# 1NC

## OFF

### 1NC — T

#### Topical affirmatives must instrumentally defend an expansion of the scope of the United States’ core antitrust laws to substantially increase prohibitions on anticompetitive business practices.

#### Resolved means a policy

Louisiana House 5

(<http://house.louisiana.gov/house-glossary.htm>)

Resolution A legislative instrument that generally is used for making declarations, stating policies, and making decisions where some other form is not required. A bill includes the constitutionally required enacting clause; a resolution uses the term "resolved". Not subject to a time limit for introduction nor to governor's veto. ( Const. Art. III, §17(B) and House Rules 8.11 , 13.1 , 6.8 , and 7.4)

#### Federal government is the legislative, executive and judicial

US Legal No Date (United States Federal Government Law and Legal Definition https://definitions.uslegal.com/u/united-states-federal-government/)

The United States Federal Government is established by the US Constitution. The Federal Government shares sovereignty over the United Sates with the individual governments of the States of US. The Federal government has three branches: i) the legislature, which is the US Congress, ii) Executive, comprised of the President and Vice president of the US and iii) Judiciary. The US Constitution prescribes a system of separation of powers and ‘checks and balances’ for the smooth functioning of all the three branches of the Federal Government. The US Constitution limits the powers of the Federal Government to the powers assigned to it; all powers not expressly assigned to the Federal Government are reserved to the States or to the people.

#### Should requires action

AHD 2k

(American Heritage Dictionary 2000 (Dictionary.com))

should. The will to do something or have something take place: I shall go out if I feel like it.

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

Lisa Kimmel 20, Senior Counsel at Crowell & Moring, LLP in Washington, D.C., twenty years of experience as an antitrust lawyer and holds a Ph.D. in economics from the University of California at Berkeley; and Eric Fanchiang, associate in Crowell & Moring’s Irvine, CA office and a member of the firm’s antitrust and commercial litigation groups, 2020, “Antitrust and Intellectual Property Licensing,” in 2020 Licensing Update, Wolters Kluwer Legal & Regulatory U.S., https://www.crowell.com/files/20200401-Licensing-Update-Chapter-13.pdf

U.S. antitrust law is defined by federal and state statutes, as interpreted by the courts. The core federal statutes are the Sherman Act,1 passed by Congress in 1890, and the Federal Trade Commission2 and Clayton Acts,3 both passed in 1914. The United States Department of Justice (“DOJ”) and the Federal Trade Commission (“FTC” or “Commission”) (together the “agencies”) share enforcement of most areas of federal antitrust law but with some differences in the scope of their authority. The FTC has sole authority to enforce Section 5 of FTC Act, which prohibits (1) unfair methods of competition and (2) unfair or deceptive acts or practices. The FTC almost always pursues claims for anticompetitive conduct as unfair methods of competition and reserves charges of unfair or deceptive acts or practices for consumer protection violations. Though the FTC's authority to challenge unfair methods of competition goes beyond conduct prohibited by the Sherman and Clayton Acts, in practice the FTC brings most unfair methods of competition cases under the same standards that courts apply to Sherman Act claims. The most prominent exception is the invitation to collude offense, which falls outside the scope of the Sherman Act (if the invitation is not accepted, there is no agreement). The FTC challenges invitations to collude as so-called “standalone” violations of Section 5.4 The DOJ has sole authority to pursue criminal violations of the antitrust laws. Most states have their own state antitrust and unfair competition statutes. State law follows federal law to some extent, though as discussed below, may differ from federal law in meaningful ways that vary state to state. State attorneys general and private parties can also typically file suit to enforce both federal and state antitrust law.

#### They violate because each of the above words require governmental action – they defend the self doing an explanation

#### Vote negative — 3 impacts —

#### 1 — Fairness — forced winner-loser nature means debate is a game — the aff has a strategic incentive to stray from the resolution — that makes research impossible, discourages argumentative innovation, and turns accessibility — accesses the terminal impact to the activity.

#### 2 — Clash — they incentivise defense of unanswerable positions and monopolization of moral high ground — denies a role for the neg and transforms debate into a lecture — that destroys rigorous testing, advocacy, and research skills — turns their advocacy and precludes every intrinsic benefit to debate.

#### 3 — Topic Education — policy debates over antitrust are valuable

Waller & Morse 20, \*John Paul Stevens Chair in Competition Law; Professor and Director, Institute for Consumer Antitrust Studies, Loyola University Chicago School of Law \*\*J.D. Expected 2021, Loyola University Chicago School of Law (\*Spencer Weber Waller \*\*Jacob Morse, 7-26-2020, "The Political Face of Antitrust," Brooklyn Journal of Corporate, Financial, and Commercial Law, https://ssrn.com/abstract=3660946)

IV. Antitrust in Civil Society

Competition issues are also part of the general civic discourse separate from the campaign rhetoric and legislative proposals offered by politicians. This is also a significant sign that antitrust has begun to be an important source of small “p” politics that engages substantial segments of the public at large. One example is the increased number of non-technical books intended for a lay audience that deal with the role of antitrust in a healthy economy and democracy. Recent and forthcoming books dealing with these themes include Tim Wu’s “The Curse of Bigness,”109 Matt Stoller’s “Goliath,”110 Maurice Stucke and Ariel Ezrachi’s “Competition Overdose,”111 Zephyr Teachout’s “Break ‘em Up,”112 and David Dayan’s “Monopolized.”113 On the academic side, there are a plethora of government and NGO studies of competition policy on digital competition114 and new works are flourishing which explore the broader ramifications of antitrust and competition in society.115 Long form and more mass-market journalism have also taken up the mantle of exploring the role of antitrust and competition policy. Such diverse magazines as The Atlantic,116 Time, 117 New Republic,118 American Prospect,119 Rolling Stone,120 New York Times magazine,121 Variety,122 National Review, 123 Foreign Policy,124 and other policy and opinion magazines have all run recent stories or profiles of individuals involved in antitrust issues. Before the COVID-19 pandemic effectively monopolized press coverage in the United States, there were thirty-three antitrust related stories on the front page of the New York Times or the front page of its business section over a three-month period in late 2019. 125 A majority of the stories focused on tech giants such as Apple, Microsoft, Google, Amazon, and Facebook.126 In addition, the New York Times also covered stories about mergers, merger policy, local issues such as the Chicago taxi market, and various smaller industries.127 This is separate from coverage during the same period of campaign issues and candidate statements relating to the field. A similar increase in coverage during this same period can be observed anecdotally in more business-oriented publications like Forbes, Barron’s, Wired, and the Wall Street Journal; general newspapers like USA Today, Washington Post, and Huffington Post; more local newspapers; as well as radio and television.128 Web pages and social media accounts on these issues have similarly proliferated on all ideological perspectives.129 Lobbying and public policy groups are growing in number and influence. Beyond the traditional trade associations and general think tanks there are now a number of active groups with antitrust as a large part of their focus. These include the Open Markets Institute, 130 American Antitrust Institute, 131 Anti-Monopoly Fund,132 Institute for Self-Reliance,133 Public Citizen,134 Public Knowledge,135 Demos, 136 and the International Center for Law and Economics.137 At the more technical legal end of the debate, antitrust is similarly flourishing as a field. One sees increased law school hiring in the field for the first time in decades. Academic institutes and centers abound with a wide variety of perspectives ranging from libertarian to enforcement oriented.138 Most major antitrust cases now feature multiple amicus briefs from legal and economic experts on both sides of an issue both in the Supreme Court or the Courts of Appeals.139

Conclusion

Antitrust has always been political in nature. Antitrust law provides broad legal commands dealing with how governments and private individuals can challenge different types of market behavior. In this way, antitrust has not changed. Antitrust will never take the place of sports, the Dow Jones index, or the weather for conversation at the breakfast table, but it has become a meaningful part of the political and policy debate for candidates, the legislature, and important segments of civil society. What has changed, however, is the degree that antitrust has reentered the political arena. Once mostly the domain of technocrats, antitrust issues have been proposed and debated by Presidential candidates, political parties, legislators, pundits, journalists, lobby groups, and voters alike. There are also a flurry of serious proposals and investigations that would make significant changes to the current system if adopted. This is all to the good. Even if none of the current proposals come to fruition, the antitrust debate is part of a broader engagement with political economy issues dealing with fundamental concerns such as economic concentration, globalization, income inequality, social and racial justice, and even recently the proper response to the COVID-19 emergency. The many proposals, initiatives, and pressure groups represent at a minimum the return of antitrust as part of the progressive agenda.

#### Switch side debate solves their offense — it’s the greatest internal link to advocacy skills and the most reflexive version of the topic.

### 1NC—P

#### Interp: Teams must disclose 30 minutes prior to the debate round – they didn’t – the impact is clash.

## ON

### 1NC – Presumption

#### Frame the 1AC through solvency, not impacts – any attempt to filter offense through the RotB or the speech act of the aff is an arbitrary goalpost that only serves to insulate it from criticism and nuanced testing – forcing us to negate the efficacy of personal strategies is at best impossible and at worst violent – the aff can’t change the material structures of capital – no warrant for how the aff spills up to impact structures of international relations writ large or out of debate means you vote neg on presumption.

### 1NC---Cap Good---TL

#### Extinction categorically outweighs all other impacts.

Seth D. Baum & Anthony M. Barrett 18. Global Catastrophic Risk Institute. 2018. “Global Catastrophes: The Most Extreme Risks.” Risk in Extreme Environments: Preparing, Avoiding, Mitigating, and Managing, edited by Vicki Bier, Routledge, pp. 174–184.

2. What Is GCR And Why Is It Important? Taken literally, a global catastrophe can be any event that is in some way catastrophic across the globe. This suggests a rather low threshold for what counts as a global catastrophe. An event causing just one death on each continent (say, from a jet-setting assassin) could rate as a global catastrophe, because surely these deaths would be catastrophic for the deceased and their loved ones. However, in common usage, a global catastrophe would be catastrophic for a significant portion of the globe. Minimum thresholds have variously been set around ten thousand to ten million deaths or $10 billion to $10 trillion in damages (Bostrom and Ćirković 2008), or death of one quarter of the human population (Atkinson 1999; Hempsell 2004). Others have emphasized catastrophes that cause long-term declines in the trajectory of human civilization (Beckstead 2013), that human civilization does not recover from (Maher and Baum 2013), that drastically reduce humanity’s potential for future achievements (Bostrom 2002, using the term “existential risk”), or that result in human extinction (Matheny 2007; Posner 2004). A common theme across all these treatments of GCR is that some catastrophes are vastly more important than others. Carl Sagan was perhaps the first to recognize this, in his commentary on nuclear winter (Sagan 1983). Without nuclear winter, a global nuclear war might kill several hundred million people. This is obviously a major catastrophe, but humanity would presumably carry on. However, with nuclear winter, per Sagan, humanity could go extinct. The loss would be not just an additional four billion or so deaths, but the loss of all future generations. To paraphrase Sagan, the loss would be billions and billions of lives, or even more. Sagan estimated 500 trillion lives, assuming humanity would continue for ten million more years, which he cited as typical for a successful species. Sagan’s 500 trillion number may even be an underestimate. The analysis here takes an adventurous turn, hinging on the evolution of the human species and the long-term fate of the universe. On these long time scales, the descendants of contemporary humans may no longer be recognizably “human”. The issue then is whether the descendants are still worth caring about, whatever they are. If they are, then it begs the question of how many of them there will be. Barring major global catastrophe, Earth will remain habitable for about one billion more years 2 until the Sun gets too warm and large. The rest of the Solar System, Milky Way galaxy, universe, and (if it exists) the multiverse will remain habitable for a lot longer than that (Adams and Laughlin 1997), should our descendants gain the capacity to migrate there. An open question in astronomy is whether it is possible for the descendants of humanity to continue living for an infinite length of time or instead merely an astronomically large but finite length of time (see e.g. Ćirković 2002; Kaku 2005). Either way, the stakes with global catastrophes could be much larger than the loss of 500 trillion lives. Debates about the infinite vs. the merely astronomical are of theoretical interest (Ng 1991; Bossert et al. 2007), but they have limited practical significance. This can be seen when evaluating GCRs from a standard risk-equals-probability-times-magnitude framework. Using Sagan’s 500 trillion lives estimate, it follows that reducing the probability of global catastrophe by a mere one-in-500-trillion chance is of the same significance as saving one human life. Phrased differently, society should try 500 trillion times harder to prevent a global catastrophe than it should to save a person’s life. Or, preventing one million deaths is equivalent to a one-in500-million reduction in the probability of global catastrophe. This suggests society should make extremely large investment in GCR reduction, at the expense of virtually all other objectives. Judge and legal scholar Richard Posner made a similar point in monetary terms (Posner 2004). Posner used $50,000 as the value of a statistical human life (VSL) and 12 billion humans as the total loss of life (double the 2004 world population); he describes both figures as significant underestimates. Multiplying them gives $600 trillion as an underestimate of the value of preventing global catastrophe. For comparison, the United States government typically uses a VSL of around one to ten million dollars (Robinson 2007). Multiplying a $10 million VSL with 500 trillion lives gives $5x1021 as the value of preventing global catastrophe. But even using “just" $600 trillion, society should be willing to spend at least that much to prevent a global catastrophe, which converts to being willing to spend at least $1 million for a one-in-500-million reduction in the probability of global catastrophe. Thus while reasonable disagreement exists on how large of a VSL to use and how much to count future generations, even low-end positions suggest vast resource allocations should be redirected to reducing GCR. This conclusion is only strengthened when considering the astronomical size of the stakes, but the same point holds either way. The bottom line is that, as long as something along the lines of the standard riskequals-probability-times-magnitude framework is being used, then even tiny GCR reductions merit significant effort. This point holds especially strongly for risks of catastrophes that would cause permanent harm to global human civilization. The discussion thus far has assumed that all human lives are valued equally. This assumption is not universally held. People often value some people more than others, favoring themselves, their family and friends, their compatriots, their generation, or others whom they identify with. Great debates rage on across moral philosophy, economics, and other fields about how much people should value others who are distant in space, time, or social relation, as well as the unborn members of future generations. This debate is crucial for all valuations of risk, including GCR. Indeed, if each of us only cares about our immediate selves, then global catastrophes may not be especially important, and we probably have better things to do with our time than worry about them. While everyone has the right to their own views and feelings, we find that the strongest arguments are for the widely held position that all human lives should be valued equally. This position is succinctly stated in the United States Declaration of Independence, updated in the 1848 Declaration of Sentiments: “We hold these truths to be self-evident: that all men and 3 women are created equal”. Philosophers speak of an agent-neutral, objective “view from nowhere” (Nagel 1986) or a “veil of ignorance” (Rawls 1971) in which each person considers what is best for society irrespective of which member of society they happen to be. Such a perspective suggests valuing everyone equally, regardless of who they are or where or when they live. This in turn suggests a very high value for reducing GCR, or a high degree of priority for GCR reduction efforts.

#### Capitalism is good and sustainable---technological progress has successfully dematerialized economic growth.

McAfee 19, \*Andrew Paul McAfee, a principal research scientist at MIT, is cofounder and codirector of the MIT Initiative on the Digital Economy at the MIT Sloan School of Management; (2019, “More from Less: The Surprising Story of How We Learned to Prosper Using Fewer Resources and What Happens Next”, https://b-ok.cc/book/5327561/8acdbe)

Capitalism and technological progress are the first pair of forces driving dematerialization. This statement will come as a surprise to many, and for good reason. After all, it’s exactly this combination that caused us to massively increase our resource consumption throughout the Industrial Era. As we saw in chapter 3, the ideas of William Jevons and Alfred Marshall point to the distressing conclusion that capitalism and tech progress always lead to more from more: more economic growth, but also more resource consumption.

So what changed? How are capitalism and tech progress now get ting us more from less ? To get answers to these important questions, let’s start by looking at a few recent examples of dematerialization.

Fertile Farms

America has long been an agricultural juggernaut. In 1982, after more than a decade of steady expansion due in part to rising grain prices, total cropland in the country stood at approximately 380 million acres. Over the next ten years, however, almost all of this increase was reversed. So much acreage was abandoned by farmers and given back to nature that cropland in 1992 was almost back to where it had been almost twenty-five years before. This decline had several causes, including falling grain prices, a severe recession, over-indebted farmers, and increased international competition.

A final factor, though, was the ability to get ever-more corn, wheat, soybeans, and other crops from the same acre of land, pound of fertilizer and pesticide, and gallon of water. The material productivity of agriculture in the United States has improved dramatically in recent decades, as we saw in chapter 5. Between 1982 and 2015 over 45 million acres—an amount of cropland equal in size to the state of Washington—was returned to nature. Over the same time potassium, phosphate, and nitrogen (the three main fertilizers) all saw declines in absolute use. Meanwhile, the total tonnage of crops produced in the country increased by more than 35 percent.

As impressive as this is, it’s dwarfed by the productivity improvements of American dairy cows. In 1950 we got 117 billion pounds of milk from 22 million cows. In 2015 we got 209 billion pounds from just 9 million animals. The average milk cow’s productivity thus improved by over 330 percent during that time.

Thin Cans

Tin cans are actually made of steel coated with a thin layer of tin to improve corrosion resistance. They’ve been used since the nineteenth century to store food. Starting in the 1930s, they began also to be used to hold beer and soft drinks.

In 1959 Coors pioneered beer cans made of aluminum, which is much lighter and more corrosion resistant than steel. Royal Crown Cola followed suit for soda five years later. As Vaclav Smil relates, “A decade later steel cans were on the way out, and none of them have been used for beer since 1994 and for soft drinks since 1996.… At 85 g the first aluminum cans were surprisingly heavy; by 1972 the weight of a two-piece can dropped to just below 21 g, by 1988 it was less than 16 g, a decade later it averaged 13.6 g, and by 2011 it was reduced to 12.75 g.”

Manufacturers accomplished these reductions by making aluminum cans’ walls thinner, and by making the sides and bottom from a single sheet of metal so that only one comparatively heavy seam was needed (to join the top to the rest of the can). Smil points out that if all beverage cans used in 2010 weighed what they did in 1980, they would have required an extra 580,000 tons of aluminum. And aluminum cans kept getting lighter. In 2012 Ball packaging introduced into the European market a 330 ml can that held 7.5 percent less than the US standard, yet at 9.5 g weighed 25 percent less.

Gone Gizmos

In 2014 Steve Cichon, a “writer, historian, and retired radio newsman in Buffalo, NY,” paid $3 for a large stack of front sections of the Buffalo News newspaper from the early months of 1991. On the back page of the Saturday, February 16, issue was an ad from the electronics retailer Radio Shack. Cichon noticed something striking about the ad: “There are 15 electronic gimzo type items on this page.… 13 of the 15 you now always have in your pocket.”

The “gizmo type items” that had vanished into the iPhone Cichon kept in his pocket included a calculator, camcorder, clock radio, mobile telephone, and tape recorder. While the ad didn’t include a compass, camera, barometer, altimeter, accelerometer, or GPS device, these, too, have vanished into the iPhone and other smartphones, as have countless atlases and compact discs.

The success of the iPhone was almost totally unanticipated. A November 2007 cover story in Forbes magazine touted that the Finnish mobile phone maker Nokia had over a billion customers around the world and asked, “Can anyone catch the cell phone king?”

Yes. Apple sold more than a billion iPhones within a decade of its June 2007 launch and became the most valuable publicly traded company in history. Nokia, meanwhile, sold its mobile phone business to Microsoft in 2013 for $7.2 billion to get “more combined muscle to truly break through with consumers,” as the Finnish company’s CEO Stephen Elop said at the time of the deal.

It didn’t work. Microsoft sold what remained of Nokia’s mobile phone business and brand to a subsidiary of the Taiwanese electronics manufacturer Foxconn for $350 million in May of 2016. Radio Shack filed for bankruptcy in 2015, and again in 2017.

From Peak Oil to… Peak Oil

In 2007 US coal consumption reached a new high of 1,128 million short tons, over 90 percent of which was burned to generate electricity. Total coal use had increased by more than 35 percent since 1990, and the US Energy Information Administration (the official energy statisticians of the US government) forecast further growth of up to 65 percent by 2030.

Also in 2007 the US Government Accountability Office (GAO), a federal agency known as “the congressional watchdog,” published a report with an admirably explanatory title: “Crude Oil: Uncertainty about Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production.” It took seriously the idea of “peak oil,” a phrase coined in 1956 by M. King Hubbert, a geologist working for Shell Oil. As originally conceived, peak oil referred to the maximum amount of oil that we could annually produce for all of humanity’s needs.

The first oil wells pumped out the crude oil that was closest to the earth’s surface or otherwise easiest to access. As those wells dried up, we had to drill deeper ones, both on land and at sea. As the world’s economies kept growing, so did total demand for oil, which kept getting harder and harder to obtain. Peak oil captured the idea that despite our best efforts and ample incentive, we would come to a time after which we would only be able to extract less and less oil year after year from the earth. Most of the estimates summarized in the GAO report found that peak oil would occur no later than 2040.

The report did not mention fracking, which in retrospect looks like a serious omission. Fracking is short for “hydraulic fracturing” and is a means of obtaining oil and natural gas from rock formations lying deep underground. It uses a high-pressure fluid to cause fractures in the rock, through which oil and gas can flow and be extracted.

The United States and other countries have long been known to have huge reserves of hydrocarbons in deep rock formations, which are often called shales. Companies had been experimenting with fracking to get at them since the middle of the twentieth century, but had made little progress. In 2000 fracking accounted for just 2 percent of US oil production.

That figure began to increase quickly right around the time of the GAO report. Not because of any single breakthrough, but instead because the suite of tools and techniques needed for profitable fracking had all improved enough. A gusher of shale oil and gas ensued.

Thanks to fracking, US crude oil production almost doubled between 2007 and 2017, when it approached the benchmark of 10 million barrels per day. By September of 2018 America had surpassed Saudi Arabia to become the world’s largest producer of oil. American natural gas production, which had been essentially flat since the mid-1970s, jumped by nearly 43 percent between 2007 and 2017.

As a result of the fracking boom the United States has experienced peak coal rather than peak oil. And the peak in coal is not in total annual supply, but instead in demand. Fracking made natural gas cheap enough that it became preferred over coal for much electricity generation. By 2017 total US coal consumption was down 36 percent from its 2007 high point.

The phrase peak oil is still around, but, as is the case with coal, it usually no longer refers to supply. As a 2017 Bloomberg headline put it, “Remember Peak Oil? Demand May Top Out Before Supply Does.” Even though the extra supply from fracking has helped push down oil and gas prices, many observers now believe that energy from other sources—the sun, wind, and the nuclei of uranium atoms—is getting cheaper faster and becoming much more widely available. So much so that, as a 2018 article in Fortune about the future of oil hypothesized, “This wouldn’t be just another oil-price cycle, a familiar roller coaster in which every down is followed by an up. It would be the start of a decades-long decline of the Oil Age itself—an uncharted world in which… oil prices might be ‘lower forever.’ ” Analysts at Shell, the company from which the phrase peak oil originated, now estimate that global peak oil demand might come as soon as 2028.

Taking Stock of Rolling Stock

My friend Bo Cutter started his career in 1968 working for Northwest Industries, a conglomerate that owned the Chicago and North Western Railway. One of his first assignments was to help a team tasked with solving a problem that sounds odd to modern ears: figuring out where CNW’s railcars were.

These cars are massive metal assemblies, each weighing thirty tons or more. In the late 1960s CNW owned thousands of them, representing a huge commitment of both material and money. Across the railroad industry, the rule of thumb then was that about 5 percent of a company’s railcars moved on any given day. This was not because the other 95 percent needed to rest. It was because their owners didn’t know where they were.

CNW owned thousands of miles of track in places as far from Chicago as North Dakota and Wyoming. Its rolling stock (as locomotives and railcars are called) could also travel outside the company’s network on tracks owned by other railroads. So these assets could be almost anywhere in the country.

When the railcars weren’t moving, they sat in freight yards. At the time Cutter started his job, freight yards didn’t keep up-to-date records of the idle rolling stock they contained because, in the days before widespread digital computers, sensors, and networks, there was no way to cost-effectively know or communicate the location of each car. So it was impossible for CNW or any other railroad to systematically track its most important inventory, even though doing so would be hugely beneficial to the company’s bottom line. For example, Cutter’s team knew that if they could increase the percentage of cars moving each day from 5 percent to 10 percent, they would need only half as many of them. Even a single percentage point increase in freight-car use would yield major financial benefits.

When Cutter started his assignment, CNW and all other railroads employed spotters, who visited yards and watched trains pass, then telegraphed their findings to the head office. Other railroads passed on similar information to collect the demurrage charges they were owed for each CNW car on their tracks and in their yards. Cutter’s team improved on these methods by making them more systematic and efficient. They put in place a better baseline audit of where railcars were, employed more spotters, painted CNW cars differently so they were easier to see, and explored how to make more use of a new tool for businesses: the digital computer.

That tool and its kin are now pervasive in the railroad industry. In the early 1990s, for example, companies started putting radio-frequency identification tags on each piece of rolling stock. These tags would be read by trackside sensors, thus automating the work of spotting. At present over 5 million messages about railcar status and location are generated and sent throughout the American railway system every day, and the country’s more than 450 railroads have nearly real-time visibility over all their rolling stock.

The Rare Earth Scare

In September of 2010 the Japanese government took into custody the captain of a Chinese fishing boat that had collided with Japanese patrol vessels near a group of uninhabited islands in the East China Sea claimed by both countries. China responded by imposing an embargo on shipments of rare earth elements (REE) to the Land of the Rising Sun.

Even though Japan relented almost immediately and released the captain, a global panic began. This is because rare earths are “vitamins of chemistry,” as USGS scientist Daniel Cordier puts it. “They help everything perform better, and they have their own unique characteristics, particularly in terms of magnetism, temperature resistance, and resistance to corrosion.”

By 2010 China produced well over 90 percent of the world’s REE. Its actions in the wake of the maritime incident convinced many that it could and would take unilateral action to control the flow of these important materials, and panicked buying soon followed (along with its close cousin rampant speculation). A bundle of REE that would have sold for less than $10,000 in early 2010 soared to more than $42,000 by April of 2011. In September of that year the US House of Representatives held a hearing called “China’s Monopoly on Rare Earths: Implications for US Foreign and Security Policy.”

China didn’t attain its near monopoly because it possessed anything close to 90 percent of global reserves of REE. In fact, rare earths aren’t rare at all (one, cerium, is about as common in the earth’s crust as copper). However, they’re difficult to extract from ore. Obtaining them requires a great deal of acid and generates tons of salt and crushed rock as by-products. Most other countries didn’t want to bear the environmental burden of this heavy processing and so left the market to China.

In the wake of the embargo, this seemed like a bad idea. As Representative Brad Sherman put it during the congressional hearing, “Chinese control over rare earth elements gives them one more argument as to why we should kowtow to China.” But there was never much kowtowing. By the time of the hearing, prices for REE were already in free fall.

Why? What happened to the apparently tight Chinese stranglehold over REE? Several factors caused it to ease, including the availability of other supply sources and incomplete maintenance of the embargo. But as public affairs professor Eugene Gholz noted in a 2014 report on the “crisis,” many users of REE simply innovated their way out of the problem. “Companies such as Hitachi Metals [and its subsidiary in North Carolina] that make rare earth magnets found ways to make equivalent magnets using smaller amounts of rare earths in the alloys.… Meanwhile, some users remembered that they did not need the high performance of specialized rare earth magnets; they were merely using them because, at least until the 2010 episode, they were relatively inexpensive and convenient.”

Overall, the companies using REE found many inexpensive and convenient alternatives. By the end of 2017 the same bundle of rare earths that had been trading above $42,000 in 2011 was available for about $1,000.

What’s Going On?

There is no shortage of examples of dematerialization. I chose the ones in this chapter because they illustrate a set of fundamental principles at the intersection of business, economics, innovation, and our impact on our planet. They are:

We do want more all the time, but not more resources. Alfred Marshall was right, but William Jevons was wrong. Our wants and desires keep growing, evidently without end, and therefore so do our economies. But our use of the earth’s resources does not. We do want more beverage options, but we don’t want to keep using more aluminum in drink cans. We want to communicate and compute and listen to music, but we don’t want an arsenal of gadgets; we’re happy with a single smartphone. As our population increases, we want more food, but we don’t have any desire to consume more fertilizer or use more land for crops.

Jevons was correct at the time he wrote that total British demand for coal was increasing even though steam engines were becoming much more efficient. He was right, in other words, that the price elasticity of demand for coal-supplied power was greater than one in the 1860s. But he was wrong to conclude that this would be permanent. Elasticities of demand can change over time for several reasons, the most fundamental of which is technological change. Coal provides a clear example of this. When fracking made natural gas much cheaper, total demand for coal in the United States went down even though its price decreased.

With the help of innovation and new technologies, economic growth in America and other rich countries—growth in all of the wants and needs that we spend money on—has become decoupled from resource consumption. This is a recent development and a profound one.

Materials cost money that companies locked in competition would rather not spend. The root of Jevons’s mistake is simple and boring: resources cost money. He realized this, of course. What he didn’t sufficiently realize was how strong the incentive is for a company in a contested market to reduce its spending on resources (or anything else) and so eke out a bit more profit. After all, a penny saved is a penny earned.

Monopolists can just pass costs on to their customers, but companies with a lot of competitors can’t. So American farmers who battle with each other (and increasingly with tough rivals in other countries) are eager to cut their spending on land, water, and fertilizer. Beer and soda companies want to minimize their aluminum purchases. Producers of magnets and high-tech gear run away from REE as soon as prices start to spike. In the United States, the 1980 Staggers Act removed government subsidies for freight-hauling railroads, forcing them into competition and cost cutting and making them all the more eager to not have expensive railcars sit idle. Again and again, we see that competition spurs dematerialization.

There are multiple paths to dematerialization. As profit-hungry companies seek to use fewer resources, they can go down four main paths. First, they can simply find ways to use less of a given material. This is what happened as beverage companies and the companies that supply them with cans teamed up to use less aluminum. It’s also the story with American farmers, who keep getting bigger harvests while using less land, water, and fertilizer. Magnet makers found ways to use fewer rare earth metals when it looked as if China might cut off their supply.

Second, it often becomes possible to substitute one resource for another. Total US coal consumption started to decrease after 2007 because fracking made natural gas more attractive to electricity generators. If nuclear power becomes more popular in the United States (a topic we’ll take up in chapter 15), we could use both less coal and less gas and generate our electricity from a small amount of material indeed. A kilogram of uranium-235 fuel contains approximately 2–3 million times as much energy as the same mass of coal or oil. According to one estimate, the total amount of energy that humans consume each year could be supplied by just seven thousand tons of uranium fuel.

Third, companies can use fewer molecules overall by making better use of the materials they already own. Improving CNW’s railcar utilization from 5 percent to 10 percent would mean that the company could cut its stock of these thirty-ton behemoths in half. Companies that own expensive physical assets tend to be fanatics about getting as much use as possible out of them, for clear and compelling financial reasons. For example, the world’s commercial airlines have improved their load factors—essentially the percentage of seats occupied on flights—from 56 percent in 1971 to more than 81 percent in 2018.

Finally, some materials get replaced by nothing at all. When a telephone, camcorder, and tape recorder are separate devices, three total microphones are needed. When they all collapse into a smartphone, only one microphone is necessary. That smartphone also uses no audiotapes, videotapes, compact discs, or camera film. The iPhone and its descendants are among the world champions of dematerialization. They use vastly less metal, plastic, glass, and silicon than did the devices they have replaced and don’t need media such as paper, discs, tape, or film.

If we use more renewable energy, we’ll be replacing coal, gas, oil, and uranium with photons from the sun (solar power) and the movement of air (wind power) and water (hydroelectric power) on the earth. All three of these types of power are also among dematerialization’s champions, since they use up essentially no resources once they’re up and running.

I call these four paths to dematerialization slim, swap, optimize, and evaporate. They’re not mutually exclusive. Companies can and do pursue all four at the same time, and all four are going on all the time in ways both obvious and subtle.

Innovation is hard to foresee. Neither the fracking revolution nor the world-changing impact of the iPhone’s introduction were well understood in advance. Both continued to be underestimated even after they occurred. The iPhone was introduced in June of 2007, with no shortage of fanfare from Apple and Steve Jobs. Yet several months later the cover of Forbes was still asking if anyone could catch Nokia.

Innovation is not steady and predictable like the orbit of the Moon or the accumulation of interest on a certificate of deposit. It’s instead inherently jumpy, uneven, and random. It’s also combinatorial, as Erik Brynjolfsson and I discussed in our book The Second Machine Age. Most new technologies and other innovations, we argued, are combinations or recombinations of preexisting elements.

The iPhone was “just” a cellular telephone plus a bunch of sensors plus a touch screen plus an operating system and population of programs, or apps. All these elements had been around for a while before 2007. It took the vision of Steve Jobs to see what they could become when combined. Fracking was the combination of multiple abilities: to “see” where hydrocarbons were to be found in rock formations deep underground; to pump down pressurized liquid to fracture the rock; to pump up the oil and gas once they were released by the fracturing; and so on. Again, none of these was new. Their effective combination was what changed the world’s energy situation.

Erik and I described the set of innovations and technologies available at any time as building blocks that ingenious people could combine and recombine into useful new configurations. These new configurations then serve as more blocks that later innovators can use. Combinatorial innovation is exciting because it’s unpredictable. It’s not easy to foresee when or where powerful new combinations are going to appear, or who’s going to come up with them. But as the number of both building blocks and innovators increases, we should have confidence that more breakthroughs such as fracking and smartphones are ahead. Innovation is highly decentralized and largely uncoordinated, occurring as the result of interactions among complex and interlocking social, technological, and economic systems. So it’s going to keep surprising us.

As the Second Machine Age progresses, dematerialization accelerates. Erik and I coined the phrase Second Machine Age to draw a contrast with the Industrial Era, which as we’ve seen transformed the planet by allowing us to overcome the limitations of muscle power. Our current time of great progress with all things related to computing is allowing us to overcome the limitations of our mental power and is transformative in a different way: it’s allowing us to reverse the Industrial Era’s bad habit of taking more and more from the earth every year.

Computer-aided design tools help engineers at packaging companies design generations of aluminum cans that keep getting lighter. Fracking took off in part because oil and gas exploration companies learned how to build accurate computer models of the rock formations that lay deep underground—models that predicted where hydrocarbons were to be found.

Smartphones took the place of many separate pieces of gear. Because they serve as GPS devices, they’ve also led us to print out many fewer maps and so contributed to our current trend of using less paper. It’s easy to look at generations of computer paper, from 1960s punch cards to the eleven-by-seventeen-inch fanfold paper of the 1980s, and conclude that the Second Machine Age has caused us to chop down ever more trees. The year of peak paper consumption in the United States, however, was 1990. As our devices have become more capable and interconnected, always on and always with us, we’ve sharply turned away from paper. Humanity as a whole probably hit peak paper in 2013.

As these examples indicate, computers and their kin help us with all four paths to dematerialization. Hardware, software, and networks let us slim, swap, optimize, and evaporate. I contend that they’re the best tools we’ve ever invented for letting us tread more lightly on our planet.

All of these principles are about the combination of technological progress and capitalism, which are the first of the two pairs of forces causing dematerialization.

#### Scientific consensus proves warming is inevitable absent negative emissions technologies – only capitalism solves.

Welch 19 [Craig Welch, environment writer at National Geographic,, “To curb climate change, we have to suck carbon from the sky. But how?,” National Geographic, 17 January 2019, https://www.nationalgeographic.com/environment/article/carbon-capture-trees-atmosphere-climate-change, R.S.]

**The world must** quickly **stop burning fossil fuels. And** **that is no longer enough.**

Again and again, including in a major report published fall, the Intergovernmental Panel on Climate Change and other science bodies have reached a stark conclusion: Most paths to halting global temperature increases at 2 degrees—and every path **to** reach **1.5 degrees**—rely in some way on adopting methods of **sucking CO2 from the sky.**

It is a significant about-face. For years many scientists dismissed or downplayed the most highly engineered CO2 removal strategies. Those techniques were often lumped in with more dangerous forms of "geoengineering," such as injecting sulfates or other aerosols into the stratosphere to reflect sunlight and cool the planet. Focusing money and energy on any such technological fix seemed both risky and fraught with "moral hazard"—a distraction from the urgent need to cut emissions by slashing use of coal, oil, and gas.

But now many see "negative emissions," as CO2 removal strategies are also called, as an essential bridge to a clean-energy future.

"**CO2 removal has gone from a moral hazard to a moral imperative**," says Julio Friedmann, senior research scholar at the Center for Global Energy Policy at Columbia University.

There are several reasons for the shift. For starters, attempting to set a hard target at 1.5 or 2 degrees gives the world an emissions cap. With carbon emissions from fossil fuels estimated to have risen 2.7 percent in 2018, we're clearly not moving fast enough to reduce emissions—or even in the right direction.

"The longer we have postponed drastic reductions, the more daunting the challenge of achieving those reductions in the necessary time frame," says Erica Belmont, a University of Wyoming engineering researcher.

Even if the developed world rapidly switched to clean fuels, poorer countries would likely take longer. Emissions from some industries, such as cement and steel production, will be hard to eliminate, and alternative fuels for air travel are expected to remain expensive for quite some time.

Rapid progress

The good news is that CO2-removal technology has advanced far faster than expected in the last decade, says Stephen Pacala, a Princeton professor who oversaw a study of carbon removal strategies published this fall by the National Academies of Science.

The costs of machines that directly capture CO2 from the air **have fallen by two-thirds or more.** Meanwhile, at least **18 commercial-scale projects** around the world already capture CO2 from the smokestacks of coal or natural gas plants, storing it underground or even using it to create other products. Costs of that technology have **dropped by half in a dozen years.** While removing CO2 from smokestack gases is not the same as removing it from the ambient air—the former prevents new emissions, the latter cleans up old ones—both techniques require some means of sequestering CO2 after it’s captured. Additionally, advances in research and development from industrial carbon-capture can help **drive innovation** in efforts to pull old carbon from the atmosphere.

"Post-combustion carbon capture and direct air capture processes have significant components where know-how is transferable," says Christopher W. Jones, associate vice president for research at Georgia Institute of Technology.

Equally important, the **political will to subsidize carbon removal appears to be growing.** Even a **GOP-led Congress hostile to climate change worked** last year **with climate hawks** like Sen. Sheldon Whitehouse, D-Rhode Island, **to approve a $50-a-ton tax credit for** specific types of **CO2 removal**, including negative emissions techniques such as direct-air capture.

“We need to design and deploy technology to capture lots of carbon from our atmosphere at a pace never before seen," Sen. Whitehouse told National Geographic. "That’s why I’ve been pursuing legislation to help drive the development of that technology."

"You are a pessimist if you work on the science of climate impacts, because you see little action," Pacala says. "The people who know the most are the most freaked out. They've seen emissions go up and up andsee a train wreck coming."

But scientists studying negative emissions, Pacala continues, "have seen the most spectacular technological achievements in energy technology in the last 10 years. We've gone from having no tools to do this, to just seeing this unrelenting progress."

He and the other authors of the National Academies report concluded that a concerted multi-billion-dollar research and development push by government and the private sector might **within 10 years** produce market-ready technology that directly removes CO2 from ambient air **on a massive scale.**

#### The worlds getting better – poverty, education, morality rates, life expectancies – capitalist governance key.

McAfee 19, \*Andrew Paul McAfee, a principal research scientist at MIT, is cofounder and codirector of the MIT Initiative on the Digital Economy at the MIT Sloan School of Management; (2019, “More from Less: The Surprising Story of How We Learned to Prosper Using Fewer Resources and What Happens Next”, https://b-ok.cc/book/5327561/8acdbe)

The World’s War on Poverty

The total number of poor people in the world peaked right at the time of the first Earth Day in 1970, then started to slowly decrease. But the real miracle came when this happy decline accelerated during the twenty-first century. In 1999, 1.76 billion people were living in extreme poverty. Just sixteen years later, this number had declined by 60 percent, to 705 million. Hundreds of millions fewer people are living in poverty now than in 1820, when the world’s total population was seven times smaller than it is today.

Much of this decline is reflective of what occurred in China, which, as we saw in the previous chapter, threw off economic socialism beginning in 1978 and let capitalism work its poverty-reducing miracles. But the story of global poverty reduction isn’t a purely Chinese one. As the graph below shows, every region around the world has seen large poverty reductions in recent years. The speed of the recent decline indicates that it’s no longer ridiculous to talk about completely eliminating extreme poverty from the planet. The World Bank thinks this might be possible by 2030.

It’s not just incomes that have improved. As I consult Our World in Data and other comprehensive sources of evidence, I struggle to find even a single important measure of human material well-being that’s not getting better in most regions around the world.

Here are recent trends in a few key areas.

Daily Bread

As recently as 1980, the global average number of available daily calories wasn’t enough to permit an active adult male to maintain his body weight. Less than thirty-five years later, however, every region in the world met this standard of twenty-five hundred daily calories.

Clean Living

More than 90 percent of the world’s people now have access to improved water; VII in 1990 only a bit more than 75 percent did. The situation is similar for sanitation: in 1990 only a bit more than half of the world’s people had it; now, more than two-thirds do.

Young Minds

The trend in secondary education enrollment around the world is similar to the one for sanitation, but even sharper: in 1986 fewer than half of the world’s teenagers were in school; at present, more than 75 percent are.

One Thing We Say to Death: Not Today

By now the pattern should be familiar: life expectancy at birth has gone up around the world in recent decades:

As we saw in chapter 1, global life expectancy was about 28.5 years in 1800. Over the next 150 years, that number increased by 20 years. Then, in the years between 1950 and 2015, it increased by 25 more. These gains are now universal; Southern Africa has regained the 10 years of expected life lost during its terrifying AIDS crisis.

One of the reasons life expectancy has gone up so quickly is the collapse in both child and maternal mortality around the world:

I find these mortality declines especially fast, large, and broad. Today, we still have desperately poor regions, failed states, and the decimations of war. But in no region today is the child mortality rate higher than the world’s average rate was in 1998.

Convergent

Trends in maternal and child mortality highlight a critical fact that’s often overlooked: around the world, inequality in most important measures of human material well-being is decreasing. Poor countries are catching up to rich ones, and gaps that were once large are shrinking. Inequalities in income and wealth dominate the news, and in many places these gaps are large and growing. They’re also important, so we’ll look at economic inequality in the next two chapters.

But it’s true, too, that there are other kinds of inequality that we should care about as we examine the human condition: inequalities in health, education, diet, sanitation, and other things that matter deeply for the quality of a person’s life. Here the news is profoundly good; these inequalities are collapsing. As the four horsemen have galloped around the world in recent decades, they’ve made life better not only for those people and countries that were already rich but for just about everyone else. Everywhere, fewer mothers and babies are dying, more kids are getting an education, more people have adequate nutrition and sanitation.

It’s essential to acknowledge these global victories because they show us that what we’re doing is working. Tech progress, capitalism, public awareness, and responsive government are spreading around the world, and improving it. It’s often said that insanity is doing the same thing over and over but expecting different results. The corollary might be that ignorance is not examining the results of what’s being done. Over and over, when we look at the evidence, we see that the four horsemen are improving our world.

#### Space-based capitalism solves negative externalities of Earth-based manufacturing, climate change, global food insecurity, resource scarcity, and biodiversity loss.

Greenblatt and Anzaldua, 19, \*Jeff Greenblatt is Founder and CEO of Emerging Futures, LLC, an environmental and space technology consultancy based in Berkeley, California. He is also Chief Scientist at Spacexchange, LLC, a collaboration between Emerging Futures and Finsophy Public Benefit Corporation, which provides economic, risk, and market analytics to the space industry; \*Alfred Anzaldúa is a retired US State Department diplomat and 30-plus-year veteran of space advocacy. As a US Foreign Service Officer, he carried out diplomatic and science/environment work, primarily in Latin America, the Caribbean, and Washington, DC. Alfred is the National Space Society Executive Vice President, Chair of the NSS Policy Committee, Deputy Chair of the NSS International Committee, and Tucson L5 Space Society International Relations Coordinator; (“How space technology benefits the Earth”, <https://www.thespacereview.com/article/3768/1>)

Space activities with potential for positive impact in the more distant future 1. Widespread space manufacturing and industrialization: Eventually, the falling cost of space-based manufacturing, and the rising cost of Earth-based manufacturing (due to increased scarcity, environmental impacts, labor standards, etc.) may cause many, if not virtually all, extractive industries and their downstream manufacturing processes to move into space. The impact of such a change would be profound, as it would shift the side effects of these activities to locations in space without biological ecosystems, endangered species, or human populations to negatively impact. The vastly larger domain of outer space would provide virtually unlimited space, energy and materials with which to operate. Provided that such industrial activities are done responsibly so as not to pollute or otherwise compromise the ability of future generations to use space resources (an example of which is described above under orbital debris removal), this could be critical to permanently preserving and restoring the health of the Earth. 2. Waste disposal in space: As the reliability of space launch improves, it will be possible to dispose of toxic substances away from Earth. For example, in a century or so, space launch should be very reliable, [making it possible to dispose of nuclear waste materials in an orbit permanently out of harm’s way](https://space.nss.org/media/Space-Manufacturing-conference-12-111-Disposal-Of-High-Level-Nuclear-Waste-In-Space.pdf), yet providing access for future generations to mine it for valuable materials. Storing nuclear waste on Earth for hundreds of years is a much simpler problem than the current much greater challenge of storing them for tens of thousands of years. This change in perspective could make the cleanup of nuclear debris much more tractable. 3. Construction of a space-based “sunshade” to reduce global warming: The severity of climate change may necessitate radical approaches, such as the reduction of sunlight reaching the Earth’s surface in conjunction with greatly reduced greenhouse emissions. Known in climate change circles as [“solar geoengineering” or “solar radiation management”](https://geoengineering.environment.harvard.edu/geoengineering) (SRM), most approaches rely on injection of aerosol particles into the stratosphere, though others increase cloud reflectance, or directly block sunlight in space. First suggested three decades ago,[9] the concept of placing a fleet of spacecraft in orbit near Earth to reduce incident solar radiation and thereby lower surface temperatures received increased attention after Roger Angel published an influential paper in 2006.[10] Placing asteroid dust with similar effects in Earth orbit has also been explored.[11] While no identified SRM method can perfectly cancel the effects of climate change (and can do nothing to halt ocean acidification), SRM may be the only way to quickly lower global temperatures. The advantages of space-based approaches include the absence of unwanted chemical interactions in Earth’s atmosphere and the ability to be quickly “turned off” if unforeseen consequences were detected. Launching trillions of tiny spacecraft to form a vast “sunshade” over the planet is not feasible today, but could become possible with decreased launch costs, development of ultra-lightweight “solar sail” materials, and mass production of spacecraft. 4. Physical benefits of low gravity: While currently very speculative, a number of physical maladies that could be described as “aggravated by Earth gravity” (including obesity, joint pain, and osteoporosis) might be partially or completely eliminated in a lower gravity environment such as found on the Moon, Mars, or in artificial gravity environments (a rotating habitat) in Earth orbit. Low gravity is to be distinguished from zero gravity (technically, “microgravity”) such as found on board the ISS, which has been shown to almost universally result in negative health effects. Research in this area is still in its infancy, due to the almost complete lack of funding for artificial gravity centrifuges in orbit to study these effects in humans. If funding materializes and positive outcomes are found, spending time in low gravity could become highly desirable, driving significant numbers of people to visit or even live in space. 5. Food production in space for people on Earth: Once space technology advances to the point where self-sustaining space settlements of many millions of people are possible, the vastly larger resources of space could be used to grow food for people on Earth as well. Indeed, the current tension among the uses of land on Earth for human habitation, agriculture, industrial activities, and preservation of nature could be broken, providing ample room for all these competing needs. Initially only small amounts of food, or specialty items deemed too expensive or taxing on Earth’s ecosystems, would be shipped to Earth, but eventually, large portions of the world might be fed from space. 6. Migration of the human population into space: One of the main drivers of space development is provide new locations for people to live, work, and explore. While currently only very few people have been able visit space, the space community today is on a clear path to grow a commercial space tourism industry and establish small but permanent human bases on the Moon and Mars. Very large space hotels would be similar to small space settlements in Equatorial LEO (close to Earth and near the equator) where radiation levels are very low by space standards. The biggest difference could be the rotation rate, as hotels guests may want just a little “gravity” to keep the silverware in place, whereas settlements will want full Earth gravity so children grow up strong. Such small habitats may lead to very large space settlements (e.g., “O’Neill cylinders”) built with space resources, each capable of hosting populations in the millions. Eventually, such settlements could allow the human population to grow to fill the much larger region of the Solar System, reducing pressure on Earth’s finite land and resources. 7. Opportunities for social, economic and political experimentation: As space settlements would be physically and environmentally separated from each other, there is the possibility of trying new ideas without negatively impacting others. Furthermore, such activities cannot destroy indigenous cultures or damage local ecosystems for the simple reason that there aren’t any ([with a remote potential for microbial life on Mars, Europa, Enceladus, or possibly other locations](https://arstechnica.com/science/2018/07/the-case-for-enceladus-as-the-best-place-to-look-for-life-beyond-earth/).) Notwithstanding the decimation of indigenous cultures and the horrors of slavery, the expansion of Western culture into the New World provided opportunities to set up new social, economic, and political systems. Besides further developing Western style democracy into the form familiar to us today, New World settlers discovered local resources, which they brought back to Europe in the form of trade items that enriched European economic, cultural, and social life. The widespread migration of humans into space settlements would provide similar opportunities to experiment, drawing on the collective frustrations of people across the world feeling powerless to change their broken systems, but without the exploitation of native populations. Success in the space domain would likely result over time in the back-transfer of new approaches and products to Earth, without the danger of human exploitation. 8. Studying and preserving ecosystems in space: Recreating complex ecosystems in space could provide opportunities to refine our knowledge to better protect terrestrial environments, and also provide valuable experience in maintaining such ecosystems for human life support in space. In the long term, O'Neill cylinders could also be used to recreate Earth environments on a large scale, with the express purpose of preserving endangered species, or even regenerating previously extinct species with genetic technology. Such efforts may become some of the more powerful legacies of the Space Age: the preservation of biodiversity most affected by human expansion.

#### Only the private sector solves asteroid deflection – avoids extinction.

Nelson 18 [Peter Lothian Nelson and Walter E. Block, \*\* Harold E. Wirth Endowed Chair and Professor of Economics, College of Business, Loyola University New Orleans, “Space Capitalism: How Humans will Colonize Planets, Moons, and Asteroids,” 2018, Springer, pp. 106-108, EA]

What of the danger of a comet impacting with the third planet from the Sun? The movie Armageddon depicted just that scenario. In it, our heroes saved the Earth, of course. But which occurrence is more likely? That this protection could be achieved by government, or the private sector of the economy? Most neo-classical economists would choose the former, due to the so-called public goods “market failure.”28 This is the “free-rider” challenge: each entrepreneur will presumably wait for someone else to undertake the costs of an action that will benefit all (saving the Earth from the comet in this case) and no one will actually do it.29 This “let George do it” philosophy presumably creates a “market failure.” But mainstream economists cannot hide behind this mischievous doctrine, since precisely the same phenomenon will afflict nations in the present scenario. In other words, the United States will wait for China, Russia, Europe, Japan, Israel, to deal with the comet,30 while that expectation will afflict all the others with inaction. That is, China, Russia, etc., each country capable of dealing with such an eventuality, will attempt to “free ride” on the efforts of anyone foolish enough to undertake it. As in the case of Buridan’s Ass (Rothbard 2010) that perished from a similar inaction, so will the human population.

Such a scenario is unlikely in the extreme. There are all sorts of reasons to expect that the “externality will become internalized.” That is, that private firms, more likely than the state apparatus, will prove flexible enough to overcome this impasse. Private railroad companies, not governments, created standard gauge, so that cargo no longer had to be loaded and unloaded each time it passed onto the property of a different firm. This benefitted all of them, and yet, somehow,31 they could overcome the tendency toward inaction. In like manner, the railroad firms also got together32 and created the now-familiar time zones. Not only did they themselves gain by being better able to coordinate with each other, but these vast benefits “spilled over” into society as a whole. We cannot rule out of consideration such cooperation on the part of governments on praxeological grounds,33 but it seems more probable that space companies could sort out a comet aimed at the Earth than a bunch of statist politicians and bureaucrats.

#### Alt fails – capitalism is ingrained. Even if they win it’s not, politics are key.

Bryant 12—Professor of Philosophy at Collin College (Levi, “We’ll Never Do Better Than a Politician: Climate Change and Purity,” <https://larvalsubjects.wordpress.com/2012/05/11/well-never-do-better-than-a-politician-climate-change-and-purity/>, dml)

It is quite true that it is the system of global capitalism or the market that has created our climate problems (though, as Jared Diamond shows in Collapse, other systems of production have also produced devastating climate problems). In its insistence on profit and expansion in each economic quarter, markets as currently structured provide no brakes for environmental destructive actions. The system is itself pathological.

However, pointing this out and deriding market based solutions **doesn’t get us very far**. In fact, such a response to proposed market-based solutions is **downright dangerous** and **irresponsible**. The fact of the matter is that 1) we currently live in a market based world, 2) there is not, in the foreseeable future an alternative system on the horizon, and 3), above all, **we need to do something now**. We **can’t afford to reject interventions** simply because they **don’t meet our ideal conceptions** of how things should be. We have to **work with the world that is here**, not the one that we would like to be here. And here it’s crucial to note that pointing this out **does not entail** that we shouldn’t work for producing that other world. It just means that we have to grapple with the world that is **actually there before us**.

It pains me to write this post because I remember, with great bitterness, the diatribes hardcore Obama supporters leveled against legitimate leftist criticisms on the grounds that these critics were completely unrealistic idealists who, in their demand for “purity”, were asking for “ponies and unicorns”. This rejoinder always seemed to ignore that words have power and that Obama, through his profound power of rhetoric, had, at least the power to shift public debates and frames, opening a path to making new forms of policy and new priorities possible. The tragedy was that he didn’t use that power, though he has gotten better.

I do not wish to denounce others and dismiss their claims on these sorts of grounds. As a Marxist anarchists, I do believe that we should fight for the creation of an alternative hominid ecology or social world. I think that the call to commit and fight, to put alternatives on the table, has been one of the most powerful contributions of thinkers like Zizek and Badiou. If we don’t commit and fight for alternatives those alternatives will never appear in the world. Nonetheless, we still have to grapple with the world we find ourselves in. And it is here, in my encounters with some Militant Marxists, that I sometimes find it difficult to avoid the conclusion that they are **unintentionally aiding** and **abetting** the **very things they claim to be fighting**. In their **refusal to become impure**, to **work with situations** or **assemblages** as we find them, to **sully their hands**, they end up **reproducing the very system** they wish to **topple** and **change**. Narcissistically they get to sit there, smug in their superiority and purity, while **everything continues as it did before** because they’ve **refused to become politicians** or engage in the **difficult concrete work** of assembling human and nonhuman actors to **render another world possible**. As a consequence, they occupy the position of Hegel’s beautiful soul that denounces the horrors of the world, celebrate the beauty of their soul, while depending on those horrors of the world to sustain their own position.

To engage in politics is to engage in networks or ecologies of relations between humans and nonhumans. To engage in ecologies is to descend into networks of causal relations and feedback loops that you cannot completely master and that will modify your own commitments and actions. But there’s **no other way**, there’s no way around this, and we **do need to act now**.

### 1NC—Weheliye DA

#### The aff reproduces racism in supposing all have equal access to the field of humanity—they put the burden of overcoming Western humanism onto oppressed peoples, absolving white supremacy

Weheliye 14 [Alexander, Associate Professor of African American Studies at Northwestern University, *Habeas Viscus: Racializing Assemblages, Biopolitics and Black Feminist Theories of the Human*, p. 9-11]

We also find this in current studies of posthumanism associated with theories of technological virtuality, as well as in the embryonic field of animal studies. In these modes of inquiry, Man interfaces with a plethora of informational technologies, or in the case of animal studies sheds its superiority complex vis-à-vis nonhuman animals, and enters into the space and time of the posthuman. Moreover, many invocations of posthumanism, whether in antihumanist post-structuralist theorizing or in current considerations of technology and animality, reinscribe the humanist subject (Man) as the personification of the human by insisting that this is the category to be overcome, rarely considering cultural and political formations outside the world of Man that might offer alternative versions of humanity.18 Moreover, posthumanism and animal studies isomorphically yoke humanity to the limited possessive individualism of Man, because these discourses also presume that we have now entered a stage in human development where all subjects have been granted equal access to western humanity and that this is, indeed, what we all want to overcome. It is remarkable, for instance, how the (not so) dreaded comparison between human and animal slavery is brandished about in the field of animal studies and how black liberation struggles serve as both the positive and negative foil for making a case for the sentience and therefore emancipation of nonhuman beings.19 This sleight of hand comes easy to those critics attempting to achieve animal rights and is frequently articulated comparatively vis-à-vis black subjects’ enslavement in the Americas—“the moral and intellectual jujitsu that yielded the catachresis, person-as-property.”20 When I taught a graduate seminar on the human and animal a few years ago, I was struck both by how frequently this comparison appeared in recent critical texts associated with animal studies and how carelessly—and often defensively—this comparative analogy was brandished about in this area of inquiry. Here is one of the more spiteful instances of this current: In Toni Morrison's eloquent meditation…she argues that the hallmarks of the individualist imagination in the founding of United States culture—“autonomy, authority, newness and difference, absolute power”—are all “made possible by, and shaped by, activated by a complex awareness and employment of a constituted Africanism,” which in turn has as its material condition of possibility the white man's “absolute power over the lives of others” in the fact of slavery. My point here, however,…is to take Morrison very seriously at her word—and then some. For what does it mean when the aspiration of human freedom, extended to all, regardless of race or class or gender, has as its material condition of possibility absolute control over the lives of nonhuman others?21 Given that Morrison mentions neither the subjugation nor liberation of animals, it remains unclear why her ideas about blackness and chattel slavery are summoned here, why the aspiration for human freedom would ineludibly lead to the subjugation of nonhuman others, and why black subjects—rather than, say, slave owners—must bear the burden of representing the final frontier of speciesism. In supposing that all human subjects occupy the space of humanity equally, post- and antihumanist discourses cannot conceptualize how “the transubstantiation of the captive into the volitional subject, chattel into proprietor, and the circumscribed body of blackness into the disembodied and abstract universal seems improbable, if not impossible.”22 Much post-1960s critical theorizing either assumes that black subjects have been fully assimilated into the human qua Man or continues to relegate the thought of nonwhite subjects to the ground of ethnographic specificity, yet as Aimé Césaire has so rightfully observed, “The West has never been further from being able to live a true humanism—a humanism made to the measure of the world.”23

### 1NC—Debate Good

#### Using legal research and scenario planning are essential to solvency --- In depth studies and scenario analysis are critical to effective antitrust enforcement

O’Keeffe, 17 (Siún O’Keeffe, Strategy advisor, Netherlands Authority for Consumers and Markets., Nov 2017, accessed on 9-14-2021, Sci-hub, "Use and Importance of Market Studies in Modern Competition Enforcement", https://sci-hub.se/https://doi.org/10.1093/jeclap/lpx081)//babcii

Market studies too, can ultimately lead to swifter problem-solving. They allow us to examine a complicated market and establish how it works. This can prove **invaluable to assessments of whether or not particular activities are harmful**. Take the Online Hotel Booking Monitor that was published by EU competition authorities in February 2017. The Monitor examined empirical evidence that showed that many hotels were unaware of the legality or otherwise of the clauses controlling their prices. Also, it revealed no evidence of increased competition in markets where both wide and narrow across platform parity clauses were prohibited, in comparison to markets where only the wide APPA was stopped (through commitments). It is an example of crossborder number-crunching cooperation between 11 member states, including ACM, and the European Commission (in a sector in which authorities are often criticised for a lack of cooperation). ACM recently conducted an online video streaming study, with a focus on online video advertising. The study showed the intricate working of a swiftly moving multi-sided market. Online video platforms compete heavily for consumer attention. This battle primarily takes places in the fields of video-content and new service provision. The study suggested that none of the online video platforms currently has a dominant position in online advertising (it did not further explore content issues). The **large, international platforms** such as YouTube and Facebook face competition on these markets, at present, from each other and from smaller competitors. Online advertisements can be placed in a number of ways. In addition, there are many different companies that sell advertising space and place advertisements. Advertisers are able to choose the type of advertisement, and choose with whom they wish to do business, and they take advantage of these opportunities. There is also sufficient competition between the companies that facilitate the trade of advertising space. Personal data-sets are becoming more and more important in online advertising. However, the study suggested that the large data-sets of established platforms are not an insurmountable barrier for being able to enter this particular market. This study reveals a dynamic market where one player has a certain degree of market power, and **explores scenarios showing potential problems** that could arise. In-depth knowledge of how a market works allows the authority to intervene more quickly in the future, if necessary with interim measures, when a problem does arise. It allows us to combine ‘thinking fast’, with ‘thinking slow’, and it helps to waylay knee-jerk legislative reactions. Interim measures and quick interventions can be invaluable to prevent situations of harm arising. However, they do not replace empirical studies and thorough investigation based on the examination of facts and data. In the digital age, despite all the pressures, there is also a need to heed William Henry Davies’ advice to take the ‘time to stand and stare’ not in the pursuit of leisure, but rather in the pursuit of fact-based decision-making.

#### Specifically true of big tech and antitrust --- Civic monopolization means an informed public is key --- Legal engagement is essential to provide cover for political action

**Moore, 16** (Martin Moore, Moore is director of the Centre for the Study of Media Communication and Power in the Policy Institute at King’s College London. He has twenty years experience working across the UK media, in the commercial sector, the third sector and in academia. Prior to King’s he was founding director of the Media Standards Trust., Apr 2016, accessed on 9-14-2021, Kcl.ac, "Tech Giants and Civic Power", https://www.kcl.ac.uk/policy-institute/assets/cmcp/tech-giants-and-civic-power.pdf)//Babcii

The digital world is currently out of joint. A small number of tech companies are very large, dominant and growing. They have not just commercial influence, but an impact on our privacy, our freedom of expression, our security, and – as this study has shown – on our civic society. Even if they mean to have a positive and constructive societal impact – as they make clear they do – they are too big and have too great an influence to escape the attention of governments, democratic and non-democratic. Governments have already responded, and more will. Most of these government responses are destined to fail. They are destined to fail for three reasons: they have not yet adequately defined the problem they are trying to solve; they are using tools that are not suited to dealing with these organisations and the services they provide; and they do not have a vision of where they would like digital society to end up. On the first, the problem, this is generally defined narrowly in terms of privacy, security, and economics. Debates on privacy centre on the **collection and use of personal data** by the tech giants. Those on security focus on the extent to which governments should or should not have access to that personal data. Economic questions relate chiefly to tax and the degree to which the tech giants may be **unfairly promoting their own services over those of their competitors**. The antitrust case launched by the European Commission against Google in April 2015, for example, centres on the extent to which Google was, or was not, using its position as an intermediary to promote its own shopping service over those of its competitors. The Commission claimed that Google had ‘abused its dominant position in the markets for general internet search services in the European Economic Area (EEA) by systematically favouring its own comparison shopping product in its general search results pages.’330 The Commission may, or may not, be able to show the tech giant biased its results to its own service, but it will much harder to demonstrate how this this hurt the end user, particularly given that the service is provided free at the point of use. This is why, as this study has shown**, the problem also needs to be framed in civic terms**. It needs to be recognized that these organisations and their services are starting to play significant civic roles in democratic society, and that, in playing these roles, **they are gaining political and social power**. Democratic societies may decide, in some cases, that this is a fair trade given the benefits - though there has been precious little discussion to date as to the terms of trade and the advantages and disadvantages of reliance. In other cases, societies may decide the risks outweigh the benefits. They then need to figure out how to respond. Working out how to respond will not be straightforward. The tools currently available to democratic governments – including legislation, regulation and taxation – are not well suited to dealing with the issues raised by the tech giants. These organisations are very large and transnational, often work to a different economic model to other corporations, and work in a communications environment that is fundamentally different from their predecessors. Until we better understand and communicate the dilemmas they raise, and until the public become concerned about the potential – or actual – threats they represent, it will be difficult to respond effectively. In the nineteenth and early twentieth century, antitrust law was applied more successfully once the problem of ‘bigness’ – that the law was introduced to address – **was more carefully investigated and exposed**. In January 1903, for example, the first of Ida **Tarbell’s** ‘muckraking’ investigations of John D. Rockefeller’s Standard Oil was published in McClure’s magazine. In this, and her following articles, Tarbell detailed how the rise to dominance of Standard Oil ‘was aided at every stage by discriminatory railroad rates and illegal tactics – bribery, fraud, criminal underselling and intimidation.’331 Such was the popular response to Tarbell’s investigations that she was lauded as the ‘Joan of Arc among moderns’ and ‘one of the most commanding figures in American letters.’332 Her **exposure of Standard Oil’s history and practices** **helped** Theodore Roosevelt **steer** his **bills against trusts through Congress** – on rail rebates, on the expedition of antitrust action, and on the establishment of a Department of Commerce with a Bureau of Corporations that had powers to investigate trusts. Eight years later, the US Supreme Court ruled that Standard Oil had abused its dominant position and should be broken up. It was **the combination of the investigation, the exposure, and the public response that enabled political action to be taken.** There has, as yet, been no twenty first century equivalent of Ida Tarbell’s investigations into the tech giants. Democratic societies also need a much clearer vision of where they would like to end up. What would a progressive digital future look like? How should plurality and diversity be defined in an age of information abundance? Should the digital civic landscape be devolved or centralized? These democratic objectives will need to include the needs of the citizen as well as the consumer, and of civic society as well as the security state. Such a vision ought to be led by the public, and has to take account of the state of the digital environment over twenty-five years after the advent of the web. The vision is unlikely to include over reliance on a small cadre of transnational tech companies, but may well include the convenience and efficiency that comes from using one provider for certain services like general search. Without greater clarity on the potential consequences of digital dominance, and a clearer vision of where democratic societies would like to end up, **there is a risk that they jeopardize the** tremendous civic benefits of **digital technology, and fail to build a digital ecosystem** that enables civic participation while protecting citizen’s rights. Without devising progressive responses democratic societies will be left with two alternatives, neither of which is attractive. They can take a laissez-faire approach, accepting that the digital environment will be dominated by a handful of tech giants, and that the most effective way of affecting their behaviour is through persuasion and collaboration. Or, they can react regressively to digital developments, banning services, imposing punishments and even prosecuting organisations and employees who run the tech companies’ tools. Democratic societies do not yet understand the phenomenon of the tech giants, what the phenomenon means in civic terms, what benefits it brings to governance, and the dangers inherent in it. Only once they understand the phenomenon better, and understand where it can help **and where it can damage civic society, will they be in a position to work out how best to respond.**

#### History proves the correlation between legal engagement and effective regulation --- Past tech monopolies prove the process of the 1AC effectively garners concessions from monopolies that solve even absent antitrust

Carlsson and Swartz, 21 (Philipp Carlsson-Szlezak and Paul Swartz, Carlsson-Szlezak is a managing director and partner in BCG’s New York office and global chief economist of BCG. Paul Swartz is a director and senior economist at the BCG Henderson Institute, based in BCG’s New York office., 8-18-2021, accessed on 9-14-2021, Fortune, "Popular outrage, not economics, will determine the fate of Big Tech", <https://fortune.com/2021/08/18/big-tech-breakup-antitrust-popular-outrage-facebook-google-standard-oil-microsoft/>)//Babcii

The power of the biggest tech companies has grown too ubiquitous to ignore—their dominance can be felt in the stock indexes, in segments of the labor market, and in the oversight (or lack thereof) of public discourse, to name just a few areas of influence. Little surprise, then, that [the political script](https://fortune.com/2021/06/24/house-panel-big-tech-facebook-google/) appears to be at a turning point: Regulatory agencies, now [staffed with vocal critics of the industry](https://fortune.com/2021/06/30/ftc-chair-lina-khan-populist-antitrust-movement-what-can-she-do-federal-trade-commission/), are accelerating the pursuit, with [Facebook](https://fortune.com/company/facebook) and [Google](https://fortune.com/company/alphabet) squarely [in the crosshairs](https://fortune.com/2021/01/04/facebook-antitrust-lawsuit-ftc-entrepreneurs-innovation/) of antitrust litigation. Yet predicting Big Tech’s comeuppance could be a losing bet. The path from corporate power to regulatory backlash is neither linear nor predominantly about economics. What’s overlooked in today’s debate is the catalyzing power of popular outrage. The presence of such anger has reliably aligned political will and driven regulatory pushback in the past—and its absence has slowed or prevented such pushback. To see why the political economy of outrage will likely shape [Big Tech’s regulatory fate](https://fortune.com/tag/big-tech/), a brief tour of U.S. history is a good starting point. The legacy of Ida Tarbell The Sherman Act and the dismemberment of Standard Oil in 1911 are often invoked today to highlight regulatory risk and power. However, a more interesting question is why the Sherman Act, passed in 1890, sat idle for nearly 20 years, even as politicians watched Standard Oil’s growing abuse of its market power. What changed? What forced Teddy Roosevelt’s hand wasn’t economic benchmarks such as peaking market share or high prices. It was Ida Tarbell, a star of the emerging field of muckraker journalism, who was on a mission of personal revenge to expose the Rockefeller empire. Her [History of the Standard Oil Company](https://energyhistory.yale.edu/library-item/ida-m-tarbell-history-standard-oil-company-1904) (1904) was a bestseller, serialized in McClure’s Magazine to great effect, and successfully galvanized public opinion against the Rockefellers and their monopoly. Growing up, Tarbell had witnessed Standard Oil bullying her father to sell his oil business—when he refused, the family had to mortgage their home. As such, the birth of U.S. antitrust action captures enduring political-economy dynamics: Standard Oil had enormous political **clout** and averted regulatory action for years. Yet, a groundswell of popular anger was sufficient to align political incentives to apply the law to Standard Oil. It would be a **mistake to see Tarbell’s victory as a case of idiosyncratic history**. On the contrary, the force of public outrage—surprisingly often channeled via the vehicle of literature—plays out again and again in the 20th century. Consider the emergence of the Food and Drug Administration, for example. Upton Sinclair, a contemporary of Tarbell’s, published The Jungle a little after Tarbell’s History. Despite being a work of fiction, The Jungle spawned massive popular backlash against the disgusting conditions in the meat processing plants of Chicago—the reading remains revolting to this day. The public reaction to Sinclair’s story, initially published in 1905, pushed President Roosevelt to sign the Pure **F**ood and **D**rug **A**ct, which passed by an overwhelming bipartisan majority of 63 to 4 in the Senate in 1906 and founded what is now the FDA. There are many other examples of popular resentment driving regulatory action: The financial Panic of 1907 helped create the Federal Reserve; Rachel Carson’s Silent Spring contributed to the swaying of another Republican President, Richard Nixon, to create the **E**nvironmental **P**rotection **A**gency; the Great Financial Crisis of 2008 led to the Consumer Financial Protection Bureau—and so on. Without outrage, regulators meander While the historical examples above draw straight lines from anger to regulatory shock, it is true that some of the biggest antitrust cases in U.S. regulatory history meandered for decades—antitrust cases against **AT&T,** [**IBM**](https://fortune.com/company/ibm)**, and** later [**Microsoft**](https://fortune.com/company/microsoft) come to mind. Here, too, popular backlash—or the lack of it—played a critical role in shaping their regulatory fates. Yes, AT&T was broken up—in 1982. But its conflict with antitrust regulators had begun all the way back in 1913. Over the years, the company bounced around from being viewed as a good monopoly to being a state-sanctioned monopoly (recall you had to rent your phone from Ma Bell—but couldn’t own it). After a meandering 70-year regulatory pursuit, AT&T lost its case and agreed to break up on Jan. 8, 1982. By contrast, on that same day in 1982, a 30-year–long regulatory pursuit of IBM was dropped. Yet **despite avoiding a breakup**, the cumulative **impact on IBM was** arguably more **significant** than that on AT&T. IBM had been pushed into unbundling hardware and software, which successfully **opened space for new software** behemoths—leaving IBM strategically on the back foot. Popular anger did not underpin the regulatory pursuits of Ma Bell and Big Blue. They did not inspire indignation, perhaps because expensive long-distance calls and clunky computers did not spark emotion—or perhaps because their stories lacked their Tarbell or Sinclair. That did not prevent regulatory action, but that action played out on the battlefield of technocratic concern, which translated into a long-winded **regulatory dance and yielded outcomes** far preferable to Standard Oil’s fate. Microsoft, which moved into the space that IBM’s curtailment had opened, remains an interesting case in the context of outrage and regulation. For there was—some—outrage. It’s easy to forget how loathed in some quarters the firm and Bill Gates were in the late 1990s, just around the time when regulatory scrutiny peaked: the bullying of Netscape, the bundling of software, Gates’ widely panned deposition performance in testimony before Congress, all drove popular dislike if not quite mass resentment. What remains mostly forgotten today is that the judge ruled, in 2000, that Microsoft should break up—delivering a fast judgment aligned with popular sentiment of recent years. Yet the outrage didn’t sustain itself through political transition and appeal. In 2001 the Justice Department said it was no longer seeking a breakup and agreed to a settlement. Is Big Tech more like Standard Oil, or IBM? While history should always be used with care, the correlation between popular backlash (or lack thereof) and sharp regulatory backlash (or lack thereof) remains compelling. In some ways, this is more surprising if we think of antitrust regulation as a field of technocratic economic analysis, and less surprising if we think of it as politicians responding to incentives—such as when the influence of corporate power is outweighed by the electoral threat of outrage.

# 2NC

### Worker Welfare Standard

#### The topical version of the aff replaces the consumer welfare standard with a worker welfare standard. Possible planks to this aff are inserted in the doc.

The United States federal government should substantially increase prohibitions on anticompetitive business practices by:

* holding all vertical restraints in presumptive violation of the Sherman Act;
* establishing a strict standard for exclusionary conduct and horizontal and vertical mergers based on market indicators;
* expanding the scope of its antitrust laws to encompass labor monopsony;
* incorporating a labor market impact assessment in its statutory merger review process;
* holding no-poaching clauses in franchising contracts and non-compete clauses in employment contracts illegal per se.

#### The aff would have advantages about accommodating labor, policing capital, and inspiring worker organization.

Vaheesan 19, \*Sandeep Vaheesan is a legal director at the Open Markets Institute, previously served as a regulations counsel at the Consumer Financial Protection Bureau; (2019, “Accommodating Capital and Policing Labor: Antitrust in the Two Gilded Ages”, https://static1.squarespace.com/static/5e449c8c3ef68d752f3e70dc/t/5eac7ae9e7384923a4b1373d/1588361971964/Accommodating-Capital-and-Policing-Labor.pdf)

IV. HOW REMAKING ANTITRUST LAW COULD HELP END THE NEW GILDED AGE

Congress, the antitrust agencies, and federal courts should restore the original anti-monopoly, pro-worker vision for the antitrust laws. For much of their history, these laws had a pro-capital, anti-worker orientation. Not-withstanding this record, these laws can be reoriented to police capital and accommodate labor in accord with the intent of Congress. In passing these laws, Congress aimed to curtail the power of capital and also preserve space for workers to organize.392 The antitrust agencies and federal courts should reject the ahistorical and deficient efficiency paradigm and embrace the political economy framework of the sponsors of the antitrust laws. Specifically, they need to reinterpret antitrust to restore competitive market structures and limit the power of large businesses over consumers, producers, rivals, and citizens. Along with imposing checks on the power of large businesses, Congress, the agencies, and the courts must preserve freedom of action for workers acting in concert.

New statutes and executive and judicial reinterpretation of antitrust law, in accord with congressional intent, would help remedy many economic and political injustices in the United States today. Monopoly and oligopoly appear to contribute to a host of societal ills. These include increased inequality,393 diminished income for workers394 and other producers,395 and declining business formation.396 At the same time, protecting workers’ collective action against antitrust challenges would create more space for workers to organize and claim a fairer share of income and wealth.397 Restoring antitrust law to its original goals would likely produce a more just and equitable society. Although no means a panacea for what ails the United States, antitrust law should be part of a broader social democratic agenda that reduces the yawning inequalities in wealth and power today.398

#### Reducing barriers to class organizing through anti-monopoly laws strengthens trade unionism and rekindles New Deal-era labor movements.

[Callaci](https://forgeorganizing.org/author/brian-callaci) 21, the Chief Economist at the Open Markets Institute. He previously worked at UNITE HERE, Workers United, and Change to Win, and served on the Joint Council of United Auto Workers Local 2322, (Brian, April 13th, 2021, “It’s Time for Labor to Embrace Antimonopoly”, https://forgeorganizing.org/article/its-time-labor-embrace-antimonopoly)

The policies advocated by each movement today are complementary as well. Bruenig is right that the worst employers are often small, undercapitalized sweatshops. But the answer to this problem doesn’t lie in monopolies. Passing a $15 minimum wage and reforming the National Labor Relations Act to make it drastically easier to unionize would make it much more difficult for inefficient businesses — big or small — to utilize low wages as a competitive strategy. High wages and unions would penalize companies below minimum efficient scale but without encouraging them to amass more dangerous amounts of power. Meanwhile, antitrust policy can protect small suppliers from monopsonistic predation by massive buyers like Walmart or Amazon, allowing them to raise wages for their own workers. Antitrust can perform a similar function for [franchisees](https://equitablegrowth.org/new-research-shows-the-franchise-business-model-in-the-united-states-harms-workers-and-franchisees/) dominated by powerful fast-food brands. As antitrust advocate Zephyr Teachout puts it, “we should make it easier to organize people, and harder to organize capital.” We need both movements as part of a progressive coalition if we are to democratize our economy and protect it from corporate power.

#### That solves their disads --

#### The aff could have strong debates about horizontalism vs verticalism which could produce a better strategy for anti-capitalist resistance – that means that the aff is a more effective discussion of cap

### Petrostates

#### Use antitrust to ban fossil fuel production everywhere except reservations—could have an advantage about indigenous tribes benefitting from high oil prices, and read defenses of the perm about native sovereignty. The neg could read a set col K of indigenous petrostates, with warming turns on case.

#### There are rich, pressing debates about climate exemptions for indigenous people

Brown and Fonseca 6/24 (Matthew Brown, Felicia Fonseca, Correspondents at Associated Press, 6-24-2021, "Boom in Native American oil complicates Biden climate push," AP NEWS, https://apnews.com/article/joe-biden-lifestyle-travel-science-native-americans-c8ff51f166d815acfd6057ca86f6808a)

On oil well pads carved from the wheat fields around Lake Sakakawea, hundreds of pump jacks slowly bob to extract 100 million barrels of crude annually from a reservation shared by three Native American tribes. About half their 16,000 members live on the Fort Berthold Indian Reservation atop one of the biggest U.S. oil discoveries in decades, North Dakota’s Bakken shale formation. The drilling rush has brought the tribes unimagined wealth -- more than $1.5 billion and counting -- and they hope it will last another 20 to 25 years. The boom also propelled an almost tenfold spike in oil production from Native American lands since 2009, federal data shows, complicating efforts by President Joe Biden to curb carbon emissions. Burning of oil from tribal lands overseen by the U.S. government now produces greenhouse gases equivalent to about 12 million vehicles a year, according to an Associated Press analysis. But Biden exempted Native American lands from a suspension of new oil and gas leases on government-managed land in deference to tribes’ sovereign status. A judge in Louisiana temporarily blocked the suspension June 15, but the administration continues to develop plans that could extend the ban or make leases more costly. With tribal lands now producing more than 3% of U.S. oil and huge reserves untapped, Interior Secretary Deb Haaland — the first Native American to lead a U.S. cabinet-level agency — faces competing pressures to help a small number of tribes develop their fossil fuels while also addressing climate change that affects all Native communities. “We’re one of the few tribes that have elected to develop our energy resources. That’s our right,” tribal Chairman Mark Fox told AP at the opening of a Fort Berthold museum and cultural center built with oil revenue. “We can develop those resources and do it responsibly so our children and grandchildren for the next 100 years have somewhere to live.” Smallpox nearly wiped out the Mandan, Hidatsa and Arikara tribes in the mid-1800s. They lost most of their territory to broken treaties — and a century later, their best remaining lands along the Missouri River were flooded when the U.S. Army Corps of Engineers created Lake Sakakawea. With dozens of villages uprooted, many people moved to a replacement community above the lake — New Town. Today, leaders of the three tribes view oil as their salvation and want to keep drilling before it’s depleted and the world moves past fossil fuels. And they want the Biden administration to speed up drilling permits and fend off efforts to shut down a pipeline carrying most reservation oil to refineries. PIPELINE FIGHT Yet tribes left out of the drilling boom have become outspoken against fossil fuels as climate change worsens. One is the Standing Rock Sioux about 100 miles (160 kilometers) to the south. Home to the Dakota and Lakota nations, Standing Rock gained prominence during a months-long standoff between law enforcement and protesters, including tribal officials, who tried to shut down the Dakota Access Pipeline that carries Fort Berthold crude. A judge revoked the pipeline’s government permit because of inadequate environmental analysis and allowed crude to flow during a new review. But Standing Rock wants the administration to halt the oil for good, fearing a pipeline break could contaminate its drinking water. Meantime, attention surrounding the skirmish provided the Sioux with foundation backing to develop a wind farm in Porcupine Hills, an area of scrub oak and buffalo grass with cattle ranches. The pipeline fight stirs bitter memories in Fawn Wasin Zi, a teacher who chairs the Standing Rock renewable power authority. She grew up hearing her father and grandmother tell about a government dam that created Lake Oahe — how they had to leave their home then watch government agents burn it, only to be denied housing, electricity and other promised compensation. Wasin Zi, whose ancestors followed legendary Lakota leader Sitting Bull, wants to ensure the tribe doesn’t fall victim yet again to a changing world, where fossil fuels warm the planet and bring drought and wildfire. “We have to find a way to use the technology that’s available right now, whether it’s geothermal or solar or wind,” she said. Only a dozen of the 326 tribal reservations produce significant oil, according to a drilling analysis provided to AP by S&P Global Platts. Biden’s nominee to oversee them as assistant secretary for Indian affairs, Bryan Newland, recently told a U.S. Senate committee the administration recognizes the importance of oil and gas to some reservations and pledged to let tribes determine resource development. Interior officials denied interview requests about tribal energy plans, but said tribes were consulted in April after Biden ordered the department to “engage with tribal authorities” on developing renewables and fossil fuels. Joseph McNeill Jr, manager of Standing Rock’s energy authority, said a conference call with Interior yielded no pledges to further the tribe’s wind project. Fort Berthold officials said they’ve had no offers of discussions with the administration. ONE TRIBE’S BUILDING BOOM Fort Berthold still reels from ills oil brought — worse crime and drugs, tanker truck traffic, road fatalities, spills of oil and wastewater. Tribal members lament that stars are lost in the glare of flaring waste gas from wells. Yet oil brought positive changes, too. As the tribes’ coffers fattened, dozens of projects got underway. The reservation now boasts new schools, senior centers, parks, civic centers, health and drug rehab facilities. Oil money is building a $26 million greenhouse complex heated by electricity from gas otherwise wasted. The $30 million cultural center in New Town pieces together the tribes’ fractured past through displays and artifacts. A sound studio captures stories from elders who lived through dam construction and flooding along the Missouri. And one exhibit traces the oil boom after fracking allowed companies to tap reserves once too difficult to drill. “Our little town, New Town, changed overnight,” said MHA Nation Interpretive Center Director Delphine Baker. “We never had traffic lights growing up. It’s like I moved to a different town.”

#### Antitrust solves—can declare fossil fuel companies per se illegal based on a total welfare standard

**Miazad 21** (Amelia Miazad is Founding Director and Senior Research Fellow of the Business in Society Institute at Berkeley Law., “PROSOCIAL ANTITRUST”, Prosocial Antitrust (March 11, 2021). Available at SSRN: https://ssrn.com/abstract=3802194 or http://dx.doi.org/10.2139/ssrn.3802194)

While courts **routinely dismiss noneconomic or “non-welfare” justifications**, precisely what procompetitive reasons come into play is, as Justice Stevens famously stated, “an absolute mystery”.242 As Professor John Newman points out, the “relevant case law reveals multiple competing approaches and seemingly irreconcilable opinions” on what constitutes “beneficial”.243 After all, whether a particular activity is beneficial necessarily begs the question— beneficial to what end? Professor Newman traces this confusion to the use of three different tests by courts:

Under the “market failure” approach, a valid justification is present if—and only if—the challenged restraint alleviates a market failure. Alternatively, the “competitive process” approach attempts to condemn restraints that harm (and bless restraints that benefit) “competition” itself or the so-called “competitive process”. Lastly, the “type of effect” approach appears to offer a shortcut: simply identify the effects of the challenged restraint, then ascertain whether they align with a pre-approved typology of virtuous marketplace effects (e.g., higher output, lower prices, etc.).244

This Article agrees with Professor Newman’s doctrinal, normative, and practical arguments in favor of the market failure test.245 Most contemporary courts also hold that “alleviating a market failure is an acceptable procompetitive justification.”246 But the market failure test is fundamentally at odds with the market reality of **increasing universal ownership**. Two limitations explain its inability to account for systematic and portfolio-wide risks. First, the market failure test relies on the prevailing consumer welfare standard.247 That generally means that a particular restraint of trade must alleviate a market failure by increasing consumer surplus in order for courts to deem it a valid procompetitive justification.248 By fastening market failure to consumer welfare, the market failure test becomes indistinguishable from the “type of effect” approach, which also focuses on measurable impacts on consumers including output and price. Second, **the market failure test assumes the perspective of a single market, preventing it from capturing portfolio-wide systemic risks like climate change.**

To be clear, this Article is not arguing that antitrust law should abandon the consumer welfare standard and expand its purview to encompass noneconomic impacts. Rather, it argues that **the consumer welfare standard is too narrow to account for economic impacts on a portfolio-wide level.** The **total welfare standard** is most closely aligned with the market reality of universal ownership, although it has been largely abandoned by courts.249 It seeks to maximize the total surplus of all participants in a market, including consumers and producers. The total welfare test’s aggregate value approach is more closely aligned with universal ownership, but it also analyzes an individual market—as opposed to market-wide impacts— because a so-called “general equilibrium analysis” is impractical. Developing a standard that aligns with the market reality of concentrated ownership is beyond the scope of this Article. This Article does argue, however, that **the current consumer welfare standard impedes collaboration to address systematic economic risks**, as the next Part explores

# 1NR

#### They are serial killers why do they get to decide when everyone dies

Paterson 3 Craig, Department of Philosophy, Providence College, Rhode Island “A Life Not Worth Living?”, Studies in Christian Ethics, <http://sce.sagepub.com>

In determining whether a life is worth living or not, attention should be focused upon an array of ‘interests’ of the person, and these, for the competent patient at least, are going to vary considerably, since they will be informed by the patient’s underlying dispositions, and, for the incompetent, by a minimal quality threshold. It follows that for competent patients, a broad-ranging assessment of quality of life concerns is the trump card as to whether or not life continues to be worthwhile. Different patients may well decide differently. That is the prerogative of the patient, for the only unpalatable alternative is to force a patient to stay alive. For Harris, life can be judged valuable or not when the person assessing his or her own life determines it to be so. If a person values his or her own life, then that life is valuable**,** precisely to the extent that he or she values it. Without any real capacity to value, there can be no value. As Harris states, ‘. . . the value of our lives is the value we give to our lives’. It follows that the primary injustice done to a person is to deprive the person of a life he or she may think valuable. Objectivity in the value of human life, for Harris, essentially becomes one of negative classification (ruling certain people out of consideration for value), allied positively to a broad range of ‘critical interests’; interests worthy of pursuing — friendships, family, life goals, etc. — which are subjected to de facto self-assessment for the further determination of meaningful value. Suicide, assisted suicide, and voluntary euthanasia, can therefore be justified, on the grounds that once the competent nature of the person making the decision has been established, the thoroughgoing commensuration between different values, in the form of interests or preferences, is essentially left up to the individual to determine for himself or herself.

#### Death bad – non-experience is a negative evil – their evidence doesn’t assume premature death which they cause

**Preston and Dixon 7** [Ted, Rio Hondo College, Scott, Minnesota State Community and Technical College, “Who wants to live forever? Immortality, authenticity, and living forever in the present”, Int J Philos Relig (2007) 61:99–117]

Death might be very bad for the one who is dead. If death deprives ~~him~~ of a lot of pleasure—the pleasure he would have enjoyed if he had not died—the death might be a huge misfortune for someone. More explicitly, death might be extrinsically bad for the one who is dead even though nothing intrinsically bad happens to ~~him~~ as a result. In my view, death would be extrinsically bad for ~~him~~ if ~~his~~ life would have contained more intrinsic value if ~~he~~ had not died then (Ibid, p. 140).¶ This is a tricky issue. On the one hand, someone might claim that even a negative evil has to happen to someone, and the dead person who no longer exists is no longer a “somebody” to experience the evil, so there shouldn’t be any subjective harm. On the other hand, it is a powerful intuition that death deprives the dead of something, somehow. Nagel tries to resolve this problem by claiming that the person who used to exist can be beneﬁted or harmed by death, and tries to show that our intuitions are in harmony with this idea. For instance, he claims we could and would say of someone trapped in a burning building who died instantly from being hit on the head rather than burning to death, that the person was lucky, or better off, for having died quickly.¶ Of course, after dying from the head trauma, there was no one in existence who was spared the pain of burning to death, but Nagel claims that the “him” we refer to in such an example refers to the person who was alive and who would have suffered (Nagel, 1987). Nagel believes the person subjectively beneﬁted, although no subject was there to receive the beneﬁt. It would be easier to understand this objectively in terms of the qualitative assessment of Feldman; however, that is not Nagel’s position. ¶ Similarly, if someone dies before seeing the birth of a grandchild, and there is no life after death, there is no person in existence who is presently being deprived of anything at all, including, of course, births of grandchildren. But the person who was alive and who would have seen it, if not for death, has counterfactually and subjectively missed out on something.¶ The same kind of thing could be said about death as a negative evil. When you die, all the good things in your life come to a stop: no more meals, movies, travel, conversation, love, work, books, music, or anything else. If those things would be good, their absence is bad. Of course, you won’t miss them: death is not like being locked up in solitary conﬁnement. But the ending of everything good in life, because of the stopping of life itself, seems clearly to be a negative evil for the person who was alive and is now dead. When someone we know dies, we feel sorry not only for ourselves but for him, because he cannot see the sun shine today, or smell the bread in the toaster (Ibid, p. 93).¶ This is admittedly a confusing concept: the idea that one can be negatively harmed or beneﬁted even when one does not exist, but it is a concept Nagel claims is intuitively powerful for us, and which Feldman supports. It is confusing because of its counterfactual base; that a subject experiences harm or good even though there is no subject. It is intuitive because we do talk and think in terms of what it would have been for someone to experience. What these two articulations may show is that counterfactuals are being used in different ways, with the intuitive version masking a lot of the work of the counterfactual harm version.¶ In response to the problem of locating when death is a problem for someone, Feldman claims that a state of affairs can be bad for someone regardless of when it occurs: “The only requirement is that the value of the life he leads if it occurs is lower than the value of the life he leads if it does not occur” (Feldman, 1992, p. 152). The comparison is between the respective values of two possible lives. The state of affairs pertaining to someone dying at some particular time, is bad for that person, if “the value-for-her of the life she leads where [that state of affairs] occurs is lower than the value-for-her of the life she would have led if [that state of affairs] had not taken place” (Ibid, p. 155). When is it the case that the value-for-her of her life would be comparatively lower? Eternally. Eternally, as opposed to at any particular moment, because “when we say that her death is a bad for her, we are really expressing a complex fact about the relative values of two possible lives” (Ibid, p. 154). Lives taken as a whole, that is. It seems that Feldman is offering an objective qualitative analysis here, which may be addressing a different component than Nagel’s subjective argument does. If we take the two arguments together, they may offer a rather compelling account of why deprivation is a bad thing in an abstracted sense. We should not forget, however, that a possible life is not a life that is lived or being lived. In that way, they both lose a bit of their intuitive force.¶ In another attempt to undermine the Epicurean argument that death is not a bad thing but one that focuses upon one’s actual desires and interests, we may turn to Nussbaum’s work. Adding to an argument already developed by David Furley, Nussbaum argues that death is bad for the one who dies because it renders “empty and vain the plans, hopes, and desires that this person had during life” (Nussbaum, 1994). As an example, consider someone dying of a terminal disease. Subjectively, the terminally ill person is unaware of this fact, though some friends and family do know. This person plans for a future that, unbeknownst to him, will be denied him, and, to the friends and relatives who objectively know, “~~his~~ hopes and projects for the future seem, right now, particularly vain, futile, and pathetic, since they are doomed to incompleteness” (Ibid). Moreover, the futility is not removed by removing the knowing spectators. “Any death that frustrates hopes and plans is bad for the life it terminates, because it reﬂects retrospectively on that life, showing its hopes and projects to have been, at the very time the agent was forming them, empty and meaningless” (Ibid).¶ Nussbaum is making an interesting move here. She is collapsing the subjective and objective views, such that if the agent were aware, ~~his~~ projects would change and mirror reality. ~~He~~ would realize that ~~his~~ interests cannot be realized, and would change ~~his~~ interests, and live out his days with an accurate assessment of his interests and mortality.¶ Nussbaum appreciates this argument because it shows how death reﬂects back on an actual life, and our intuitions do not depend on “the irrational ﬁction of a surviving subject” (Ibid, p. 208). This argument is in harmony with Nagel’s claim that death can be bad for someone—even if that someone no longer exists. And, because it is rooted in the feared futility of our current projects, it is not vulnerable to the “asymmetry problem” (i.e., the alleged irrationality of lamenting the loss of possible experience in the future due to “premature” death, but not lamenting the loss of possible experience in the past due to not having been born sooner) since the unborn do not yet have any projects subject to futility. Nussbaum adds, to this argument, however, by appealing to the temporally extended structure of the relationships and activities we tend to cherish.¶ A parent’s love for a child, a child’s for a parent, a teacher’s for a student, a citizen’s for a city: these involve interaction over time, and much planning and hoping. Even the love or friendship of two mature adults has a structure that evolves and deepens over time; and it will centrally involve sharing futuredirected projects. This orientation to the future seems to be inseparable from the value we attach to these relationships; we cannot imagine them taking place in an instant without imagining them stripped of much of the human value they actually have. . . . Much the same, too, can be said of individual forms of virtuous activity. To act justly or courageously, one must undertake complex projects that develop over time; so too for intellectual and creative work; so too for athletic achievement. . . . So death, when it comes, does not only frustrate projects and desires that just happen to be there. It intrudes upon the value and beauty of temporally evolving activities and relations. And the fear of death is not only the fear that present projects are right now empty, it is the fear that present value and wonder is right now diminished (Ibid, p. 208–209).¶ This argument also helps to explain our intuition that death is especially tragic when it comes prematurely. While we might grieve the death of someone at any age, it seems especially bad when it is a child, or a young adult, that died. We sometimes explicitly state this in terms of the deceased having “so much left to do,” or having their “whole lives ahead of them.” It is not that death is unimportant when it is the elderly who die, but that, in many cases, the elderly have already had a chance to accomplish goals they have set for themselves. Indeed, many times those who face impending death with tranquility are those who can say, of themselves, that they have already lived a long, full life—while the elderly who most lament death are those who regret what they have failed to do in the time they had.

#### **Specifically, there are numerous inevitable cosmic threats – only space colonization can avoid extinction** – super volcanoes, asteroids, rogue planets, rogue stars, black holes, supernova, gamma ray bursts, sun energy fluctuations, and sun red giant phase

Levesque, ’19 Dan Levesque, Content creator for Death by Cosmos, director of independent media organization Ebb Media, BA in philosophy from the University of Victoria, and Business Analyst at BC Public Service, September 5th, 2019, “Cataclysms: 9 Cosmic Disasters that could Destroy Life on Earth”, Death by Cosmos, <https://deathbycosmos.com/death-by-cosmic-events/>, EO

While human-caused catastrophes are entirely within our ability to control and mitigate, cosmic disasters generally are not. While a few of these threats could be reduced by increasing our scientific knowledge of the issues at hand, in many cases, our only hope for long-term survival involves leaving Earth altogether and colonizing other worlds and stars. Here are all of the ways in which the cosmos might throw us an existential curve ball, ranked in order from highest plausible impact to lowest plausible impact. 1. Eruption of a Supervolcano The Earth has been volcanically active since its formation more than 4.5 billion years ago. The role volcanic eruptions have played in the history of life on Earth can't be understated, with several of the biggest mass extinctions in Earth's history linked to volcanic activity. Volcanic eruptions are capable of releasing large amounts of material, including ash and greenhouse gasses, into the atmosphere. In some of the largest known eruptions, this ash has encircled the globe, blocking out sunlight and covering the ground in ash deposits. When volcanic activity starts blocking out sunlight, photosynthesis becomes compromised, which stunts the growth of plants and plankton alike. When this happens, the entire food chain can be thrown out of wack from the bottom up. In addition to a compromised food chain, global temperatures can plummet due to the lack of sunlight. This happened most recently in 1816, when a significant eruption in Indonesia caused what became known as the "year without a summer," resulting in crop failures across the Northern hemisphere as a result of low temperatures. By comparison, the eruption of a supervolcano could cause temperatures to plummet for years on end. Such an event could trigger another ice age, precipitated by a fall in global temperatures and the mass die-off of plants and animals that have adapted to specific environmental niches. What makes large-scale volcanism particularly risky is that it could completely destroy the agricultural sector we rely on for sustenance, preventing us from producing enough food to feed the nearly 8 billion people on Earth. If sun-deprived conditions caused by atmospheric ash were to continue for several years, this would lead to mass starvation on an unprecedented level. 2. Asteroid Impact In Plato's Timaeus, the ancient philosopher seems to identify cataclysmic asteroid impacts as a threat to human civilization. Famously, 65 million years ago, a gigantic asteroid struck Earth and caused the dinosaurs to go extinct. Well, that may not be entirely accurate. Some evidence points to the idea that around the same time this 10-kilometer wide asteroid slammed into what is today the Yucatan Peninsula, mass volcanic eruptions were spewing lava and ash into the atmosphere in today's India. don’t take down the dinosaurs with just one big space rock—you need to set the world on fire at the same time. That's an example of a convergence of cataclysms. It's thought that the impact event itself may have been so powerful that it actually intensified these volcanic eruptions on the other side of the planet, essentially sealing the fate of the giant lizards and ushering in the age of mammals. Luckily, over the past few decades, we've gained a considerable amount of knowledge about asteroids and their movements through the solar system. With more advanced asteroid-hunting telescopes being deployed all the time, NASA has been on the forefront of detecting and cataloging near-Earth asteroids for quite some time. We now know with a large degree of confidence the orbits and trajectories of perhaps 90-95% of all of the near-Earth asteroids larger than one kilometer in size—these are the planet-killing asteroids, large enough that a potential impact would cause destruction across an entire continent. There may be as many as 1,000 of these orbiting in our general vicinity. From there, things get a bit more bleak. There are an estimated 27,000 near-Earth asteroids larger than 140 meters in size, of which we've only identified approximately one third. Asteroids this large are capable of wiping a small- to mid-sized country off of the map, and it's a little bit disconcerting that the majority of these are yet to be found and cataloged. While such an event would be unlikely to cause the downfall of global civilization, it could certainly cause global instability on a large scale—especially if it impacted a significantly populated area. And then we have the significant leftovers—an estimated 840,000 near-Earth asteroids measuring between 40 to 140 meters in size, of which we've only identified around 1.5% so far. These objects would be larger than the Chelyabinsk meteor that exploded over Russia in 2013 and injured some 1,500 people, and closer in size to the meteor that caused the infamous Tunguska event in the middle of Siberia back in 1908. An asteroid over 40 meters in diameter is referred to as a "city-killer," and could conceivably cause significant or even cataclysmic damage to an urban metropolis in the case of a direct hit. The danger here is that city-killers are smaller and more difficult to detect than larger asteroids, so they're much more likely to strike with little or no warning. Fortunately, assuming an equal distribution of asteroid impacts across the Earth's surface, it's more likely that such an impact would end up in the middle of the ocean or a large empty expanse of land, like Siberia—so we probably don't need to worry that much. Even so, it could be wise to continue our investment in asteroid detection capabilities. While we may not know with 100% accuracy when the next deadly asteroid might come our way, we can be 100% confident that one day it will—whether or not we're still around to witness it. 3. A Wandering Rogue Planet If the prospect of a 10-kilometer wide asteroid slamming into Earth sounds daunting, imagine what a collision with a planet-sized object might do. This has happened before—about 4.5 billion years ago, culminating in the formation of the Earth and our Moon. But this event occurred between two planetary bodies in unstable orbits within our early solar system, a condition which doesn't exist in today's modern solar system (it's extremely unlikely that Mars, for example, would collide with the Earth at any point in the future). But that doesn't entirely rule out collisions with planetary bodies originating from outside of our solar system. While all planets must initially form in orbit around a star, they don't necessarily have to remain there. In some cases, planets can be ejected from their originating star system (ie. by being pushed out by the gravitational influence of another large planet or star), becoming doomed to roam interstellar space without being connected to a host star. At this point, they become known as rogue planets. It's estimated that in our Milky Way Galaxy alone, rogue planets may outnumber the amount of stars in the galaxy. Higher estimates seem to indicate that rogue planets may outnumber stars by several orders of magnitude. A rogue planet entering our solar system from interstellar space could cause significant disruption in the orbits of asteroids, comets, and our neighboring planets. These effects could be particularly worsened depending on the size of the rogue planet that comes to visit—we know from surveys of nearby star systems that exoplanets several times more massive than Jupiter appear to be common. The instability caused by a close encounter with a wandering rogue planet could send massive comets from the Oort cloud raining down on the inner solar system, or even destabilize the orbits of other planets and cause them to be ejected from our solar system entirely (or send them colliding into another planet). Since the vast majority of our solar system consists of empty space, it's extremely unlikely that such an object would collide with another planetary body or become trapped in orbit around our sun, but this is another possibility. Worst of all, since a rogue planet wouldn't be emitting any visible light, detecting these objects in interstellar space would be extremely difficult. We likely wouldn't know that such an object was approaching until it was already knocking at our door. 4. A Close Encounter with a Star Planetary objects aren’t as big as they get—we might also need to consider the possibility that neighboring stars could get a little too close for comfort. We know that the Oort cloud may extend as far as several light years beyond our solar system. Any star entering within the Oort cloud could cause an incredible amount of disruption, resulting in a bombardment of icy comets and planetesimals raining down on us from the outer solar system. Proxima Centauri, our Sun's nearest neighboring star, currently sits at a comfortable 4.2 light years away. At this distance, this relatively small star (being only around 1/8th the mass of our own sun) isn't large enough or close enough to cause any such perturbations of the Oort cloud. But there are plenty of other stars in our galactic neighborhood, and they have a habit of moving around. It's currently estimated that in about 1.3 million years, Gliese 710, a nearby star with 60% the mass of our Sun, may approach as close as 0.22 light years to Earth. The results of this encounter may be catastrophic for Earth and the inner solar system in general, causing massive comets to be hurtled into the inner solar system at a highly accelerated rate for several million years. Assuming life on Earth still exists by then, the Sun's close encounter with Gliese 710 would significantly increase the probability and frequency of a significant impact event occurring—perhaps even an impact more devastating than what happened to the dinosaurs. 5. Black Holes in our Midst Since the concept of black holes entered the scientific canon and the public lexicon several decades ago, humans have been captivated by the concept of a point in space from which nothing—not even light—can escape. In addition to their mystique, black holes may also represent a highly underrated existential threat to life on Earth. This is for good reason. The mere existence of black holes had remained in the realm of scientific theory up until 2019, when the first-ever direct image of a black hole was captured. The recency of this image reveals the problem: because their gravitational fields are so strong that not even light can escape the event horizon, detecting a black hole against the backdrop of empty space is impossible. Because we can't detect them, we can't count them. And because we can't count them, we can never know for certain how many there are, and what the distribution curve is. Nobody really knows how many black holes might exist in any given galaxy, or what the average size of these black holes might be. It's plausible that black holes ranging in size from a few dozen to a few hundred solar masses may be common, millions of which could be distributed throughout our galaxy without our knowledge. Detecting these objects from afar would be a nearly impossible feat, and it's conceivable that we wouldn't recognize their presence until we begun noticing the telltale signs of gravitational abnormalities in our galactic neighborhood. The effects of a massive invisible object in our vicinity could be profound. Just as a rogue planet entering our solar system or a nearby star getting a little too close for comfort, a large black hole could push or tug at our solar system and nearby star systems from afar. The large gravitational disruption that a black hole encounter would entail could send our sun hurtling towards the center of the galaxy, or could increase the probability of an unwanted encounter with a nearby star system. 6. A Nearby Supernova or Gamma Ray Burst As if black holes and planetary collisions weren't worrying enough, we also need to contend with the fact that, at the end of their life cycle, some of the largest stars tend to explode and spew gamma radiations over long distances of space. Gamma rays consist of extremely high-energy electromagnetic waves that can be hazardous to biological life. In some cases, gamma ray bursts produced by an exploding hypernova (a stellar explosion that's an order of magnitude more powerful than a supernova) can become narrowly focused into concentrated beams. If any of these gamma-ray beams were to be directed towards Earth, it could destroy the entire Ozone layer and leave our biosphere exposed to high-radiation cosmic rays. The beams from gamma ray-ray bursts can be so powerful that, when pointed in our direction, they've been detected at distances up to 10 billion light years away. At these distances, gamma-rays don't pose any threat to life on Earth. But if such an outburst were to originate from inside our Milky Way Galaxy, especially within a distance of a few thousand light years, that wouldn't be a good day for life on Earth. Such an event is thought to be fairly uncommon, perhaps occurring every one billion years or so on average because hypernovae are relatively rare. But a hypernova isn't the only type of explosion that can produce high-powered gamma rays: we also have to consider the risk that a passing star could explode as a regular old supernova. Because supernovae are far more common, these are far more likely to disrupt life on Earth than a distant gamma-ray burst. It's estimated that a sufficiently powerful supernova occurring within 50 light years of Earth may produce enough gamma radiation to destroy all or part of the Ozone layer. And the closer an explosion occurs, or the more x-rays and gamma rays it produces, the more devastating such an encounter could be. One average, it's estimated that a supernova explosion occurs within 33 light years of Earth every 240 million years or so. Such an event may have been responsible for a mass-extinction event some 450 million years ago, in which up to 85% of marine species went extinct (during the Ordovician-Silurian extinction events). If such an event were to occur today, there would be little we could do to mitigate the effects of sudden and total Ozone loss. 7. Fluctuations in our Sun's Energy Output We don’t need to look outside of our solar system for killer stars—just look up in the sky on a sunny day (or don’t, because your retinas might burn out of your skull). Forget about light-year distances; there's a gigantic nuclear fusion explosion in space going on just 8 light-minutes away from Earth, every second of every day, for the past 4.6 billion years. And most of the time, we aren't even worried. We know that the Sun is capable of producing solar storms and solar flares. While these aren't typically powerful enough to seriously disrupt life on Earth, there is reason to consider our own Sun as a potential driver of civilization collapse. Back in 1859, a powerful geomagnetic storm had a direct impact on Earth. This is known as the Carrington Event, and it was powerful enough to bring down telegraph systems at the time. Had this type of event occurred today, it would have caused widespread blackouts and damage to the electrical grid. Since most of our civilization runs on electricity and relies on digital computers, any significant damage to these systems caused by a future solar storm could cause an unprecedented global disruption with cost estimates ranging in the trillions of dollars. While we could take steps to make sure our electronics and electrical grids are robust enough to survive such an event, the Sun does have another trick up it's sleeve. Over time, the Sun's energy output tends to fluctuate—it can decrease over some ~11 year cycles, and increase over others. While these fluctuations are usually very small, they do have an impact on the Earth's climate: it's thought that the Sun's current cycle of increased energy output may be responsible for anywhere from 7% to upwards of 30% of global warming over the past 30 years (with the rest being attributed to human activity). It's thought that the Sun's energy fluctuations over time may also be partly responsible for the numerous glacial periods (or ice ages), followed by warmer interglacial periods (the climate of the past 11,700 years) that have occurred in the Northern Hemisphere over the past 2.5 million years. Of course, due to the complexity of these systems and the numerous drivers of warming and cooling periods, scientists can't be completely sure to what extent different inputs (such as solar fluctuations) may account for climate fluctuations. This puts human civilization in a precarious spot, faced with two extremes: unprecedented global warming, and the prospect of slipping into another ice age. Sometimes it doesn't take a direct impact or a supernova to cause a global catastrophe, but rather the slow progression of complex natural cycles that we don't yet fully understand. 8. The Sun's Red Giant Phase While fluctuations in solar output play out over the short-term (hundreds or thousands of years), the long-term future of our Sun looks a lot different. For one, the Sun's luminosity has increased by about 1% every 110 million years. Within a few hundred million years, the increasing energy output of the Sun may have may begin having a more extreme impact on Earth's climate, causing global temperatures to rise and making life on Earth more difficult overall. This increased luminosity will continue until, in about 5 billion years (when the sun is 67% more luminous than today), all of its hydrogen fuel will be exhausted and it will begin transitioning into its red giant phase. Life on Earth won't last long enough to see this, as increasing solar output and global warming will likely cause all life on Earth to go extinct within 2.8 billion years. If human civilization is still around a few hundred million years from now, the only option for our long-term survival would be either moving the Earth or moving ourselves to other planets altogether (ie. Mars) as solar output increases. That is, if we haven't packed up and left the solar system entirely by that point.

#### Fourth wave of science solves

**Kaku 18** [Michio, an American theoretical physicist, futurist, and popularizer of science. He is a professor of theoretical physics in the City College of New York and CUNY Graduate Center. “There's Only One Way For Humanity to Survive. Go To Mars.,” <https://news.nationalgeographic.com/2018/02/there-s-only-one-way-for-humanity-to-survive--go-to-mars-/>]

You use the phrase “the fourth wave of science.” Explain what this means and how it could one day make it possible to terraform Mars. We’ve had three waves of scientific innovation. The first wave, the Industrial Revolution, gave us the steam engine, the locomotive, and factories. The second wave was electricity and magnetism, whereby we had TV, internal combustion cars, a beginning of the space program. The third revolution is high tech: computers, lasers, the Internet. Now we have the fourth wave of innovation: artificial intelligence, biotech, and nanotech. That’s going to change the way we view Mars. Many people say Mars is cold and desolate, and there’s nothing to grow there. We can genetically modify plants and algae to thrive in the Martian atmosphere. But who’s going to do the heavy lifting? We all would like to see futuristic cities on Mars, but robots are going to become much more adapted to working in these harsh environments by the end of this century, so we expect to see robotic construction workers building the fantastic domed cities you see in science fiction novels.

#### It’s possible by 2030 with sustained growth

Victor **Tangermann**, 10-17-20**17**, "A timeline for humanity's colonization of space," https://futurism.com/a-timeline-for-humanitys-colonization-of-space

Humans have long desired to explore the vast realms of space. Today, we are finally poised to send people out into the cosmos. Indeed, a number of private and public space companies are gearing up for Space Race 2.0 — a (very expensive) competition that inches us closer to uncovering answers about our universe and exploring new realms of our own humanity. Though they are still in the race, shifting priorities and limited budgets have undermined NASA’s lead in exploring the solar system and beyond. In the meantime, private entities like SpaceX and Virgin Galactic are flush with cash, and they are stepping up to try and engineer better, bigger, and faster rockets. And this is a good thing because, if humans are to find life on other planets, or perhaps a new planet for ourselves, more work needs to be done. Engineers and scientists need to develop life support systems, find reliable sources of water and fuel, overcome the negative effects living in space has on the body, and find a faster way to travel. There is still much to be done, but sending the average person to the Moon and beyond no longer seems so far out of reach. Yet, when will it finally happen? When will humans finally roam across an alien world? Here’s a comprehensive timeline of our future beyond Earth. Late 2017: Heavy Falcon Launch SpaceX plans to launch the Falcon Heavy for the first time before the end of 2017. Because the rocket can be reused, the Falcon Heavy rocket can deliver its payload into space at only a third of the cost of the next closest operational vehicle, the Delta IV Heavy. This lower upfront cost means that more organizations can carry out experiments in outer space. One of these experiments is the Planetary Society’s LightSail 2 solar sail that will launch on board a Heavy Falcon in early 2018. SpaceX’s Falcon Heavy rocket lives up to its name. 27 rocket engines weigh down the 70-meter (229-foot), 1.4-metric-ton (3.1-million-pound) rocket. That’s a lot of extra weight, but the payload makes it worthwhile — the rocket can launch 63,800 kg (140,660 lbs) of equipment, cargo, and passengers into orbit around Earth. That’s more than double the weight that the Space Shuttle can haul to the same altitude. 2018: Preparing For Space Tourism In 2018, SpaceX plans to launch more than ever before, sending 30 rockets into orbit (up from 20 in 2017). More attempts give the company more data to show how it can perfect its technology to launch rockets cheaply and securely. Eventually, this inexpensive and safe spaceflight will make space tourism finally viable. In fact, just this year, SpaceX announced that they would be sending two humans to orbit the Moon in 2018. Image Credit: Virgin Galactic Virgin Galactic is gearing up to launch its first astronauts into space before the end of February 2018. Before it launches with passengers on board, though, the spacecraft will have to undergo a series of test flights. The space plane, called the VSS Unity, completed its fifth ‘glide flight’ (distinct from the vertical trajectory of traditional space rockets) earlier in 2017. In the first months of 2018, it will be taking flights closer to the Karaman line, the official border between the Earth’s atmosphere and outer space located 100 km (62 miles) above the Earth’s surface. Image Credit: Planetary Society Around that same time in early 2018, scientists will test the LightSail 2, a device that moves through space by harnessing the power of solar photons — no fuel tanks or thrusters required. The LightSail 2, a citizen-funded spacecraft and created by the Planetary Society (the largest nonprofit organization that promotes the exploration of outer space), would be a proof of concept that solar sailing could propel spacecraft deeper into space. The unmanned, light-propelled spacecraft will hitch a ride on SpaceX’s Falcon Heavy rocket before taking its test flight at an altitude of 720 km (447.4 miles). 2019: Space Tourism And Observation Image Credit: Blue Origin Blue Origin, the spaceflight services company started by Amazon founder Jeff Bezos, recently announced that it intends to take tourists to space before April 2019. In groups of six, passengers will board an 18-meter (60-foot) rocket to the edge of space, around 100 km (62 miles) from the Earth’s surface. Once there, they will experience zero-gravity flight. Three independent parachutes and a retro-thrust system ensure that passengers will gently sail back to Earth. This experience does not come cheap — a ticket to board the New Glenn to reach Earth orbit is rumored to cost anywhere between $150,000 and $250,000. And, yet, there’s little question that people will want to sign up — Virgin Galactic, a competing space tourism project, reportedly already has 700 people signed up. In 2019, Blue Origin plans to add two- and three-stage rockets to its arsenal. They are fully reusable, up to 99 meters (326 feet) tall, and can deliver payloads at a relatively low cost, competing with SpaceX’s Falcon Heavy rockets. Image Credit: NASA NASA also intends to launch its James Webb Telescope in the first quarter of 2019. The telescope will observe the solar system in the infrared to see every phase of the solar system’s maturation; it will ultimately be 100 times more powerful than the Hubble Space Telescope, thanks to its array of 18 hexagonal mirror segments. With a combined mirror diameter of 6.5 meters (the Hubble measures in at only 2.4), the James Webb Telescope will be able to detect events such as the formation of galaxies dating back to the time of the Big Bang. It will also have a special focus on discovering new planets that could be capable of supporting life. 2020-2025: “Earth Reliant” And Beyond From finding evidence of liquid water to detecting organic matter in the soil of the Red Planet’s surface, the Curiosity rover has answered some fundamental questions about what it’s like on Mars. However, that information has also sparked more questions about what other elements may be present. To this end, in an effort to establish whether oxygen is present in the Martian atmosphere, and at what concentration, Curiosity’s successor, the Mars 2020 rover, will be saddled with a host of sensors and instruments that will allow it to answer this question. Information about oxygen concentration will be important if humans are ever able to visit the Red Planet themselves, which could be possible as early as 2030. There are other things that need to happen if we’re going to colonize other planets. NASA has established three phases that we need to complete before this is possible. In the first, which NASA calls “Earth Reliant,” we continue to test the feasibility of living in space and conduct more research aboard the ISS. In the second (“Proving Ground”), operations around the Moon will be used to establish ways to return humans to the Earth safely. With those stages complete, we will finally reach the third stage (“Earth Independent”) in which humans establish a self-sufficient colony on Mars. Image Credit: NASA Just over 50 years after humans first touched the lunar surface, NASA is gearing up to launch another manned spacecraft to go beyond the Moon. The astronauts will be on board a ship called the Orion, which will lift off using NASA’s Space Launch System (SLS), a modular heavy launch vehicle. SLS is similar to SpaceX’s Heavy Falcon and has a maximum payload of 70 to 130 metric tons (150,000 to 290,000 lbs). First, though, the spacecraft will do a few test runs without any humans on board. The first mission, Exploration Mission-1, is slated for late 2018. The SLS will launch the unmanned craft, travel to the Moon, enter orbit about 100 km (62 miles) above the lunar surface, and use gravity to propel itself into deep, unexplored space. The goal of this mission is to see if the craft can help humans survive a trip to distant planets. The second mission (Exploration Mission-2), planned for August 2021, will be NASA’s first manned test flight beyond the Moon. “During this mission, we have a number of tests designed to demonstrate critical functions, including mission planning, system performance, crew interfaces, and navigation and guidance in deep space,” Bill Hill, the deputy associated administrator of Exploration Systems Development at NASA Headquarters said in a 2016 NASA blog. To gain enough momentum to make the trip around the Moon, the spacecraft will have to make multiple orbits around Earth, occasionally igniting its thrusters. During its stable orbit of the Moon, the Orion will gather data and test the spacecraft’s capabilities for interplanetary flight. 2022: Making Mars Habitable While NASA spends the 2020s exploring how to best keep humans healthy in space, SpaceX plans to start putting down the infrastructure for humans to colonize it. SpaceX anticipates completing its first 54.6-million-km (33.9-million-mile) trip to Mars in 2022. Image Credit: SpaceX In his update earlier this year, Elon Musk revealed plans for a rocket that is far bigger and more powerful than NASA’s Space Launch System and even his agency’s own Falcon Heavy — the BFR. A rocket that big would have enough space for fuel to take humans to Mars, or even allow for Earth-based city-to-city travel. With a maximum payload of 150 tons, the enormous 106-meter (347.7-feet) rocket would break the current record for biggest payload (including cargo, fuel, and passengers) launched into orbit, while providing the lowest cost for each additional launch. To reach the Moon, the BFR would launch from the Earth’s surface, transfer propellant from fuel depots previously stationed in Earth’s orbit, accelerate in orbit, pick up an injection of fuel for the remaining distance to the lunar surface on the way, and land. SpaceX plans to refuel the rocket once it is in orbit in order to extend its range and payload capacity so that it can return safely to Earth. Tests have already shown that it’s possible to refuel rockets in space. NASA conducted the Robotic Refueling Mission in 2011, and it successfully completed a robot-actuated propellant transfer on an exposed platform of the International Space Station. Image Credit: SpaceX By 2022, SpaceX expects to land at least two cargo ships on Mars in order to establish a habitat for humans. The primary goal of those initial missions is to find a reliable source of water on the Martian surface. 2024: Manned Missions On The BFR Image Credit: SpaceX Two years after those cargo ships establish an infrastructure, SpaceX plans to send humans to inhabit a colony on Mars. The passengers aboard the BFR’s 40-cabin Mars transit module will be the first to make the unprecedented trip. This is, Musk would probably admit, an aggressive timeline. And it may not work in SpaceX’s favor: Due to planetary alignments and other factors such as solar power requirements and fuel limitations, the launch window of Earth-Mars travel is only a few weeks, according to Wired. And that’s assuming that all the other pieces fall perfectly into place — neither the BFR nor its predecessor, the Falcon Heavy, has yet had a successful launch. Should the BFR mission make it to Mars, it will contain the materials to construct a propellant production plant as part of its Martian colony. The plan would suck carbon dioxide from the atmosphere and turn it into deep-cryo CO4 fuel using solar power. 2025-2030: A Year In Space Image Credit: NASA SpaceX might be ready to send humans to live in space by the early 2020s, but NASA is a little more cautious. The government space agency is planning to put astronauts into orbit for a year to find out if humans are indeed ready to live on a different planet. In March 2016, NASA astronaut Scott Kelly completed a similar year-long mission aboard the ISS to test the effects of zero gravity on the human body and what that will mean for future space travel to Mars. Unlike Kelly’s mission, however, NASA’s 2021 mission will put astronauts in orbit around the Moon. They’ll be in a “deep-space gateway” — a small ISS-like station that will serve as a testing ground for future deep space missions, including later missions to Mars. It will be built over five earlier missions, four of them with humans aboard. The effects of spending a year in lunar orbit on the human body, caused by factors such as different day-night cycles and solar radiation, are still unknown. 2030s: NASA Sends Humans To Mars Five years after SpaceX’s manned missions to Mars, NASA plans to send its own spacecraft to the Red Planet. Using data and samples from the Curiosity and Mars 2020 rovers, NASA will first establish how humans could sustain themselves on the Martian surface before sending manned spacecraft from its deep-space gateway to do so.