cloud brightening in which floating solar-powered pumps spray salt upwards to brighten clouds and create a reflective barrier between the Sun and the ocean, is known to cool ocean surfaces and is a promising way to promote Arctic summer cooling. It mimics nature, and can be scaled up or down in a flexible way. Studies of marine cloud brightening, its climate impacts and interactions with human systems, are underway. As with promotion of ocean pastures, such solutions must be critically analysed, but there is no longer any doubt of their crucial importance. What we do in the next five years determines the viability of humanity’s future. Even if we narrow our aspirations to “survival”, fixing on a timescale of 50 years or so, the challenges are daunting. Humanity deserves better. We know what to do to be able to imagine thousands of years of human civilisation ahead, as well as behind us.

#### Debt won’t collapse the economy

Bryan 16 — Bob Bryan is a policy reporter at Business Insider. He graduated from the University of North Carolina at Chapel Hill with degrees in journalism and political science, 4-25-2016 ("The US government's $19 trillion debt isn't a problem ", Business Insider, http://www.businessinsider.com/us-government-19-trillion-debt-not-a-problem-2016-4)

The US government has a lot of debt, about $19 trillion of it. That's a huge, intimidating number on the face of it, but according to Scott Brown of Raymond James, it's also not a serious issue. "Just when you thought all the fear-mongering had subsided, the national debt has resurfaced as a topic in this year's presidential race," Brown said Monday in a note to clients. "Yes, the deficit is large. No, it is not a problem." In Brown's analysis there are two things happening when people talk about the debt. On the one hand, they are concerned about the current deficit, essentially the rolling short-term additions to the debt. The increase in this, Brown said, is simply a necessity of response to the latest recession. "The federal budget deficit hit $1.4 trillion in FY09, or about 10% of nominal GDP," Brown wrote. "That is enormous, but it simply reflected the magnitude of the Great Recession. "Revenues fell. Recession-related spending (unemployment insurance, fiscal stimulus) rose. As the economy recovered, recession-related spending went away and tax receipts improved. The deficit is now down to 2.5% of GDP, which is sustainable." On the other hand, people are also concerned about the long-term amassed debt, that gnarly $19 trillion number. The issue with this line of complaint, Brown said, is there is no nominal level in which the whole thing comes crashing down. "There is no magic level of debt that gets an economy in trouble," Brown, the chief economist at Raymond James, said in the note. "Research arguing that view has been discredited. The federal government currently has no problem borrowing, nor is there any evidence that it is crowding out private investment." Brown's argument is fairly simple: Debt is an issue only if you can't repay it or if other people believe you can't repay it. And, as Business Insider's Myles Udland has noted, the US can literally print the money it needs to repay its debt, and it still maintains a high credit rating.

#### Elites – they block a transition

Alexander 15—Lecturer at the Office for Environmental Programs at the University of Melbourne who wrote his PhD thesis on degrowth (Samuel, Prosperous Descent: Crisis as Opportunity in an Age of Limits p. xiv-xv)

Before proceeding I should briefly anticipate an objection that will no doubt arise even from this preliminary overview. Let me be clear: the notion of ‘prosperous descent’ is not a prediction. I am not arguing that human beings are going to create a global village of thriving, sufficiency economies, nor do I even suggest that this is likely. And I am certainly not arguing that an unplanned, chaotic civilisational collapse into poverty is going to be ‘prosperous’ (so please do not accuse me of that). My argument is simply that economies of sufficiency, in which the entire community of life can flourish, are the only way to respond effectively to the overlapping crises of industrial civilisation. To oppose Margaret Thatcher with her own words: ‘there is no alternative’. If this can be established, as I believe it can, it would follow that we should try to create sufficiency economies, here and now, even if our chances of success do not look good. We may never realise the ideal of a sufficiency economy, but having a coherent ideal functions as a compass to guide action. Without a compass, our energies and efforts would lack direction and thus could easily be misdirected with the best of intentions. Indeed, I worry that dominant strains of the environmental movement today can be understood primarily as misdirected good intentions, efforts which tend to be mistaken in attempting to ‘green’ a growth-orientated mode of production that can never be green. Others oppose the existing order without having any conception of what should replace it. Even those who reject the growth economy sometimes fail to understand the radical implications of such a proposal; fail to understand that we cannot give up growth while other aspects of life more or less go on as usual. Sufficiency, I contend, is a revolutionary project. While I believe the practical question of ‘strategy’ – the question of how to realise a sufficiency economy – should remain open and dependent on context, the ‘theory of change’ that informs these essays is one grounded in grassroots, community-based action and initiatives. That is to say, I contend that until we have a culture or social consciousness that embraces sufficiency, our politicians are not going to be driven to create the necessary structures of sufficiency, nor, in the absence of such a culture, are we going to build new structures ourselves. In fact, even if such a culture of sufficiency emerged, our politicians are likely to be sluggish and non-responsive in supporting it. This means that the primary (although not necessarily the exclusive) forces of societal change must come ‘from below’, from people like you and me, working in our local communities, at the grassroots level. Before all else, we need to create the social conditions for deep transformation. There is a huge amount our governments could do, of course, to create just and sustainable economies of sufficiency, and in certain chapters I explore some available policy options. This can help us imagine alternative forms of human society and organisation. But we must not wait for governments to act, or we will still be waiting while the ship of civilisation sails over the cliff and crashes into the dark abyss below.

#### Covid proves recovery will be the priority, NOT sustainability – dirty growth, anti-environment agendas, and public backlash turn the k

Bradshaw et al 21 (Corey J. A. Bradshaw, Global Ecology, College of Science and Engineering, Flinders University, Australia, Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage; Paul R. Ehrlich, Department of Biology, Stanford University; Andrew Beattie, Department of Biological Sciences, Macquarie University, Australia; Gerardo Ceballos, Instituto de Ecología, Universidad Nacional Autónoma de México; Eileen Crist, Department of Science, Technology, and Society, Virginia Tech; Joan Diamond, Millennium Alliance for Humanity and the Biosphere, Department of Biology, Stanford University; Rodolfo Dirzo, Department of Biology, Stanford University; Anne H. Ehrlich, Department of Biology, Stanford University; John Harte, Energy and Resources Group, University of California, Berkeley, The Rocky Mountain Biological Laboratory; Mary Ellen Harte, The Rocky Mountain Biological Laboratory; Graham Pyke, Department of Biological Sciences, Macquarie University, Australia; Peter H. Raven, Missouri Botanical Garden; William J. Ripple, Department of Forest Ecosystems and Society, Oregon State University; Frédérik Saltré, Global Ecology, College of Science and Engineering, Flinders University, Australia, Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage; Christine Turnbull, Department of Biological Sciences, Macquarie University, Australia; Mathis Wackernagel, Global Footprint Network; and Daniel T. Blumstein, La Kretz Hall, Institute of the Environment and Sustainability, and Department of Ecology and Evolutionary Biology, University of California, Los Angeles; “Underestimating the Challenges of Avoiding a Ghastly Future,” Frontiers in Conservation Science, 1-13-2021, DOI: 10.3389/fcosc.2020.615419)

Simultaneous with population growth, humanity's consumption as a fraction of Earth's regenerative capacity has grown from ~ 73% in 1960 to 170% in 2016 (Lin et al., 2018), with substantially greater per-person consumption in countries with highest income. With COVID-19, this overshoot dropped to 56% above Earth's regenerative capacity, which means that between January and August 2020, humanity consumed as much as Earth can renew in the entire year (overshootday.org). While inequality among people and countries remains staggering, the global middle class has grown rapidly and exceeded half the human population by 2018 (Kharas and Hamel, 2018). Over 70% of all people currently live in countries that run a biocapacity deficit while also having less than world-average income, excluding them from compensating their biocapacity deficit through purchases (Wackernagel et al., 2019) and eroding future resilience via reduced food security (Ehrlich and Harte, 2015b). The consumption rates of high-income countries continue to be substantially higher than low-income countries, with many of the latter even experiencing declines in per-capita footprint (Dasgupta and Ehrlich, 2013; Wackernagel et al., 2019). This massive ecological overshoot is largely enabled by the increasing use of fossil fuels. These convenient fuels have allowed us to decouple human demand from biological regeneration: 85% of commercial energy, 65% of fibers, and most plastics are now produced from fossil fuels. Also, food production depends on fossil-fuel input, with every unit of food energy produced requiring a multiple in fossil-fuel energy (e.g., 3 × for high-consuming countries like Canada, Australia, USA, and China; overshootday.org). This, coupled with increasing consumption of carbon-intensive meat (Ripple et al., 2014) congruent with the rising middle class, has exploded the global carbon footprint of agriculture. While climate change demands a full exit from fossil-fuel use well before 2050, pressures on the biosphere are likely to mount prior to decarbonization as humanity brings energy alternatives online. Consumption and biodiversity challenges will also be amplified by the enormous physical inertia of all large “stocks” that shape current trends: built infrastructure, energy systems, and human populations. It is therefore also inevitable that aggregate consumption will increase at least into the near future, especially as affluence and population continue to grow in tandem (Wiedmann et al., 2020). Even if major catastrophes occur during this interval, they would unlikely affect the population trajectory until well into the 22nd Century (Bradshaw and Brook, 2014). Although population-connected climate change (Wynes and Nicholas, 2017) will worsen human mortality (Mora et al., 2017; Parks et al., 2020), morbidity (Patz et al., 2005; Díaz et al., 2006; Peng et al., 2011), development (Barreca and Schaller, 2020), cognition (Jacobson et al., 2019), agricultural yields (Verdin et al., 2005; Schmidhuber and Tubiello, 2007; Brown and Funk, 2008; Gaupp et al., 2020), and conflicts (Boas, 2015), there is no way—ethically or otherwise (barring extreme and unprecedented increases in human mortality)—to avoid rising human numbers and the accompanying overconsumption. That said, instituting human-rights policies to lower fertility and reining in consumption patterns could diminish the impacts of these phenomena (Rees, 2020). Failed International Goals and Prospects for the Future Stopping biodiversity loss is nowhere close to the top of any country's priorities, trailing far behind other concerns such as employment, healthcare, economic growth, or currency stability. It is therefore no surprise that none of the Aichi Biodiversity Targets for 2020 set at the Convention on Biological Diversity's (CBD.int) 2010 conference was met (Secretariat of the Convention on Biological Diversity, 2020). Even had they been met, they would have still fallen short of realizing any substantive reductions in extinction rate. More broadly, most of the nature-related United Nations Sustainable Development Goals (SDGs) (e.g., SDGs 6, 13–15) are also on track for failure (Wackernagel et al., 2017; Díaz et al., 2019; Messerli et al., 2019), largely because most SDGs have not adequately incorporated their interdependencies with other socio-economic factors (Bradshaw and Di Minin, 2019; Bradshaw et al., 2019; Messerli et al., 2019). Therefore, the apparent paradox of high and rising average standard of living despite a mounting environmental toll has come at a great cost to the stability of humanity's medium- and long-term life-support system. In other words, humanity is running an ecological Ponzi scheme in which society robs nature and future generations to pay for boosting incomes in the short term (Ehrlich et al., 2012). Even the World Economic Forum, which is captive of dangerous greenwashing propaganda (Bakan, 2020), now recognizes biodiversity loss as one of the top threats to the global economy (World Economic Forum, 2020). The emergence of a long-predicted pandemic (Daily and Ehrlich, 1996a), likely related to biodiversity loss, poignantly exemplifies how that imbalance is degrading both human health and wealth (Austin, 2020; Dobson et al., 2020; Roe et al., 2020). With three-quarters of new infectious diseases resulting from human-animal interactions, environmental degradation via climate change, deforestation, intensive farming, bushmeat hunting, and an exploding wildlife trade mean that the opportunities for pathogen-transferring interactions are high (Austin, 2020; Daszak et al., 2020). That much of this degradation is occurring in Biodiversity Hotspots where pathogen diversity is also highest (Keesing et al., 2010), but where institutional capacity is weakest, further increases the risk of pathogen release and spread (Austin, 2020; Schmeller et al., 2020). Climate Disruption The dangerous effects of climate change are much more evident to people than those of biodiversity loss (Legagneux et al., 2018), but society is still finding it difficult to deal with them effectively. Civilization has already exceeded a global warming of ~ 1.0°C above pre-industrial conditions, and is on track to cause at least a 1.5°C warming between 2030 and 2052 (IPCC, 2018). In fact, today's greenhouse-gas concentration is >500 ppm CO2-e (Butler and Montzka, 2020), while according to the IPCC, 450 ppm CO2-e would give Earth a mere 66% chance of not exceeding a 2°C warming (IPCC, 2014). Greenhouse-gas concentration will continue to increase (via positive feedbacks such as melting permafrost and the release of stored methane) (Burke et al., 2018), resulting in further delay of temperature-reducing responses even if humanity stops using fossil fuels entirely well before 2030 (Steffen et al., 2018). Human alteration of the climate has become globally detectable in any single day's weather (Sippel et al., 2020). In fact, the world's climate has matched or exceeded previous predictions (Brysse et al., 2013), possibly because of the IPCC's reliance on averages from several models (Herger et al., 2018) and the language of political conservativeness inherent in policy recommendations seeking multinational consensus (Herrando-Pérez et al., 2019). However, the latest climate models (CMIP6) show greater future warming than previously predicted (Forster et al., 2020), even if society tracks the needed lower-emissions pathway over the coming decades. Nations have in general not met the goals of the 5 year-old Paris Agreement (United Nations, 2016), and while global awareness and concern have risen, and scientists have proposed major transformative change (in energy production, pollution reduction, custodianship of nature, food production, economics, population policies, etc.), an effective international response has yet to emerge (Ripple et al., 2020). Even assuming that all signatories do, in fact, manage to ratify their commitments (a doubtful prospect), expected warming would still reach 2.6–3.1°C by 2100 (Rogelj et al., 2016) unless large, additional commitments are made and fulfilled. Without such commitments, the projected rise of Earth's temperature will be catastrophic for biodiversity (Urban, 2015; Steffen et al., 2018; Strona and Bradshaw, 2018) and humanity (Smith et al., 2016). Regarding international climate-change accords, the Paris Agreement (United Nations, 2016) set the 1.5–2°C target unanimously. But since then, progress to propose, let alone follow, (voluntary) “intended national determined contributions” for post-2020 climate action have been utterly inadequate. Political Impotence If most of the world's population truly understood and appreciated the magnitude of the crises we summarize here, and the inevitability of worsening conditions, one could logically expect positive changes in politics and policies to match the gravity of the existential threats. But the opposite is unfolding. The rise of right-wing populist leaders is associated with anti-environment agendas as seen recently for example in Brazil (Nature, 2018), the USA (Hejny, 2018), and Australia (Burck et al., 2019). Large differences in income, wealth, and consumption among people and even among countries render it difficult to make any policy global in its execution or effect. A central concept in ecology is density feedback (Herrando-Pérez et al., 2012)—as a population approaches its environmental carrying capacity, average individual fitness declines (Brook and Bradshaw, 2006). This tends to push populations toward an instantaneous expression of carrying capacity that slows or reverses population growth. But for most of history, human ingenuity has inflated the natural environment's carrying capacity for us by developing new ways to increase food production (Hopfenberg, 2003), expand wildlife exploitation, and enhance the availability of other resources. This inflation has involved modifying temperature via shelter, clothing, and microclimate control, transporting goods from remote locations, and generally reducing the probability of death or injury through community infrastructure and services (Cohen, 1995). But with the availability of fossil fuels, our species has pushed its consumption of nature's goods and services much farther beyond long-term carrying capacity (or more precisely, the planet's biocapacity), making the readjustment from overshoot that is inevitable far more catastrophic if not managed carefully (Nyström et al., 2019). A growing human population will only exacerbate this, leading to greater competition for an ever-dwindling resource pool. The corollaries are many: continued reduction of environmental intactness (Bradshaw et al., 2010; Bradshaw and Di Minin, 2019), reduced child health (especially in low-income nations) (Bradshaw et al., 2019), increased food demand exacerbating environmental degradation via agro-intensification (Crist et al., 2017), vaster and possibly catastrophic effects of global toxification (Cribb, 2014; Swan and Colino, 2021), greater expression of social pathologies (Levy and Herzog, 1974) including violence exacerbated by climate change and environmental degradation itself (Agnew, 2013; White, 2017, 2019), more terrorism (Coccia, 2018), and an economic system even more prone to sequester the remaining wealth among fewer individuals (Kus, 2016; Piketty, 2020) much like how cropland expansion since the early 1990s has disproportionately concentrated wealth among the super-rich (Ceddia, 2020). The predominant paradigm is still one of pegging “environment” against “economy”; yet in reality, the choice is between exiting overshoot by design or disaster—because exiting overshoot is inevitable one way or another. Given these misconceptions and entrenched interests, the continued rise of extreme ideologies is likely, which in turn limits the capacity of making prudent, long-term decisions, thus potentially accelerating a vicious cycle of global ecological deterioration and its penalties. Even the USA's much-touted New Green Deal (U. S. House of Representatives, 2019) has in fact exacerbated the country's political polarization (Gustafson et al., 2019), mainly because of the weaponization of ‘environmentalism' as a political ideology rather than being viewed as a universal mode of self-preservation and planetary protection that ought to transcend political tribalism. Indeed, environmental protest groups are being labeled as “terrorists” in many countries (Hudson, 2020). Further, the severity of the commitments required for any country to achieve meaningful reductions in consumption and emissions will inevitably lead to public backlash and further ideological entrenchments, mainly because the threat of potential short-term sacrifices is seen as politically inopportune. Even though climate change alone will incur a vast economic burden (Burke et al., 2015; Carleton and Hsiang, 2016; Auffhammer, 2018) possibly leading to war (nuclear, or otherwise) at a global scale (Klare, 2020), most of the world's economies are predicated on the political idea that meaningful counteraction now is too costly to be politically palatable. Combined with financed disinformation campaigns in a bid to protect short-term profits (Oreskes and Conway, 2010; Mayer, 2016; Bakan, 2020), it is doubtful that any needed shift in economic investments of sufficient scale will be made in time.

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1. **Decline causes war – best evidence**

**Howell 13** (Patrick, B.A. from Emory University. “Economic Crises and the Initiation of Militarized Disputes,” A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree Master of Arts, 2013, https://getd.libs.uga.edu/pdfs/howell\_patrick\_d\_201305\_ma.pdf)

The findings are clear: economic crises are an important trigger for shifts in a state’s rate of dispute initiation. By using a large sample of states over a period of 185 years, this conclusion then can also be taken as **generalizable to the entire population of states** in the international system. In addition to providing support for issue crossover and the influence economic troubles can play on foreign policy decisions, the findings here also support the methodological rationale for using economic crises as explicit, **observable events**, **instead of as trends in other** variables (e.g. GDP growth). Of course, this is not to say that all work on this topic is final. There exist a number of areas where this research agenda can be improved upon and/or extended to in order to provide a more holistic account of where and how economic crises exactly apply political pressure on leaders. First, the study of diversionary war exists in both quantitative tests and in more fine toothed examinations of actual cases (Levy and Vakili 1992; Fravel 2010). Exploring the internal processes within states in such a fashion can also produce a deeper understanding of the exact causal mechanisms through which prospect theory operates. Aggregation and levels of analysis become a basic concern with applying prospect theory outside of the laboratory and to states and governments. After all, “prospect theory is developed as a theory of individual decision making, the question is whether it is applicable to collective decision making” (Vis 2011, 337). Here a unitary actor assumption is made from the outset, but it is also possible that the observed effect is driven instead by individual decision-makers themselves (for example, Fuhrmann and Early 2008, who keep the level of analysis only on President Bush). A deeper case study of a few select cases with an eye towards process might reveal whether the increase in conflict initiation is due to a single policy entrepreneur or leader, or if it is the result of collective behavior (as perhaps even aides, legislators, and bureaucrats seek to compensate for the detrimental effects that accompany an economic crisis separately or in concert). Examination of specific cases might also provide a more accurate picture for policymakers of the strategy that can accompany an economic crisis and inducement of diversionary tendencies in another state. Smith (Smith 1998) hypothesizes diversionary actions as a strategic game, and finds that potential target states should then adopt a policy of strategic avoidance – disengaging from any scenario that might make them a target from a diversionary conflict initiated by an opposing state in dire straits. This question of strategic avoidance occurs most often in the study of the United States (Fordham 2005; Meernik 2005), with evidence that other states avoid and/or initiate fewer disputes with the United States when the American economy is performing poorly. The empirical test here using a proportionbased dependent variable might already be capturing some degree of a strategic avoidance effect, in that some of the variation in the proportion of initiation could be because the rate of other states initiating disputes on the crisis-stricken state is decreasing. If strategic avoidance is occurring, it actually increases the strength of aspects of the diversionary war literature (in that other states are actually behaving according to expectations of diversionary actions), but much more work and nuance would be needed to separate where then the logic in strategic avoiders is originating. The final implication of the findings to be discussed here is the role of institutions in this analysis. As stated above, the institutional controls that were included in the estimation **demonstrated null effects** on the overall rate of militarized dispute initiation. This finding is interesting considering the enshrined role that institutions and regime types tend to play within scholarly work on diversionary war. Similar to the mixed results of GDP indicators, mixed and contradictory results can be found throughout the body of work on diversionary war: some find that the diversionary effects exist mainly in democratic settings (Gelpi 1997; Davies 2002; Brul´e and Williams 2009), while others find that diversionary effects occur in autocratic settings (Miller 1999; Lai and Slater 2005; Pickering and Kisangani 2010). One method of reconciling the conflicting conclusions of whether democratic or autocratic leaders are more likely to engage in diversionary behavior is in direct tests comparing the two regime types. Typically, these comparisons have either found the two regime types differ in the targets that are selected by each (Bueno De Mesquita and Siverson 1995), or have found some fault with the way that the regime types themselves are defined, due to differing incentives for differing subtypes of regimes (Pickering and Kisangani 2005). In order to examine the difference between democracies and autocracies, I split the sample from Model 2 into either of the regime types, using a score of 6 in the Polity2 measure as a cut-point. Splitting the sample has the effect of interacting regime type with all independent variables, giving regime specific effects not only for economic crises, but also all control variables.1 The results of this regime split can be found in Table 2. As can be seen here, the effect of economic crises is positive and significant in both institutional settings. Comparing the coefficients for economic crisis in Table 2 with those of the original Model 2, the likely explanation for why the institutional variables in the original model did not have an impact on crisis initiation is because all democracies and autocracies possess relatively similar incentives for increasing crisis initiation following economic crises, so any variation across institutions was only averaged out. However, the results presented in Table 2 also provide support for a difference existing in the process of how diversionary conflict might occur in either regime type, due to the differences in control variable significance. This lends some credence to the separation of democracies and autocracies for study of diversionary war, but provides no evidence that the effect should only exist in one or the other. The similarity in the **main independent variable** of economic crises, though, furthers the assertion that the effect of economic crises increasing dispute initiation can be viewed as a general behavior of all states in the international system. Conclusions Altogether, there can be said to be a **robust, positive relationship** between the occurrence of economic crises and the rate of dispute initiation by states. This effect is especially strong and demonstrable when **time ordering is preserved** by examining how crises in the previous year affect states in their current year. These findings can also be said to have a relatively high degree of substantive import as well. As Figure 1 showed, the occurrence of each subsequent economic crisis increases the chances of a state initiating disputes by almost 3%. The nearly 20 percentage point increase in dispute initiation across the range of the lagged economic crisis variable also represents a **substantial impact**, **especially considering the rare event nature of militarized disputes to begin with.** This generalizable finding can have far-reaching impact to both the study of diversionary war in academia, as well as directly for policymakers. In academe settings, there is good evidence to support the use of acute economic crises over those variables based on the slowershifting trends of GDP or public opinion measurements. Economic crises act as an **explicit trigger** that can mark a leader’s shift into a losses frame and **engage in riskier behavior** consistent with both prospect theory and diversionary war hypotheses. Meanwhile, applying this observed effect to the real world would seem to indicate that if a state goes through an economic crisis, other states should have increased wariness in their dealings with the crisis-stricken state and/or be more prepared for the possibility of a new dispute emerging in the wake of such an event.

1. **Nuke war causes extinction – AND, turns dedev**

**Starr 14** {Steven, Senior Scientist for Physicians for Social Responsibility, Director of the Clinical Laboratory Science Program (Missouri), commentator in the Bulletin of the Atomic Scientists and the Strategic Arms Reduction, Associate member of the Nuclear Age Peace Foundation, “The Lethality of Nuclear Weapons: Nuclear War has No Winner,” Global Research: Centre for Research on Globalization, 6/5, http://www.globalresearch.ca/the-lethality-of-nuclear-weapons-nuclear-war-has-no-winner/5385611}

Nuclear war **has no winner**. Beginning in 2006, several of the world’s **leading climatologists** (at Rutgers, UCLA, John Hopkins University, and the University of Colorado-Boulder) published a series of studies that evaluated the long-term environmental consequences of a nuclear war, including baseline scenarios fought with **merely 1%** of the explosive power in the US and/or Russian launch-ready nuclear arsenals. They concluded that the consequences of even a “small” nuclear war would include **catastrophic disruptions** of global climate[i] and **massive destruction** of Earth’s protective ozone layer[ii]. These **and more recent studies** predict that global agriculture would be so negatively affected by such a war, a global famine would result, which would cause up to **2 billion people to starve to death**. [iii]¶ These **peer-reviewed** studies – which were analyzed by the **best scientists in the world** and found to be without error – also predict that a war fought with less than half of US or Russian strategic nuclear weapons would **destroy the human race**.[iv] In other words, a US-Russian nuclear war would create such extreme long-term damage to the global environment that it would leave the Earth **uninhabitable** for humans and most animal forms of life.¶ A recent article in the Bulletin of the Atomic Scientists, “Self-assured destruction: The climate impacts of nuclear war”,[v] begins by stating:¶ “A nuclear war between Russia and the United States, even after the arsenal reductions planned under New START, could produce a nuclear winter. Hence, an attack by either side could be **suicidal**, resulting in self-assured destruction.”¶ In 2009, I wrote an article[vi] for the International Commission on Nuclear Non-proliferation and Disarmament that summarizes the findings of these studies. It explains that nuclear firestorms would produce millions of tons of smoke, which would rise above cloud level and form a global stratospheric smoke layer that would **rapidly encircle the Earth**. The smoke layer would remain for at least a **decade**, and it would act to destroy the protective ozone layer (vastly increasing the UV-B reaching Earth[vii]) as well as block warming sunlight, thus creating Ice Age weather conditions that would last **10 years** or longer.¶ Following a US-Russian nuclear war, temperatures in the central US and Eurasia would fall below freezing every day for one to three years; the intense cold would **completely eliminate growing seasons for a decade** or longer. No crops could be grown, leading to a famine that would **kill most humans and large animal populations**.¶ Electromagnetic pulse from high-altitude nuclear detonations would destroy the integrated circuits in all modern electronic devices[viii], including those in commercial nuclear power plants. Every nuclear reactor would almost **instantly** meltdown; every nuclear spent fuel pool (which contain many times more radioactivity than found in the reactors) would boil-off, releasing vast amounts of **long-lived** radioactivity. The fallout would make most of the US and Europe **uninhabitable**. Of course, the survivors of the nuclear war would be **starving to death anyway.** Once nuclear weapons were introduced into a US-Russian conflict, there would be little chance that a nuclear holocaust could be avoided. Theories of “limited nuclear war” and “nuclear de-escalation” are **unrealistic**.[ix] In 2002 the Bush administration modified US strategic doctrine from a retaliatory role to permit preemptive nuclear attack; in 2010, the Obama administration made only incremental and miniscule changes to this doctrine, leaving it essentially unchanged. Furthermore, Counterforce doctrine – used by both the US and Russian military – emphasizes the need for preemptive strikes once nuclear war begins. Both sides would be under immense pressure to launch a preemptive nuclear first-strike once military hostilities had commenced, especially if nuclear weapons had already been used on the battlefield.

1. **Collapse turns dedev too – decks green programs now**

**Korowicz 14** – David Korowitcz, Former Ministerial Appointment to the Council of Comhar, Director of Metis Risk, on the executive committee of Feasta, “How to be Trapped: An Interview with David Korowicz,” The Foundation for the Economics of Sustainability, March 19, 2014, http://www.resilience.org/stories/2014-03-19/how-to-be-trapped-an-interview-with-david-korowicz)

That said, a disorderly de-growth/collapse would bring us to a new era where we would end up with a much reduced capacity to **access** and use **resources** and **dump waste**. But **we’d still have to respond to problems** and that would generally require whatever energy and resources were at hand. For example, anthropogenic greenhouse gas emissions would likely nose-dive, a good thing of course, although the effects of climate changes would continue to **get worse** because of lags in the climate system while our adaptive capacity compared to today would have been **shattered**. Thus the real cost of climate change would **escalate** beyond our ability to pay quite **suddenly** and much faster than conventional climate-economic models would suggest. The danger here is that in a state of poverty and forced localization our attempts to respond to such emergent stress and crises mean we start **undermining our local environments** and their on-going capacity to support us. So any form of steady-state economy in the foreseeable future is inherently problematic.

1. **Dedev can’t solve warming and transition dooms billions to mass poverty**

\*answers Hickel

**Piper 21** (Kelsey, writing with Vox, citing Zeke Hausfather, climate scientist at the Breakthrough Institute, and Michael Mann, climatologist at Penn State, “Can we save the planet by shrinking the economy?,” 8/3/21, <https://www.vox.com/future-perfect/22408556/save-planet-shrink-economy-degrowth)//NRG>

The tension at the heart of degrowth: Can we fix global poverty without economic growth? One big problem with degrowth is this simple fact: In the coming decades, most carbon emissions won’t be coming from rich countries like the US — they’ll be happening in newly middle-income countries, like India, China, or Indonesia. Already, developing nations account for 63 percent of emissions, and they’re expected to account for even more as they develop further and as the rich world decarbonizes. Even if emissions in rich countries go to zero very soon, climate change is set to worsen as poorer countries increase their own emissions. That will, of course, have deeply negative climate impacts. But the alternative is a nonstarter — should the world really prioritize curbing emissions and economic growth if it meant suppressing the growth of those countries? Degrowthers see no dilemma here. What Hickel envisions is global movement in two directions: Poor countries could develop up to a certain level of prosperity and then stop; rich countries could develop down to that level and then stop. Thus, climate catastrophe could be averted, all while making the world’s poor more prosperous. “Rich countries urgently need to reduce their excess energy and resource use to sustainable levels so our sisters and brothers in the global South can live well too,” Hickel put it. “We live on an abundant planet and we can all flourish on it together, but to do so we have to share it more fairly, and build economies that are designed around meeting human needs rather than around perpetual growth.” From a climate change perspective, though, there’s a problem. First, it means that **degrowth would do nothing about the bulk of emissions, which are occurring in developing countries.** Second, the global economy is more **interconnected** than Hickel implies. When Covid-19 hit, poor countries were **devastated** not just by the virus but by the aftershocks of virus-induced slowdowns in consumption in rich countries. There’s some genuine appeal to the idea of an end to “consumerism,” but the pandemic offered a taste of how a sudden drop in rich-world consumption would actually affect the developing world. Covid-19 dramatically curtailed Western **imports** and **tourism** for a time. The consequences in poor countries were devastating. **Hunger** rose, and **child mortality** followed.

1. **Covid proves transition fails – society turns back to growth**

**McAfee 20** (Andrew, principal research scientist at MIT, “Why Degrowth Is the Worst Idea on the Planet,” 10/6/20, <https://www.wired.com/story/opinion-why-degrowth-is-the-worst-idea-on-the-planet/)///NRG>

Thanks to Covid-19, we have an inkling of how this would feel. A “**degrowth recession**” wouldn't have the virus’ deaths and sickness, and it wouldn't require us to practice social distancing. But it would have all the economic contractions’ **job losses**, **business closures**, **mortgage defaults**, and other hardships and uncertainties. And it would have them **without end**—after all, growth can't be allowed to restart. Corporate and government revenue would decrease permanently, and therefore so would innovation and R&D. How many of us would be willing to accept **all of this** in exchange for somewhat less pollution and resource use? To sharpen the question, how many of us would be willing to accept this recession if it wasn’t necessary—if it were clear that we could get environmental improvements while **continuing to grow** and prosper? The ecomodernist argument is that that is in fact clear. Unlike the degrowth argument, it's supported by a great deal of evidence. What's at least important is that it will be supported by a great deal of the world's people, who will eagerly sign up to climb our new green path to prosperity.