# 1AC

### Plan

#### Plan: The United States federal government should substantially increase prohibitions on private sector conduct that is more restrictive of competition than reasonably necessary to enable creation of information technology standards.

### 1AC---Innovation ADV

#### Advantage 1 is Innovation:

#### Current standard setting organization and FRAND enforcement is failing now

Melamed & Shapiro 18, \*A. Douglas Melamed is Professor of the Practice of Law at Stanford Law School; \*Carl Shapiro is the Transamerica Professor of Business Strategy at the Haas School of Business at the University of California at Berkeley; (May 2018, “How Antitrust Law Can Make FRAND Commitments More Effective”, https://www-cdn.law.stanford.edu/wp-content/uploads/2018/05/How-Antitrust-Law-Can-Make-FRAND-Commitments-More-Effective.pdf)

I. Standard Setting and the Competitive Process

The fundamental economics in the information technology sector, driven by network effects, implies that there is enormous value associated with establishing compatibility standards. Popular standards include the mobile broadband standards used in cell phones, which are established by the 3rd Generation Partnership Project (3GPP), and the Wi-Fi technology for wireless local area networks, which is enabled by the 802.11 standard established by the Institute of Electrical and Electronics Engineers (IEEE).4

There are many SSOs, and their rules and procedures differ considerably. In addition to IEEE, leading SSOs include the International Organization for Standardization (ISO), the International Telecommunication Union (ITU), the European Telecommunications Standards Institute (ETSI), the Internet Engineering Task Force (IETF), and the World Wide Web Consortium (W3C).5 SSOs generally establish standards by holding a series of committee meetings among industry participants. These meetings culminate in a vote on a technical specification that describes what features or attributes a product must have in order to comply with the standard. Most SSOs are open to all industry participants and seek to operate on a consensus basis, applying certain voting rules. SSOs do not normally engage in patent licensing, nor do they specify how patent royalties will be divided up among patent holders. They leave that to their members, which in some cases form patent pools to address these issues.6

SSOs adopt specific policies relating to intellectual property rights (IPRs).7 These IPR policies are generally intended to enable the SEP holders to obtain reasonable royalties for licensing their patents, while prohibiting them from charging excessive royalties after other industry participants have committed to the standard. At that point, firms committed to implementing the standard— which we call “implementers”—would find it very costly to avoid using the patented technology. For this purpose, most SSOs require SEP owners to license their SEPs on FRAND terms.8

FRAND policies are especially necessary because negotiations between SEP holders and implementers generally take place only after the implementers have used and infringed the technologies claimed by the SEPs. Standards involving information and communications technology can involve hundreds or even thousands of SEPs, many with uncertain boundaries for infringement. In addition, a time lag exists between patent application and patent issuance. For these and other reasons, it is impractical for implementers to enter into negotiations for patent licenses with all SEP owners prior to the establishment of a standard and to their implementation of it.9

The fact that patent negotiations generally do not take place until after implementers have used and infringed the technologies has several critical implications. First, at the time of negotiation, implementers are locked into the standard and the technologies claimed by the SEPs—that is, the cost to switch to an alternative technology or standard at that point—ex post—is much greater than it was ex ante, before the patented technology was first included in the standard. Ex post, the patent holder is no longer competing to have its technology included in the standard, nor is it competing to have implementers of the standard use its technology. Instead, because the patent holder owns an asset that is essential to the standard, implementers have no choice but to use the patented technology.

If the standard is commercially successful, implementers are willing to pay a much larger royalty for use of the patented technology than they would have paid ex ante, when the SEP holder faced competition from other technologies. In these circumstances, the SEP holder can be said to have obtained monopoly power in the market in which the patented technology is licensed for use in implementing the standard.10

Second, because of lock-in and the implementer’s ongoing infringement, the potential for litigation looms large in licensing negotiations. In effect, the parties are negotiating about how to settle an infringement suit, and that negotiation is heavily influenced by their predictions as to what the court will do if they cannot agree. This situation is not unique to SEPs; it arises frequently when firms are faced with patent infringement claims for products they have independently developed or technologies they have inadvertently infringed. Patent law addresses such instances by specifying that patent holders are entitled to “reasonable royalties,” defined as the royalties that the parties would have negotiated prior to the infringement and thus prior to lock-in.11 Those hypothetical ex ante royalties reflect the market value of the patent license. Notwithstanding the law’s embrace of this principle, however, as a practical matter, patent holders are generally able to recover more than the ex ante value of the patent when litigation occurs after the implementers are locked in. Further, negotiations in the shadow of litigation after lock-in tend to result in royalties in excess of the ex ante or market value of the patented technology.12

Third, the shadow of litigation is particularly problematic in the communications and technology sector, in which products typically include hundreds or thousands of patented technologies. A court-ordered injunction involving such products would deprive the implementer of not only the value of the technology covered by the patent-in-suit, but also the value of the entire product.13 Implementers that are forced to bear the risk of an injunction are thus induced to agree to royalties greater than those that would be appropriate if only the value of the patented technology were at stake. Those royalties systematically provide SEP holders with excessive compensation in comparison with the benchmark of ex ante royalties.

These implications of lock-in and ex post dealings are well-understood: they represent an example of the general concept of lock-in and opportunism developed by Oliver Williamson.14 The Federal Circuit has also recognized the market distortions caused by the inclusion of patented technologies in public standards and the resulting danger of patent holdup involving SEPs.15

For these and other reasons, the SEP holder has ex post monopoly power that, if left unchecked, would enable it to obtain royalties far in excess of the royalties that it could earn in a competitive market.16 To address this common problem and limit ex post opportunism by SEP holders, SSOs typically require participants that own SEPs to make certain FRAND commitments. In particular, by requiring a commitment to license on “fair and reasonable” terms, the FRAND requirement aims to prevent, or at least reduce, the extent of monopoly pricing by SEP holders. And by requiring a commitment to license on “nondiscriminatory” terms, the FRAND requirement can prevent SEP holders from extracting monopoly premiums by selective licensing or, more important, migrating their monopoly power from the FRAND-regulated market to unregulated standard-implementing product markets by licensing to only one or a few implementers or licensing to selected implementers on discriminatorily favorable terms.

#### Holdup is accentuated by FTC v Qualcomm

Moss 20, \*Alex Moss is a Staff Attorney on EFF’s intellectual property team, before joining EFF, Alex practiced complex commercial litigation at Sullivan & Cromwell LLP in New York and Durie Tangri LLP in San Francisco; (August 26th, 2020, “Throwing Out the FTC's Suit Against Qualcomm Moves Antitrust Law in the Wrong Direction”, https://www.eff.org/deeplinks/2020/08/throwing-out-ftcs-suit-against-qualcomm-moves-antitrust-law-wrong-direction)

Standards can enhance competition and consumer choice, but they also massively inflate the value of patents deemed essential to the standard, and give their owners the power to sue companies that implement the standard for money damages or injunctions to block them from using their SEPs. When standards cover critical features like wireless connectivity, SEP owners wield a huge amount of “hold-up” power because their patents allow them to effectively block access to the standard altogether. That lets them charge unduly large tolls to anyone who wants to implement the standard.

To minimize that risk, standard-setting organizations typically require companies that want their patented technology incorporated into a standard to promise in advance to license their SEPs to others on fair, reasonable, and non-discriminatory (FRAND) terms. But that promise strikes at a key tension between antitrust and patent law: patent owners have no obligation to let anyone use technology their patent covers, but to get those technologies incorporated into standards, patent owners usually have to promise that they will give permission to anyone who wants to implement the standard as long as they pay a reasonable license fee.

Qualcomm is one of the most important and dominant companies in the history of wireless communication standards. It is a multinational conglomerate that has owned patents on every major wireless communication standard since its first CDMA patent in 1985, and it participates in the standard-setting organizations that define those standards. Qualcomm is somewhat unique in that it not only licenses SEPs, but also supplies the modem chips used by a wide range of devices. These include chips that implement wireless communication standards, which lie at the heart of every mobile computing device.

Although Qualcomm promised to license its SEPs (including patents essential to CDMA, 3G, 4G, and 5G) on FRAND terms, its conduct has to many looked unfair, unreasonable, and highly discriminatory. In particular, Qualcomm has drawn scrutiny for bundling tens of thousands of patents together—including many that are not standard-essential—and offering portfolio-only licenses no matter what licensees actually want or need; refusing to sell modem chips to anyone without a SEP license and threatening to withhold chips from companies trying to negotiate different license terms; refusing to license anyone other than original-equipment manufacturers (OEMs); and insisting on royalties calculated as a percentage of the sale price of a handset sold to end users for hundreds of dollars, despite the minimal contribution of any particular patent to the retail value.

In 2017, the U.S. Federal Trade Commission [sued](https://www.ftc.gov/news-events/press-releases/2017/01/ftc-charges-qualcomm-monopolizing-key-semiconductor-device-used) Qualcomm for violating both sections of the Sherman Antitrust Act by engaging in a number of anticompetitive SEP licensing practices. In May 2019, the U.S. District Court for the Northern District of California agreed with the FTC, identifying numerous instances of Qualcomm’s unlawful, anticompetitive conduct in a comprehensive [233-page opinion](https://www.eff.org/document/ftc-v-qualcomm-district-court-opinion). We were pleased to see the FTC take action and the district court credit the overwhelming evidence that Qualcomm’s conduct is corrosive to market-based competition and threatens to cement Qualcomm’s dominance for years to come.

But this month, a panel of judges from the Court of Appeals for the Ninth Circuit unanimously [overturned](https://www.eff.org/document/ninth-circuit-opinion-ftc-v-qualcomm) the district court’s decision, reasoning that Qualcomm’s conduct was “hypercompetitive” but not “anticompetitive,” and therefore not a violation of antitrust law. To reach that result, the Ninth Circuit made the patent grant more powerful and antitrust law weaker than ever.

According to the Ninth Circuit, patent owners don’t have a duty to let anyone use what their patent covers, and therefore Qualcomm had no duty to license its SEPs to anyone. But that framing requires ignoring the promises Qualcomm made to license its SEPs on reasonable and non-discriminatory terms—promises that courts in this country and around the world have consistently enforced. It also means ignoring antitrust principles like the essential facilities doctrine, which limits the ability of a monopolist with hold-up power over an essential facility (like a port) to shut out rivals. Instead, the Ninth Circuit held rather simplistically that a duty to deal could arise only if the monopolist had provided access, and then reversed its policy.

But even when Qualcomm restricted its licensing policies in critical ways, the Ninth Circuit found reasons to approve those restrictions. For example, Qualcomm stopped licensing its patents to chip manufacturers and started licensing them only to OEMs. This had a major benefit: it let Qualcomm charge a much higher royalty rate based on the high retail price of the end user devices, like smartphones and tablets, that OEMs make and sell. If Qualcomm had continued to license to chip suppliers, its patents would be “exhausted” once the chips were sold to OEMs, extinguishing Qualcomm’s right to assert its patents and control how the chips were used.

Patent exhaustion is a century-old doctrine that protects the rights of consumers to use things they buy without getting the patent owner’s permission again and again. Patent exhaustion is important because it prevents price-gouging, but also because it protects space for innovation by letting people use things they buy freely, including to build innovations of their own. The doctrine thus helps patent law serve its underlying goal—promoting economic growth and innovation. In other words, the doctrine of exhaustion is baked into the patent grant; it is not optional. Nevertheless, the Ninth Circuit wholeheartedly approved of Qualcomm’s efforts to avoid exhaustion—even when that meant cutting off access to previous licensees (chip-makers) in ways that let Qualcomm charge far more in licensing fees than its SEPs could possibly have contributed to the retail value of the final product.

It makes no sense that Qualcomm could contract around a fundamental principle like patent exhaustion, but at the same time did not assume any antitrust duty to deal under these circumstances. Worse, it’s harmful for the economy, innovation, and consumers. Unfortunately, the kind of harm that antitrust law recognizes is limited to harm affecting “competition” or the “competitive process.” Antitrust law, at least as the Ninth Circuit interprets it, doesn’t do nearly enough to address the harm downstream consumers experience when they pay inflated prices for high-tech devices, and miss out on innovation that might have developed from fair, reasonable, and non-discriminatory licensing practices.

We hope the FTC sticks to its guns and asks the Ninth Circuit to go en banc and reconsider this decision. Otherwise, antitrust law will become an even weaker weapon against innovation-stifling conduct in technology markets.

#### Weakened antitrust enforcement emboldens firms to follow Qualcomm’s lead

Hovenkamp 20, \*Herbert J. Hovenkamp is James G. Dinan University Professor at the University of Pennsylvania Law School and the Wharton School of the University of Pennsylvania; (2020, “FRAND and Antitrust”, <https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=3095&context=faculty_scholarship>)

While the FRAND process has been highly productive, it is also fragile. Firms are tempted to make commitments at the beginning when the incentive to join is large, but renege on them later when they can profit by doing so. At least in this particular case, private FRAND enforcement had not worked very well. Qualcomm had been able to violate FRAND commitments in order to exclude rivals and obtain higher royalties than FRAND would permit, largely with impunity. Other firms will very likely follow Qualcomm’s lead. If that happens the FRAND system will fall apart, doing irreparable injury to the modern wireless telecommunications network or, at the very least, diminishing the leadership role of the United States in preserving effective network competition.

While governments can be heavily involved in standard set-ting,9 the implementation of technical standards in information technologies is largely the work of private actors. Government involvement is limited mainly to enforcement of contract, intellectual property, or antitrust law. As private actors, those involved in standard setting or compliance are fully subject to the federal antitrust laws.

This Article addresses one question: when is an SSO participant’s violation of a FRAND commitment an antitrust violation, and if it is, of what kind and what are the implications for remedies? It warns against two extremes. One is thinking that any violation of a FRAND commitment is an antitrust violation as well. In the first instance FRAND obligations are contractual, and most breaches of contract do not violate any antitrust law. The other extreme is thinking that, because a FRAND violation is a breach of contract, it cannot also be an antitrust violation. The question of an antitrust violation does not de-pend on whether the conduct breached a particular agreement but rather on whether it caused competitive harm. This can happen because the conduct restrained trade under section 1 of the Sherman Act, was unreasonably exclusionary under section 2 of the Sherman Act, or amounted to an anticompetitive condition or understanding as defined by section 3 of the Clay-ton Act.10 The end goal is to identify practices that harm com-petition, thereby injuring consumers.

The Ninth Circuit’s Qualcomm decision will make antitrust violations in the context of FRAND licensing much more difficult to prove, even in cases where anticompetitive behavior and consumer harm seem clear.11 Indeed, in this case the court itself acknowledged the harm to consumers but appeared to think that they were not entitled to protection.12 If this decision stands, FRAND obligations will to a larger extent have to be settled through private litigation and the federal antitrust enforcement agencies will have a diminished role. Anticompetitive behavior by one firm that is not effectively disciplined will lead others to do the same thing.

#### A trusted and credible system for ICT innovation is critical to rapid tech diffusion and economic growth---absent FRAND, the system will collapse.

Bauer et al. 17, \*Matthias Bauer is Senior Economist at ECIPE; \*Fredrik Erixon is a Swedish economist and writer. He has been the Director of the European Centre for International Political Economy (ECIPE) ever since its start in 2006; (October 2017, “Standard Essential Patents and the Quest for Faster Diffusion of Technology”, https://ecipe.org/publications/standard-essential-patents/)

It is easy to take a pessimistic view about whether the system will break. If the current trend continues, the system is likely to break at some point for the simple reason that companies will not trust it anymore. The series of legal disputes witnessed over the past years – sometimes referred to as the “smartphone patent wars” – has been fodder for a pessimistic reading of “the two tales of SEPs”. While it is common in the business world that disputes over patents and licenses are settled in courts, various SEP disputes have revealed problematic aspects of the SEP market that are different from those disputes that follow the normal stream of business and contracts. Often, the SEP disputes are less concerned about the rights and boundaries of patents, and more about antitrust limits to market behavior: they concern market abusive practices and restrictions to competition as much as they are about intellectual property.

If the SEP system actually does break at some point, the consequences would be felt throughout the economy. SEPs have been a critical part of the ICT revolution. SEPs have allowed for the fast rates of innovation diffusion that the world has witnessed over the past quarter of a century. All the computer and Internet related products and services that people are now dependent upon for their private and professional lives are intricate webs of intellectual property. As many as 250,000 patents can be used to claim ownership of some technical specification or design element in a single smartphone (NYT 2012). A laptop, suggests one calculation, implements more than 250 interoperability standards (Biddle et al. 2010), and the number of SEP holders for 3G and 4G standards grew from 2 in 1994 to 130 in 2013 while the number of SEPs rose from fewer than 150 in 1994 to more than 150,000 in 2013 (Galetovic and Gupta 2016). The standardization-body ETSI has registered more than 150,000 declarations of SEPs from companies, and ETSI is just one of many bodies in the world of ICT standardization. For the 3G standard, the same body has about 24,000 patents that have been declared essential. Now, with the economy yet again on the threshold of big technological change, a trusted and credible system for creators and users of technology to standardize proprietary technology would be a boon for innovation, interoperability and – ultimately – the consumers.

And there are reasons for optimism. Although many of the problems in the SEP regimes need to be addressed, the numbers above indicate that the SEP system is in fact attractive to patent holders and SEP implementers. It is easy to see why: neither holders nor implementers are presented with alternative options that on the face of it would be far more profitable for them. In other words, there simply would not be as many patents declared as essential if both creators and users of technology believed the SEP system worked to their disadvantage or was grossly unfair. While the reality for some companies may be that legal disputes and unpredictability prompt them to find other ways than SEPs to get access to key technologies for their products, it remains the case that most stakeholders have strong economic incentives to maintain a balanced SEP system that is trusted.

First, standard essential patents are an asset for creators of technology because, by becoming essential to a standard, their volumes of sales for technologies that users value rise significantly. As many holders want to raise more revenues for their SEPs and – ideally – have the freedom to contract with buyers on their terms, they can expand their customer base when they agree to sell patented technology in accordance with a set of rules that are designed to prevent SEP holders exploiting the weakness of a customer that has grown dependent on having access to their technology.

Second, SEPs are hugely beneficial also to those that buy the licenses – the implementers or users. Through the SEP system, they can access technologies that are interoperable and work with different products and functionalities – and they can do it under conditions that, if history is a guide, in most cases give them stable and predictable terms of contract. As a consequence, both creators and users can focus on their competitive advantages and profit on the economies of scale and specialization. Downstream firms do not need to develop their own upstream technology and upstream firms do not need to package their technologies in end-customer products in order to make their products valuable.

Third, standard-setting organisations (SSOs) also have a big stake in an SEP system that works well – and, like creators and users of technology, they would stand to lose significantly if the SEP system were to collapse.

Lastly, the biggest beneficiaries are individual consumers – those who buy the end products using FRAND-conditioned SEPs. The advent of SEPs and the rules represented by FRAND have enabled a development of fast technology creation and contributed to the rapid diffusion in ICT goods and ICT-based services. The SEP system has also allowed for new competition, both between existing technologies and brands, and from new ones that have stepped into the market with the ambition to disrupt it, again to the benefit of the consumer. It is difficult to imagine that the ICT and digital development would have been as fast as it has been if SEPs had not been a central feature of the market.

The changing fortunes of companies operating in the cellular and smartphone market would not have been possible if there had not been an SEP system that supported competition. Now that the world economy is on the doorstep of new innovations that are dependent on a great number of input technologies – e.g. the Internet-of-Things, transport connectivity and intelligent vehicles – it is crucially important for the consumer that a balanced and functioning SEP system is maintained and that actors in the system converge towards it – which would ultimately meet their economic interests.

#### ICT innovation is key to post-COVID economic recovery and long-term growth.

van Ark 21, \*Bart van Ark is a Senior Advisor of the Economy, Strategy and Finance (ESF) Center at The Conference Board; Bart van Ark, \*Klaas de Vries is an economist with The Conference Board; \*Abdul Erumban is an assistant professor at the University of Groningen, The Netherlands and a senior research fellow at The Conference Board; (2021, “HOW TO NOT MISS A PRODUCTIVITY REVIVAL ONCE AGAIN”, https://sci-hub.se/10.1017/nie.2020.49)

Introduction

As the global economy has entered recession in 2020, triggered by the COVID-19 pandemic, the human casualties, and economic damage are perceived to be very large. Even as the health crisis will gradually become manageable, the impact on economic growth can be long-lasting and the recovery path can take several years. In particular, growth drivers such as the pace of job creation, income generation and investment may take several years to get back to pre-crisis trends. Initially the productivity of those growth drivers may be of less concern as the mantra of ‘we’ll do what it takes to avoid worse’ is predominant in this phase of the crisis.

However, once the recovery gets underway the productive use of resources is key to sustained growth. While we do not ignore the short-term challenges of the economic recovery, our primary focus in this paper is on the productivity puzzle from a long-term perspective. Productivity is driven by technological change and innovation which, in turn, depends on investment in human and physical capital as well as in other ‘missing capitals’ often referred to as intangible assets. Indeed, those investments create a positive feedback effect, as the productivity it generates also helps to make more efficient usage of scarce resources in the future. When properly measured and valued, productivity also provides a critical yardstick to realise a fairer distribution of the gains from economic growth to those who bring the resources to bear. It thereby creates the incentives for people to produce and business to invest helping to drive economic growth and raise living standards.

Unfortunately, in the aftermath of the global financial crisis of 2008/2009, many economies around the world, especially advanced economies, have failed to recharge the economy by powering productivity as the key source of growth in the long term. Indeed the latest update of The Conference Board Total Economy Database (July 2020) points at significant weakening in labor productivity growth in Europe up to 2019 (figure 1a–c). While the United States experienced somewhat faster productivity growth from 2017 to 2019 than the Euro Area and the United Kingdom, it still has not recovered to the rates of productivity growth from before the global financial crisis either.

The slowdown in productivity growth over the past 15 years has been well documented. There are multiple causes including an exhaustion of catch-up potential in emerging markets impacting economies along entire global value chains, and the drag from the global financial crisis because of low demand and weak investment, too low interest rates causing misallocations an overreliance on cheap labor, and failing fiscal policies (Bauer et al., 2020; Cette et al., 2016; Crafts, 2018; Dieppe, 2020; Fernald et al., 2017; Syverson, 2016).1 Technical measurement issues regarding inputs and outputs may have played a role as well.

In our earlier work we have stressed the importance of time lags in the adoption of new technologies, and in particular the complexity in generating productivity growth from the latest round of new digital technologies since the early 2010s, including the move toward mobile, ubiquitous access to broadband, the rise of cloud storage and advances in artificial intelligence (AI) and robotics (van Ark, 2016a, 2016b; van Ark and O’Mahony, 2016; van Ark et al., 2016).

While the first priority for economic recovery from the COVID-19 crisis is to restore jobs, it is important that any employment-intensive growth path does go together with a productivity revival. In this paper, we argue that it is possible to avoid another productivity slowdown. Underneath the aggregate figures, there is evidence pointing toward a possible tipping point at which many advanced economies may expect to see more widespread impacts from the adoption and absorption of digital technology on productivity and GDP growth.

In Section 2 we review the latest literature on the productivity impacts of general purpose technologies (GPTs), including the notion of time lapses through which digital technologies result in faster productivity growth. We also look at patterns by which innovation and productivity effects GPTs emerge across industries and disperse across the economy. We explain why the New Digital Economy (NDE) is especially characterised by long lag effects.

In Section 3 we provide an empirical analysis of productivity growth by industry data to observe whether we can detect a distinct pattern across groups of industries pointing to a structural improvement in recent years. We use a taxonomy on digital intensity by industry which was recently developed by the Organisation for Economic Co-operation and Development (OECD) (Calvino et al., 2018), showing that the most digital-intensive industries have experienced a relatively strong performance in terms of labor productivity growth since 2007 and especially since 2013.

In Section 4 of the paper, we discuss the connection between labor and skills in the digital economy, which we believe provides the key to a productivity revival. We developed a new metric on innovation competencies by occupation on the basis of data from the O\*Net database on occupation-specific descriptors in the United States (Hao et al., 2018). When applied to the United Kingdom, we find that innovation competencies point at stronger productivity effects by industry.

In Section 5 we focus on how productivity has been behaving in the short-term during the COVID-19 recession. In particular, we address the potential trade-offs between traditional pro-cyclical recovery effects and scarring effects the recession leaves, especially on the labor market. We argue that increased adoption and usage of digital technologies during the COVID-19 crisis may create a positive productivity effect. In the final section, Section 6, we will review our hypothesis that a productivity revival could be imminent in the light of the recovery from the COVID-19 crisis. In order not to miss this opportunity again, as happened a decade ago, we argue that a coordinated effort from business and policy is needed, and has to be delivered in such a way that the gains from productivity will be more widespread and such that those who provide the resources for growth are incentivised to deliver them in an efficient way.

2. The productivity paradox of the New Digital Economy

It is well known that General Purpose Technologies (GPTs), defined as new methods of producing and inventing new goods and services which are important enough to have a long-term aggregate impact on the economy, can take a significant amount of time to translate to faster productivity growth at the aggregate level of the economy. This is inherent to the three critical characteristics of a GPT as identified by Bresnahan and Trajtenberg (1995).2

1. Pervasiveness –The GPT should spread to most sectors.

2. Improvement –The GPT should get better over time and, hence, should keep lowering the costs of its users.

3. Innovation spawning –The GPT should make it easier to invent and produce new products or processes.

Historical analysis has focussed on productivity trends in previous technology phases (Bakker et al., 2019; Crafts, 2004). Recent literature has shown that the information and communication technology (ICT) revolution of the past 50 years can be characterised as a GPT and doesn’t pale with previous GPTs such as steam technology, electricity and the combustion engine. For example, Hempell (2005) concludes that ‘investment in information and communication technologies (ICT) are closely linked to complementary innovations and are most productive in firms with experience from earlier innovations’. In a more recent analysis of the evolution of the Internet, Simcoe (2015) argues that the modularity of the internet has prevented a fall in return to investments in innovation by ‘facilitating low-cost adaptation of a shared general-purpose technology to the demands of heterogeneous applications’. In a review of the data, Liao et al. (2016) conclude that:

‘...ICT investment does contribute to productivity but not in the usual manner –we find a positive (but lagged) ICT effect on technological progress. We argue that for a positive ICT role on growth to actually take place, a period of negative relationship between productivity and ICT investment together with ICT-using sectors’ capacity to learn from the embodied new technology was crucial. In addition, it took a learning period with appropriate complementary co-inventions for the new ICT-capital to become effective and its gains to be realised. Our findings provide solid, further empirical evidence to support ICT as a general purpose technology’.

#### Growth solves nuclear war.

Henricksen 17, \*Thomas H., emeritus senior fellow at the Hoover Institution; (March 23rd, 2017, “Post-American World Order,” Hoover Institution, <http://www.hoover.org/research/post-american-world-order>)

What Is To Be Done?

The first marching order is to dodge any kind of perpetual war of the sort that George Orwell outlined in  “1984,” which engulfed the three super states of Eastasia, Eurasia, and Oceania, and made possible the totalitarian Big Brother regime. A long-running Cold War-type confrontation would almost certainly take another form than the one that ran from 1945 until the downfall of the Soviet Union.

What prescriptions can be offered in the face of the escalating competition among the three global powers? First, by staying militarily and economically strong, the United States will have the resources to deter its peers’ hawkish behavior that might otherwise trigger a major conflict. Judging by the history of the Cold War, the coming strategic chess match with Russia and China will prove tense and demanding—since all the countries boast nuclear arms and long-range ballistic missiles. Next, the United States should widen and sustain willing coalitions of partners, something at which America excels, and at which China and Russia fail conspicuously.

There can be little room for error in fraught crises among nuclear-weaponized and hostile powers. Short- and long-term standoffs are likely, as they were during the Cold War. Thus, the playbook, in part, involves a waiting game in which each power looks to its rivals to suffer grievous internal problems which could entail a collapse, as happened to the Soviet Union.

Some Chinese and Russian experts predict grave domestic problems for each other. They also entertain similar thoughts about the United States, which they view as terminally decadent and catastrophically polarized over politics, ethnicity, and the future direction of the country. So, the brewing three-way struggle also involves a systemic contest, which will test the competitors’ economic and political institutions.

At this juncture, the world is entering a standoff among the three great and several not-so-great powers. Averting war, while defending our interests, will prove a challenge, calling for deft policy, political endurance, and economic growth, as well as sufficient military force to keep at bay aggressive states or prevail over them if ever a war breaks out.

#### Absence of domestic 5G competition cedes leadership in technical standards to China.

Duan 19, \*Charles Duan is a senior fellow and associate director of tech & innovation policy at the R Street Institute, where he focuses his research on intellectual property issues; (February 5th, 2019, “Why China Is Winning the 5G War”, https://nationalinterest.org/feature/why-china-winning-5g-war-43347)

There is little doubt today that American superiority in the next generation of mobile communications, commonly called 5G, is a matter of extraordinary national concern. There is also little doubt that China is a strong competitor, already having outspent the United States by [$24 billion](https://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-5g-deployment-imperative.pdf#page=3) and planning [$411 billion](https://www.scmp.com/tech/china-tech/article/2098948/china-plans-28-trillion-yuan-capital-expenditure-create-worlds) in 5G investment over the next decade. The Chinese government has also laid out multiple national plans for establishing the country as a leader in mobile technology, and the Chinese firm Huawei is poised to be the [top smartphone manufacturer](https://www.cnbc.com/2018/11/16/huawei-aims-to-overtake-samsung-as-no-1-smartphone-player-by-2020.html) by 2020.

And what are United States companies doing about this? Bickering over patents.

For years, the leading American supplier of advanced mobile communications chips has been the San Diego-based Qualcomm. The company has been an innovator of mobile technology, but it has also been a remarkable innovator of convoluted legal strategies. As an ongoing Federal Trade Commission [lawsuit alleges](https://www.ftc.gov/news-events/press-releases/2017/01/ftc-charges-qualcomm-monopolizing-key-semiconductor-device-used), Qualcomm has used its dominant position as a chip supplier and its extensive patent holdings to weave an intricate web of patent licensing across the mobile industry. The effect of that complex licensing scheme, the FTC claims, has been to force competitor chipmakers out of the market and to extract concessions and high patent royalties from smartphone and mobile-device makers.

Qualcomm today faces only one major U.S. competitor—Intel, whose chips Apple recently [started using](https://www.cultofmac.com/484250/intel-reaping-rewards-apples-scrap-qualcomm/) instead of Qualcomm’s. Not surprisingly, Qualcomm has leveraged its patents to force a retaliatory investigation against Apple, the effect of which could be, as an administrative judge [recently determined](http://www.fosspatents.com/2018/10/itc-judge-didnt-buy-testimony-for-which.html), to boot Intel out of the mobile-chip market and leave Qualcomm as a monopoly.

It is hard to imagine that this infighting among Apple, Intel and Qualcomm is getting the United States very far in 5G, and it is harder to imagine that Qualcomm’s desired outcome would do so, either. The best path, instead, is the obvious one: allowing competition and expanding the number of firms working on 5G.

Competition encourages companies to out-innovate each other in order to grab market share. Of particular importance to 5G, competition leads to [better cybersecurity](https://morningconsult.com/opinions/in-the-race-to-5g-monopoly-considered-harmful/) in products, making them less vulnerable to hacking or misuse.

Competition is especially crucial when it comes to the technical standards that define how 5G works. These standards are the work of 3GPP, an international consortium of technology companies in the field. Chinese players such as Huawei and ZTE are major participants in 3GPP. Ensuring that 3GPP’s standards reflect American values requires having as many American companies at the negotiating table as possible—which is harder to achieve when those companies are trying to sue each other out of business.

Certainly patents themselves, as rewards for new inventions, are a driver of innovation in areas such as 5G. The problem, though, is not the existence of a patent system but the ever-expanding power of the patent laws, which encourage companies to pour dollars into complex patent licensing and assertion schemes—as companies like Qualcomm have done—rather than to perform the hard work of building new technologies. When innovation in patent strategy is more profitable than actual innovation, we lose the race to 5G and other technologies.

But don’t take my word for it. [Multiple members of Congress](https://www.patentprogress.org/2019/01/11/congress-weighs-in-on-qualcomm-and-apple-at-the-itc/), from both sides of the aisle, have denounced the use of patents to kick companies like Intel out of 5G development, predicting that such actions would “dampen the quality, innovation, competitive pricing, and in this case the preservation of a strong U.S. presence in the development of 5G and thus the national security of the United States.”

Or look to what China itself is doing. The Chinese government is handing out rewards left and right to encourage technology research and development. Indeed, it grants subsidies and financial benefits (ranging from the [ordinary](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2818503) to the [imperfect](https://funginstitute.berkeley.edu/wp-content/uploads/2013/12/patent_subsidy_Zhen.pdf) to the [bizarre](https://www.scmp.com/news/china/article/1681850/how-get-out-jail-early-china-buy-inventors-idea-and-patent-it)) to encourage its citizens to file for patents. But while China specifically encourages filing for patents, it does little to encourage using them: Patent infringement awards in court are peanuts—often only [five figures](https://scholarship.law.berkeley.edu/btlj/vol33/iss2/2/)—and most Chinese patent owners drop their patents [within five years](https://www.bloomberg.com/news/articles/2018-09-26/china-claims-more-patents-than-any-country-most-are-worthless) of getting them. The message in China is clear: You will be rewarded for innovating, but not for quibbling over patents.

The United States should take the same tack if it wants to match China in 5G. Ever-stronger patent rights encourage counterproductive disputes that are a drag on industry, a drag on research and development, and ultimately a drag on domestic competitiveness on the global stage. If America wants to lead in 5G, then it must clear the path for strong competition among leading American technology companies.

#### Standards leadership allows China to export digital authoritarianism.

Drew et al. 21, \*Dr Alexi Drew, Research Associate, The Policy Institute, King’s College London; (May 7th, 2021, “The Critical Geopolitics of Standards Setting”, https://www.transatlantic-dialogue-on-china.rusi.org/article/the-critical-geopolitics-of-standards-setting)

However, this previously ‘western’ domain is challenged by a Chinese bloc of private industry actors with centrally directed, strategic motivations for their efforts who have managed to leverage the flaws of this system for political and economic advantage.  The market-driven self-regulation model of technical standards has proven itself unsustainable given the geopolitical power achievable through the control of these standards. The marketised approach is easily abusable by a technologically developed nation-state with geopolitical intentions firmly in mind.

Obscurity Through Complexity

Technical standards have the immediate appearance of being both apolitical and ethically neutral. This seems to set them apart from the debate over standards of state behaviour in [cyber space concerning espionage and actions below the threshold of armed conflict](https://www.cfr.org/blog/unexpectedly-all-un-countries-agreed-cybersecurity-report-so-what). Yet, technological standards are unequivocally connected to normative practices of international behaviour and ethics. The extremely complex nature of the standards under consideration in bodies such as the International Organization for Standardization, the International Electrotechnical Commission (IEC), the International Telecommunications Union (ITU), and the Third Generation Partnership Project (3GPP) obscures the very tangible real-world impact that the standards they set have. The 3GPP is responsible for standards setting for mobile telecommunications. It covers everything from 5G through to autonomous vehicles and the Internet of Things. These are the bodies defining how the modern world is constructed.

On the one hand they appear quite benign, responsible for such banalities as the use of Universal Serial Bus (USB) connectors versus proprietary standards. This hardly seems a matter of national security importance. But the same process is responsible for what ultimately shape the basic operating parameters of facial recognition technology in closed circuit television systems, the level of centralised state control at the technical foundations of the internet, and the protections of personally identifiable data. These generate profound implications for international policy and ethics.

Internal Competition vs Strategic Direction

Technical standards setting processes have, historically, been dominated by private sector actors who have had both the capacity to develop a particular technology to the point of holding a significant market share, and the ability to use that market share to advocate for the standardisation of the technology in line with their own production. The market led approach has continued to be the prevailing model by which American companies have globalised the technical standards behind US dominated technological innovation. This privatised form of self-regulation for technology companies is only partially influenced by the approach taken within the EU where [some licensing of standards are controlled by state or EU led institutions.](https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2019/ui-brief-no.-2-2019.pdf)

In contrast to this approach the Chinese model has involved a high level of state-oriented direction, oversight, and direct engagement on the creation and signing off technical standards. Efforts to harmonise and centralise technical standards domestically have become increasingly internationalised as the CCP takes this centralised, strategic approach to technical standards setting bodies such as the ITU, 3GPP, and IEC. Technical standards have also become an increasingly central component of the Digital Silk Road with the openly expressed goal of increasing uptake of Chinese technical standards in partner countries.

The implications of this clash between a system of technical standardisation that is driven by the market versus one driven by an authoritarian government subsidised model are a direct challenge to the development of free, open, and ethical technology. Standardisation mechanisms have become political, or rather there has been a gradual realisation of the political power to be gained from the control of technical standards. While the PRC might have come to this awareness first, the US and Europe have since had a rude awakening about the missed opportunity. The privatised model of technical standards setting favoured by European and US markets relies upon the dynamics of financial competition to regulate behaviour. This is in stark contrast to the statist Chinese model.

#### Causes global backsliding.

Kendall-Taylor et. al 20 \*Andrea Kendall-Taylor, senior fellow and director of the Transatlantic Security Program at the Center for a New American Security, co-author of Democracies and Authoritarian Regimes; Erica Frantz is Assistant Professor of Political Science at Michigan State University; Joseph Wright is Professor of Political Science at Pennsylvania State University; (March/April 2020, “The Digital Dictators,” Foreign Affairs, <https://www.foreignaffairs.com/articles/china/2020-02-06/digital-dictators>)

The risk that technology will usher in a wave of authoritarianism is all the more concerning because our own empirical research has indicated that beyond buttressing autocracies, digital tools are associated with an increased risk of democratic backsliding in fragile democracies. New technologies are particularly dangerous for weak democracies because many of these digital tools are dual use: technology can enhance government efficiency and provide the capacity to address challenges such as crime and terrorism, but no matter the intentions with which governments initially acquire such technology, they can also use these tools to muzzle and restrict the activities of their opponents.

#### Democracy solves a litany of existential threats.

Diamond 19, Professor of Political Science and Sociology at Stanford University, Senior Fellow at the Hoover Institution, Senior Fellow at the Freeman Spogli Institute for International Studies, PhD in Sociology from Stanford University, (Dr. Larry, Ill Winds: Saving Democracy from Russian Rage, Chinese Ambition, and American Complacency, p. 199-202)

The most obvious response to the ill winds blowing from the world’s autocracies is to help the winds of freedom blowing in the other direction. The democracies of the West cannot save themselves if they do not stand with democrats around the world. This is truer now than ever, for several reasons. We live in a globalized world, one in which models, trends, and ideas cascade across borders. Any wind of change may gather quickly and blow with gale force. People everywhere form ideas about how to govern—or simply about which forms of government and sources of power may be irresistible—based on what they see happening elsewhere. We are now immersed in a fierce global contest of ideas, information, and norms. In the digital age, that contest is moving at lightning speed, shaping how people think about their political systems and the way the world runs. As doubts about and threats to democracy are mounting in the West, this is not a contest that the democracies can afford to lose. Globalization, with its flows of trade and information, raises the stakes for us in another way. Authoritarian and badly governed regimes increasingly pose a direct threat to popular sovereignty and the rule of law in our own democracies. Covert flows of money and influence are subverting and corrupting our democratic processes and institutions. They will not stop just because Americans and others pretend that we have no stake in the future of freedom in the world. If we want to defend the core principles of self-government, transparency, and accountability in our own democracies, we have no choice but to promote them globally. It is not enough to say that dictatorship is bad and that democracy, however flawed, is still better. Popular enthusiasm for a lesser evil cannot be sustained indefinitely. People need the inspiration of a positive vision. Democracy must demonstrate that it is a just and fair political system that advances humane values and the common good. To make our republics more perfect, established democracies must not only adopt reforms to more fully include and empower their own citizens. They must also support people, groups, and institutions struggling to achieve democratic values elsewhere. The best way to counter Russian rage and Chinese ambition is to show that Moscow and Beijing are on the wrong side of history; that people everywhere yearn to be free; and that they can make freedom work to achieve a more just, sustainable, and prosperous society. In our networked age, both idealism and the harder imperatives of global power and security argue for more democracy, not less. For one thing, if we do not worry about the quality of governance in lower-income countries, we will face more and more troubled and failing states. Famine and genocide are the curse of authoritarian states, not democratic ones. Outright state collapse is the ultimate, bitter fruit of tyranny. When countries like Syria, Libya, and Afghanistan descend into civil war; when poor states in Africa cannot generate jobs and improve their citizens’ lives due to rule by corrupt and callous strongmen; when Central American societies are held hostage by brutal gangs and kleptocratic rulers, people flee—and wash up on the shores of the democracies. Europe and the United States cannot withstand the rising pressures of immigration unless they work to support better, more stable and accountable government in troubled countries. The world has simply grown too small, too flat, and too fast to wall off rotten states and pretend they are on some other planet. Hard security interests are at stake. As even the Trump administration’s 2017 National Security Strategy makes clear, the main threats to U.S. national security all stem from authoritarianism, whether in the form of tyrannies from Russia and China to Iran and North Korea or in the guise of antidemocratic terrorist movements such as ISIS.1 By supporting the development of democracy around the world, we can deny these authoritarian adversaries the geopolitical running room they seek. Just as Russia, China, and Iran are trying to undermine democracies to bend other countries to their will, so too can we contain these autocrats’ ambitions by helping other countries build effective, resilient democracies that can withstand the dictators’ malevolence. Of course, democratically elected governments with open societies will not support the American line on every issue. But no free society wants to mortgage its future to another country. The American national interest would best be secured by a pluralistic world of free countries—one in which autocrats can no longer use corruption and coercion to gobble up resources, alliances, and territory. If you look back over our history to see who has posed a threat to the United States and our allies, it has always been authoritarian regimes and empires. As political scientists have long noted, no two democracies have ever gone to war with each other—ever. It is not the democracies of the world that are supporting international terrorism, proliferating weapons of mass destruction, or threatening the territory of their neighbors.

#### Emergence of smart cities depends on IoT applications of 5G interoperability standards---absent FRAND, excessive royalties will undermine sustainable development.

Schwartz 18, \*Matt Schwartz, Privacy Fellowship Coordinator at ACT, App Association; (March 2nd, 2018, “It’s Smart to be FRANDly: How the FRAND Commitment Will Determine the Future of Smart Cities”, https://actonline.org/2018/03/02/its-smart-to-be-frandly-how-the-frand-commitment-will-determine-the-future-of-smart-cities/)

In December, we [outlined](https://actonline.org/2017/12/18/smart-cities-connecting-your-community-through-technology/%5d) the emergence of Smart Cities – cities that harness technological innovations like internet of things (IoT) devices and data analytics to improve essential infrastructure in growing urban centers. The technological foundation of Smart Cities aims to improve public safety, better allocate resources, and meet the needs of citizens more quickly.

A central element to Smart Cities is the comprehensive network of sensors and devices implemented within buildings, roads, traffic signs, and parking meters that allows them to interact with public, and potentially private-owned, infrastructure. These sensors will “speak” to one another, communicating information about energy usage, traffic density, or other elements of city management that have traditionally either been analyzed separately or not tracked at all. The potential of Smart Cities allows data to flow from previously disconnected branches of the city and be processed in real-time, unlocking previously unknown insights.

The powerful interoperability of Smart Cities will rely heavily on standardized technologies developed in organizations like the IEEE, which is responsible for standardizing the wi-fi technology we use every day. Standardized technologies often include standard-essential patents (SEPs), which, like their name suggests, are patents declared essential to an industry standard by a standards-setting organization. In simple terms, one cannot implement the standardized technology without using the patent.

Like regular patents, the users of SEPs must pay royalties or licensing fees to the patent owner before they may use it. For example, if a manufacturing company wants to make an IoT device interoperable with a 5G network, the manufacturer must pay a licensing fee to the owner of the SEP that is essential to the 5G standard. SEPs play a vital role in the new innovations we enjoy and have come to expect, and because of the value of these patents, SEP holders have the ability to demand high license fees from those who wish to implement the standard. To offset this competition issue, many SEP holders voluntarily agree to license their SEPs to any willing licensee under fair, reasonable, and non-discriminatory (FRAND) terms.

While wi-fi and LTE are standards that will be vital to Smart City deployment, countless new standardized technologies are being developed that will be integral to any fully-operational Smart City. With reasonable access to SEPs, assured by the FRAND commitment, innovators can enjoy the legal and business certainty they need to compete. While the meaning of the FRAND commitment continues to be refined – as evidenced by the development of SEP best practices recently launched by the App Association in Europe – its foundations are well-established.

But what happens when SEP holders do not abide by the FRAND licensing commitment, or simply refuse to license at all? Sadly, small and medium-sized companies would be forced to accept untenable licensing terms, but more realistically, they would be priced out of using the standard altogether. As a result, it would impose a barrier to innovation that would result in fewer products offered to consumers or cities eager to implement IoT technologies. For example, many hope the rise of autonomous vehicles will be seamlessly integrated into the Smart City network. But how beneficial would it be if only some autonomous vehicle brands are able to license the technology needed to communicate with traffic lights, simply because of the market power of a chipmaker? The FRAND commitment is an important backstop to that unfortunate possibility.

It is vital for SEP holders to honor FRAND licensing terms, if not for small and medium-sized innovators, then for the sustainability of future Smart Cities. FRAND creates a platform for innovation, providing a floor on which companies can stand, innovate, and compete. If the foundation of the FRAND commitment is reneged, American innovators pay a steep price – not only do they lose a key component of product development and market entry, but they are also left with years of expensive negotiations and litigation if they choose to challenge the licensing practice. What’s more, the confidence developed in the open standards development system is shaken, and Smart Cities have fewer choices in IoT solutions for their future.

To achieve the promise of Smart Cities, a balanced standards ecosystem is essential. We must allow small and medium-sized developers to leverage industry standards for innovation and prevent cost-prohibitive royalty structures and negotiating practices that are detrimental to competition, while also ensuring that SEP owners can protect their intellectual property and be fairly compensated for its use. The FRAND commitment continues to be the best framework to achieve this balance, and adherence to its principles will determine the future and success of Smart Cities.

#### Climate change is anthropogenic and causes extinction---5G-enabled smart cities are critical for mitigation and adaptation.

Huseien 21, \*Ghasan Fahim Huseien is a research fellow at Department of Building, School of Design and Environment, National University of Singapore, Singapore; Dr. Kwok Wei Shah is presently an assistant professor and deputy program director with the Department of Building, School of Design and Environment, National University of Singapore, Singapore; (August 23rd, 2021, “Potential Applications of 5G Network Technology for Climate Change Control: A Scoping Review of Singapore”, https://www.mdpi.com/2071-1050/13/17/9720)

Currently, the entire planet is at risk due to continual climate change [1–3]. The recorded increase in average temperature across the world in the past hundred years, and the associated changes attributed to this, are known as global warming. Many scientists are convinced by the published evidence that this change is anthropogenic and resulted from the elevated emission levels of global greenhouse gases (GHGs) [4,5]. Gases such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone are responsible for the absorption and emission of thermal radiation. These changes in the relative quantities of the GHGs induce a proportional change in the amount of preserved solar energy. Presently, the accepted indicator for global warming is the sustained rise in the mean temperature worldwide. This definition is designed to account for the fact that there may be some localized exceptions to this rise. For example, there may be cooling experienced in a region while the global temperature may increase altogether, hence the need for average temperature. A key concern with the GHGs trapping of more heat in the atmosphere is that it affects both climate and short scale weather patterns. Consequently, it results in greater numbers of adverse weather events such as storms, heat waves, cold snaps, droughts, and fires [6]. Climate-related risks to health, livelihoods, food security, water supply, human safety, and economic growth are projected to increase with global warming of 1.5 ◦C [7] and further increase further at 2 ◦C, as shown in Figure 1. In addition, the risks to global aggregated economic growth due to the climate change impacts are projected to be lower at 1.5 ◦C than at 2 ◦C by the end of this century.

Carbon dioxide has the most substantial effect on global warming [8]. Although it was once assumed to have an ~100 year lifespan in the atmosphere, careful studies revealed that the situation is far worse, with three-quarters of the gas expected to remain for a time in the region of up to ~1000 years, with the remainder lasting for an indefinite period of time [9]. It was indicated that the present impacts of humanity on the atmosphere can certainly cause a long term problem [10]. Carbon dioxide is released when oil, coal, and other fossil fuels are burnt for the energy we use to power our homes, cars, and smartphones. By lessening its usage, we can curb our own contribution to climate change while saving money. The first challenge is eliminating the burning of coal, oil, and, eventually, natural gas. Oil is the lubricant of the global economy as it is hidden inside such ubiquitous items as plastic and corn, fundamental to the transportation of both consumers and goods. Coal is the substrate, supplying roughly half of the electricity worldwide, a percentage that is likely to grow according to the International Energy Agency (IEA). In fact, buildings contribute up to 43% of all the greenhouse gas emissions worldwide [11], even though investing in thicker insulation and other cost-effective as well as temperature-regulating strategies can save money in the long run. Investment in new infrastructures, or radical upgradation of the existing highways and transmission lines, may help to reduce greenhouse gas emissions, yielding economic growth in the developing countries.

Nations across the globe have kept very high targets to reducing their GHG discharges [12,13]. In order to meet these goals, considerable reductions in city energy usage is required. At a global scale, urban communities represent over half (55%) of the population, which is predicted to reach 68% by the middle of this century [14]. Urban areas claim ownership of the highest levels of energy use, gas emission, and also the largest local economy. As such, it is crucial for urban areas to reduce their consumption and utilize renewable sources wherever available to reduce their gas discharge levels. Smart cities often utilize digital sensors to measure and transmit data about the levels of GHGs in the city at that moment, as a means of tackling them [15]. The efficacy of such a system is thus reliant on the network used to collate and analyze the data collected as an extant network. The mobile telecommunications networks offer a convenient solution to this desire, as their pre-existence has the clear benefit of reducing costs compared to the design and implementation of a novel system. It is recognized that smart cities will certainly act as the key players meeting these ambitious targets [16,17]. In this study, we focused primarily on the potential applications of 5G network technology to control climate change in Singapore. In addition, a clear overview of the sustainability benefits of introducing 5G technology compatible smart cities, buildings, and farms in all aspects of urbanization is provided. Herein, the main purpose is to tackle the negative outcomes associated with anthropogenic climate change, with a particular focus on the contributions that are best made by the telecoms network operators.

Climate change is one of the most challenging problems that humanity has ever faced. Presently, hundreds of millions of lives, innumerable species, entire ecosystems, health, economy, and the future habitability of this planet are at risk. Fortunately, climate change is solvable, we just need to wisely exploit the existing technologies and sciences. Climate change mitigation is a pressing international need in which many management actions are required. The development of 5G technology has been largely driven by smart mobile devices and advanced communication technologies. It may thus serve as a technical enabler for a whole new range of business opportunities, energy, and facilities management, together with industrial applications. Moreover, it may enable different devices to work together seamlessly. Definitely, the 5G cellular network technology is expected to revolutionize the global industries with profound effects on the savings of energy, waste generation and recycling, and water resources management, thus reducing the climate change impacts.

#### The plan requires SSO’s to administer reasonable action to prohibit ex post opportunism---that solves

Melamed & Shapiro 18, \*A. Douglas Melamed is Professor of the Practice of Law at Stanford Law School; \*Carl Shapiro is the Transamerica Professor of Business Strategy at the Haas School of Business at the University of California at Berkeley; (May 2018, “How Antitrust Law Can Make FRAND Commitments More Effective”, https://www-cdn.law.stanford.edu/wp-content/uploads/2018/05/How-Antitrust-Law-Can-Make-FRAND-Commitments-More-Effective.pdf)

3. Application of the Basic Legal Principles

The antitrust principle is straightforward: industry-wide collaboration through SSOs to establish procompetitive standards is permitted only if it is no more restrictive of competition than reasonably necessary to enable creation of the standards. When standard setting predictably creates technology monopolies that, if unrestrained, will enable anticompetitive ex post opportunism that would otherwise not occur, an SSO that does not take effective measures to prevent or minimize such ex post opportunism engages in conduct that is more restrictive of competition than necessary. In that case, the SSO and, in appropriate cases, its members, may well violate Section 1 of the Sherman Act.

Under this principle, SSO procedures and FRAND rules should be evaluated based on whether they lead to reasonable SEP royalties, using the competitive ex ante licensing standard discussed above, which has been adopted by the courts in patent law. Put differently, FRAND rules should be evaluated based on their ability to prevent SEP holders from obtaining more than the ex ante value of their technology from implementers.

This limitation would not prevent a SEP holder from proﬁting, perhaps greatly, from participating in the SSO and having its patented technology included in the standard. The SEP holder continues to be rewarded for its technology because the inclusion of its technology in the standard can still greatly increase the volume of licensing opportunities available to the SEP holder.

Whether a particular set of FRAND rules are sufficiently effective in preventing ex post opportunism will depend on the particular circumstances. The procedural unfolding of the case will also depend upon the circumstances. As a general matter, the case would probably be structured as an ordinary Rule of Reason case.82

First, the plaintiff would have to demonstrate harm to competition as a result of the collaboration of the SSO’s members, many of which compete with one another. In this case, the harm to competition would stem from the ability of the SEP holder to exercise monopoly power by obtaining royalties in excess of the competitive, ex ante level. The decision to include patented technologies in the standard would be the allegedly unlawful agreement. Notably, the court need not determine what a FRAND royalty is; it would suffice to determine that market power has been created or exercised, and that existing SSO rules and policies were not adequate to prevent the competitive harm. The defendant, which could be the SSO or perhaps one or more SSO members, would win at this point if the plaintiff failed to show harm to competition. If might fail if the standard faces substantial competition and the court concludes that the SEP holder therefore does not have market power or if the SSO’s rules and policies are found to be effective in preventing ex post opportunism, even if the plaintiff or even the court thinks that other rules and policies would be preferable.

Second, if the plaintiff makes the requisite showing of harm to competition, the defendant(s) would then have to show some procompetitive justiﬁcation— in this case, the beneﬁts of the standard. These two initial steps should be straightforward.

Third, if as is likely the defendant is able to show a procompetitive justiﬁcation, the plaintiff would have to show that the SSO could have used available, reasonable alternatives to realize the efficiency beneﬁts with less or none of the competitive harms. The plaintiff might identify reasonable alternatives that would have led to a different standard, based on including unpatented technology in the standard or perhaps involving fewer SEPs or fewer owners of SEPs, which would be less subject to patent holdup. More likely, the plaintiff could suggest alternative SSO rules that would not change the standard, but would reduce the likelihood or extent of ex post opportunism. For example, the plaintiff might suggest more rigorous FRAND-type rules, such as rules that set forth more precise principles on which FRAND royalties are to be determined and the circumstances under which SEP holders might seek injunctions.

Fourth, the burden would then shift to the defendant(s) to show that the beneﬁts of the standard could not have been realized if the SSO had adopted any of the proffered alternatives or that those alternatives were unrealistic.83 The plaintiff would be entitled to judgment if the court concludes that those beneﬁts could have been realized with less competitive harm if the SSO had adopted the standard with different IPR rules or policies.

Our overall sense, based on experience and the empirical literature, is that the extant FRAND rules are generally useful, but tend to be inadequate because they are imprecise and leave unresolved such critical issues as (a) the meaning of a reasonable royalty, even conceptually; (b) the meaning of “non-discriminatory;” (c) to whom licenses must be offered; and (d) under what circumstances may a SEP holder obtain an injunction.84 These imprecise FRAND commitments are therefore not sufficient to adequately prevent ex post opportunism. The recent revisions to IEEE’s FRAND policy represent a signiﬁcant step in the right direction, but even this advance leaves important questions unanswered.85 If FRAND rules are inadequate in these ways, litigation involving extant FRAND rules would likely be resolved only at the ﬁnal, fourth step. The defendant would be able to demonstrate the beneﬁts created by the standard; the plaintiff would be able to demonstrate the creation of market power and that other reasonable and practical rules or policies would ameliorate the problem. The case would thus turn on whether the defendant is able to demonstrate that signiﬁcant beneﬁts associated with standardization could not have been realized if the SSO had adopted those other rules or policies.

The court would have available a variety of possible remedies if the plaintiff prevails. Implementers that paid supracompetitive royalties or were unlawfully excluded in whole or in part from product markets as a result of the inadequate FRAND policies would be entitled to damages and, in some cases, to treble damages.86 If the unlawful SSO conduct is regarded as the collective action of the SSO and its members, which is likely to be the case in most instances, SSO members would be jointly and severally liable for the damages. Forward-looking injunctive relief aimed at restoring competition would need to be fashioned to the requirements of the individual case. For example, a court could order the SSO to adopt a new rule or policy proposed by the plaintiff. If the court is reluctant to take on that governance role, it might give the SSO a period of time—maybe ninety days—to develop a rule, subject to the court’s ultimate approval, which would adequately ameliorate the competitive problem created by the SSO. Alternatively or in addition, the court might order the parties to attempt to negotiate a rule or policy on which they can agree. And, depending on the circumstances, the court might order SEP holders, including at least those that were defendants in the case, to comply with the new SSO rules and policies.

### 1AC---Cybersecurity ADV

#### Advantage 2 is Cybersecurity:

#### Aggressive patent strategies create structural flaws in 5G standardization that imperils domestic cybersecurity---market competition reduces the incidence of vulnerability and severity of attacks.

Duan 20, \*Charles Duan is a senior fellow and associate director of tech & innovation policy at the R Street Institute, where he focuses his research on intellectual property issues; (2020, “OF MONOPOLIES AND MONOCULTURES: THE INTERSECTION OF PATENTS AND NATIONAL SECURITY”, Santa Clara High Technology Law Journal, 36(4), 369-405. Retrieved from <https://www2.lib.ku.edu/login?url=https://www.proquest.com/scholarly-journals/monopolies-monocultures-intersection-patents/docview/2442966690/se-2?accountid=14556>)

III. COMPETITION AND CYBERSECURITY

In addition to the historical review done so far, another approach to understanding the relationship among patents, competition, and national security is to consider the role of cybersecurity. There is little doubt that computer system vulnerabilities that enable hacking and spread of computer exploits are a threat to the nation’s defenses, so better cybersecurity is a key part of national security strategy.155

Strong competition can thus complement national security by enhancing domestic cybersecurity, and patent assertion that unduly weakens competition detracts from cybersecurity.156 Competition promotes better cybersecurity in at least two ways. First, multiple studies show that competition encourages firms to improve their products on multiple vectors including cybersecurity. Second, competition avoids a situation that security experts call a “monoculture,” which increases vulnerability to severe cyberattacks. As former Secretary of Homeland Security Michael Chertoff wrote recently, “We need competition and multiple providers, not a potentially vulnerable technological monoculture,” to guarantee national security.157 Thus, cybersecurity provides a useful lens for understanding how unfettered patent assertion and licensing can detract from national security.

A. Cybersecurity as Competitive Value-Add

Competition enhances national security by reducing the incidence of technical vulnerabilities. That effect is especially important for security sensitive systems such as mobile telecommunications.

Intuitively, a causal chain from competition to cybersecurity makes logical sense. Computer security is a value-added benefit to consumers, so firms in competitive markets are likely to use security to gain an edge over their competitors.158 In monopolized markets, though, there may be less external impetus to test products for flaws, and the monopolist may choose to focus less on security and more on new product features or increased product quality.

Economic research confirms these hypotheses about competition leading to better cybersecurity. A 2009 empirical study of web browsers considered the impact of market concentration on the amount of time that vendors took to fix security vulnerabilities as they were discovered.159 The study found that the presence of more competitors correlated with faster cybersecurity response—a reduction of 8–10 days in response time per additional market rival.160 Similarly, business researchers in 2005 modeled incentives for firms to engage in sharing of cybersecurity information, and concluded that the “inclination to share information and invest in security technologies increases as the degree of competitiveness in an industry increases.”161 Another study found that, where two software firms are in competition, at least one will be willing to take on some degree of risk and responsibility for cybersecurity, whereas a monopoly software firm will consistently fail to accept such responsibility.162 To be sure, an unpublished study from 2017 found that some market concentration can make firms more responsive to cybersecurity issues, but only to a point: “being in a dominant position reduces the positive effect of having less competitors on the responsiveness of the vendor,” and indeed the “more dominant the firm is, the less rapid it is in releasing security patches.”163 This research confirms that competition is more conducive to cybersecurity.

It is not hard to see how this applies to emerging communication technologies markets. In the absence of competition, the above research suggests that device manufacturers, chip makers, and software developers will lack incentives to respond to vulnerabilities, to share information about cybersecurity practices and issues, and to take responsibility for security matters. Mobile phone chips have had their share of cybersecurity failures already.164 The best way to flush out ongoing and future cybersecurity issues is to maintain competitive pressure at all levels of the supply chain.

B. Vulnerabilities of “Monocultures”

A second reason why monopoly undermines cybersecurity is that monopoly leads to a “monoculture” of single-vendor products, opening the door to massive systemic failure in the case of a cyberattack. Computer researchers developed the theory of software monocultures in the early 2000s, in response to the regular phenomenon of computer viruses and other attacks spreading rapidly by exploiting flaws in the dominant operating system at the time, Microsoft Windows.165 Where a computer system such as Windows has a commanding share of users, a virus that exploits a flaw in that system can quickly spread to infect a whole interconnected ecosystem. An operating system monopoly thus enables fast and easy spread of cyberattacks, and better cybersecurity would be achieved through greater diversity in online systems.166 As one research group posited, “a network architecture that supports a collection of heterogeneous network elements for the same functional capability offers a greater possibility of surviving security attacks as compared to homogeneous networks.”167

There has been considerable study of the theory that computer monocultures are naturally more vulnerable to attacks.168 In one study, computer science researchers reviewed a catalog of 6,340 software vulnerabilities recorded in 2007, to compare whether comparable software would share the same flaws.169 Of the 2,627 vulnerabilities applicable to application software (as opposed to operating systems, web scripts, and other software components), only 29 (1.1%) applied to substitute products from different vendors but providing the same functionality.170 By contrast, different versions of a single software product were found to share vulnerabilities 84.7% of the time.171 Thus, software monocultures share exploitable flaws even when there is some variation in versions across the monoculture; by contrast, diversity in software is almost guaranteed to prevent a single flaw from affecting all users.

In the case of 5G and wireless mobile communications, a monoculture is an especially concerning possibility. To the extent that systems such as smart city sensors or communication networks are widely deployed in a monoculture fashion, a widespread attack could have devastating consequences, potentially blacking out a region and affecting essential services such as 911.172 A monoculture that is vulnerable to so-called “rootkits” or “backdoors”—maliciously installed software that enable bad actors to commandeer systems—could also enable mass surveillance or spying by private hackers or foreign governments.173 The presence of systems from multiple vendors would mitigate these possibilities.

#### Insecure technical standards cause inevitable systemic grid collapse---extinction.

DeNardis 21, \*Dr. Laura DeNardis, PhD in Science and Technology Studies from Virginia Tech, Dean of the School of Communication at American University, and Gordon M. Goldstein, Adjunct Senior Fellow at the Council on Foreign Relations, (March 1st, 2021, “The Real Lesson of the Texas Power Debacle”, Lawfare, 3/1/2021, https://www.lawfareblog.com/real-lesson-texas-power-debacle)

The infrastructure was essential, ubiquitous and providing basic functionality for everything in daily life from water to heat and transportation. And in an instant it was gone, plunging tens of thousands of residents into a life-threatening crisis. This is, of course, the narrative of the recent debacle in Texas, where a winter storm overwhelmed the state’s electrical grid and brought the state to a near-total blackout. But it should also be interpreted as a preemptive warning of what Americans will face from the next generation of the internet and the new realm of cybersecurity risk it will dramatically amplify.

Both forms of infrastructure—a state-run electrical grid and the 5G and “internet of things” future to which we are rapidly hurtling—share three attributes. First, their construction reflects a lack of imagination about the danger that can quickly coalesce when seemingly remote threat scenarios become real. Second, compounding a lack of analytic imagination is an absence of preparedness. Third, for both the Texas electrical grid and the emerging internet, public policy protections are either meager or completely absent.

In planning for the resilience of its electrical grid, public officials in Texas discounted the potentially devastating disruption that could occur from unpredictable events—whether related to climate change or just a once-a-century anomaly. They also eschewed precautions other states take seriously by allowing for the interconnection of electrical grid supply chains across their borders, ostensibly because of their ideological rejection of federal regulatory oversight governing such arrangements.

As the United States builds out a new national 5G cyber-physical communications network through private service providers, Americans similarly discount the risks—myriad in their diversity and severity—that are orders of magnitude more significant than what Texas confronted recently. More physical things than people are already connected. The super empowered internet of tomorrow, known among some in the field as the “internet of everything,” will exceed by tens of billions of devices the number of connections between individuals simply communicating via social media or digital screens.

This confronts policymakers with an imminent threat: A cyber outage is no longer about losing digital communications but about losing basic societal functioning and even human life. The failure of imagination is to think of the SolarWinds attack on U.S. federal agencies and tech companies as a worst-case scenario. The failure of imagination is to think of cybersecurity through a content-centric lens rather than as possible attacks on the material world. The emergence of internet-connected cardiac devices, digitally dependent cars, and internet-connected agriculture systems portend the stakes of a cyberattack to health care, economic and social functioning, and food security.

The United States should be prepared for, and certainly not be caught by surprise by, such cyberattacks. Yet, the internet of everything is notoriously insecure. Internet-connected physical objects are not necessarily upgradeable. Nor do they come with adequate default security and encryption. The 5G infrastructure that helps connect digital objects has been at the center of debates over Chinese espionage. Industrial cyber-physical systems are based on technical standards that have not been collaboratively vetted for security and interoperability. One of the most infamous cyberattacks—the so-called Mirai botnet that took down major media sites and corporations—hijacked these insecure objects in homes to carry out the assault. The United States is not yet prepared.

Finally, in the race to conceive and deploy effective public policy responses, the U.S. government as a whole is hardly more anticipatory or synthesized in its response to potential calamity than the state of Texas. The focus of U.S. cyber policy remains on information policy issues such as disinformation, manipulation and violent speech rather than securing the digital world that now powers our material day-to-day lives. The Biden administration confronts an enormous challenge in crafting a comprehensive strategy to the cybersecurity risks foreshadowed by the ruinous experience in Texas and its management of vital infrastructure. While the digital world has leapt from two-dimensional to three-dimensional space, cyber policy has not at all jumped from 2D to 3D.

This failure of imagination, preparedness and policy protection must not be America’s cyber future; the stakes are far too high and the costs are far too great. The Texas disaster is a potent illustration of what has always been true: Our digital society and economy are extremely vulnerable and grow more porous and subject to penetration day by day. As digital sensors and cyber control systems become further embedded in physical infrastructure like energy systems, agriculture and transportation, there is no longer a separation between security of the “real” world and security of the online world. They are entangled and increasingly enmeshed—and policy has yet to catch up to either envisioning or mitigating the looming threats the U.S. confronts.

If the energy grid cannot weather a winter storm, how can it be expected to withstand a major cyberattack? What other vital forms of national infrastructure—ranging from water, bridges, highways and roads, and ultimately our day-to-day financial system—are comparably at risk? As Texas dramatizes, it is neither hyperbolic nor exaggerated to assert that our survival could now depend on securing the inevitable cyber-physical future that is accelerating with stunning rapidity.

#### Actors have the means and motivations to strike critical infrastructure.

Wintch 21, \*Timothy M. Wintch, an active-duty Major in the United States Air Force. He is currently a graduate student at the Oettinger School of Science & Technology Intelligence, National Intelligence University, in Bethesda, Maryland. Mr. Wintch has over 11 years of experience in command-and-control operations as an Air Battle Manager. He holds a Bachelor of Arts in Politics from the University of California, Santa Cruz, and a Master of Arts in Military Studies from American Military University. (April 20th, 2021, “PERSPECTIVE: Cyber and Physical Threats to the U.S. Power Grid and Keeping the Lights on”, https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/)

Among critical infrastructure sectors in the U.S., energy is perhaps the most crucial of the 16 sectors defined by the Department of Homeland Security. This sector is so vital because it provides the energy necessary to run every other critical infrastructure sector. However, the U.S. power grid, the backbone of the energy sector, is built upon an aging skeleton that is becoming increasingly vulnerable every day. Whether from terrorists or nation-states like Russia and China, the power grid is susceptible to not just physical attacks, but also to cyber intrusion as well. However, much of this threat can be mitigated if the U.S. takes the appropriate steps to safeguard the power grid and avoid a potential catastrophe in the future.

Since Sept. 11, 2001, terrorism on U.S. soil has been at the forefront of American consciousness. Critical infrastructure provides an appealing target because of the disproportionally large impact even a small attack can have on the sectors. In particular, the power grid represents a particularly lucrative target, both in terms of the ease of access and the large impact it can make. The National Research Council stated that the U.S. power grid is “vulnerable to intelligent multi-site attacks by knowledgeable attackers intent on causing maximum physical damage to key components on a wide geographical scale.”[[1]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn1) Additionally, the physical security of transmission and distribution systems is difficult due to the dispersed nature of these key components, which in turn is advantageous to attackers as it reduces the likelihood of their capture.[[2]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn2) From 2002-2012, approximately 2,500 physical attacks occurred against transmission lines and towers worldwide and approximately 500 attacks against transformer substations.[[3]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn3) Terrorists have the motivation to attack the U.S. power grid but the very nature of the grid makes it highly vulnerable. The power grid is not only at risk from physical attacks, but also nation-state cyberattacks.

One nation that has shown both the capability and intent to use attacks against critical energy infrastructure is Russia, as demonstrated in their 2015 annexation of Crimea from Ukraine. A Russian cyber threat group known as Sandworm, which used its BlackEnergy malware, attacked Ukrainian computer systems that provide remote control of the Ukraine power grid.[[4]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn4) This attack, and another in 2016, each left the capital Kiev without power, prompting cyber experts to raise concern about the same malware already existing in NATO and the U.S. power grids.[[5]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn5) In any conflict between Russia and NATO, not only would similar cyberattacks pose a threat, but so would potential physical attacks severing fuel oil and natural gas lines to Western Europe. Russia has both the capability and intent to attack critical infrastructure, particularly power grids, during future conflicts in their “hybrid warfare” approach.

Another nation that has the capability to attack critical energy infrastructure is China, representing a threat to not just the U.S. energy infrastructure but also that of our allies whose support would be vital in a major conflict. A recent NATO report highlighted this threat from China’s Belt and Road Initiative, stating that “[China’s] foreign direct investment in strategic sectors [such as energy generation and distribution] …raises questions about whether access and control over such infrastructure can be maintained, particularly in crisis when it would be required to support the military.”[[6]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn6) Like Russia, China has been active with cyber intrusions in U.S. energy infrastructure. The Mission Support Center at Idaho National Laboratory characterized these as attacks as “multiple intrusions into US ICS/SCADA [Industrial Control Systems/Supervisory Control and Data Acquisition] and smart grid tools [that] may be aimed more at intellectual property theft and gathering intelligence to bolster their own infrastructure, but it is likely that they are also using these intrusions to develop capabilities to attack the [bulk electric system], as well.”[[7]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn7) China, therefore, has both the capability and intent to conduct cyber intrusions and attacks for myriad reasons.

Another arm of this threat is the reliance the U.S. energy industry has on imports from China, especially transformers. In early 2020, federal officials seized a transformer in the port of Houston that had been imported by the Jiangsu Huapeng Transformer Company before sending it to Sandia National Laboratory in Albuquerque. Sandia is contracted by the U.S. Department of Energy for mitigating national security threats.[[8]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn8) The Wall Street Journal reported that “Mike Howard, chief executive of the Electric Power Research Institute, a utility-funded technical organization, said that the diversion of a huge, expensive transformer is so unusual – in his experience, unprecedented – that it suggests officials had significant security concerns.”[[9]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/" \l "_ftn9) Previously destined for the Washington Area Power Administration’s Ault, Colo., substation, the transformer is believed to have been seized due to “backdoor” exploitable hardware emplaced by the Chinese prior to shipment.[[10]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/#_ftn10) Shortly after these events, President Trump issued Executive Order 13920, “[Securing the United States Bulk-Power System](https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-securing-united-states-bulk-power-system/),” essentially limiting the import of Chinese-built critical energy infrastructure components due to concerns about cybersecurity.[[11]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/#_ftn11) Interestingly, Jiangsu Huapeng “boasted that it supported 10 percent of New York City’s electricity load.”[[12]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/#_ftn12)

Franklin Kramer, the former Assistant Secretary of Defense for International Security Affairs, testified before a U.S. House of Representatives Energy and Commerce subcommittee during an energy and power hearing in 2011 and said that a “highly-coordinated and structured cyber, physical, or blended attack on the bulk power system, however, could result in long-term (irreparable) damage to key system components in multiple simultaneous or near-simultaneous strikes.” He added that “an outage could result with the potential to affect a wide geographic area and cause large population centers to lose power for extended periods.”[[13]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/#_ftn13) Even the inclusion of features such as smart grids to the overall grid structure poses new vulnerabilities through their connectivity. Kramer stated that “such connectivity means that the distribution system could be a key vector for a national security attack on the grid.”[[14]](https://www.hstoday.us/subject-matter-areas/infrastructure-security/perspective-cyber-and-physical-threats-to-the-u-s-power-grid-and-keeping-the-lights-on/#_ftn14)

#### Those attacks cause accidental nuclear escalation.

Klare 19, \*Michael T. Klare is a professor emeritus of peace and world security studies at Hampshire College and senior visiting fellow at the Arms Control Association; (November 19th, “Cyber Battles, Nuclear Outcomes? Dangerous New Pathways to Escalation”, https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation)

Yet another pathway to escalation could arise from a cascading series of cyberstrikes and counterstrikes against vital national infrastructure rather than on military targets. All major powers, along with Iran and North Korea, have developed and deployed cyberweapons designed to disrupt and destroy major elements of an adversary’s key economic systems, such as power grids, financial systems, and transportation networks. As noted, Russia has infiltrated the U.S. electrical grid, and it is widely believed that the United States has done the same in Russia.[12](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote12) The Pentagon has also devised a plan known as “Nitro Zeus,” intended to immobilize the entire Iranian economy and so force it to capitulate to U.S. demands or, if that approach failed, to pave the way for a crippling air and missile attack.[13](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote12)

The danger here is that economic attacks of this sort, if undertaken during a period of tension and crisis, could lead to an escalating series of tit-for-tat attacks against ever more vital elements of an adversary’s critical infrastructure, producing widespread chaos and harm and eventually leading one side to initiate kinetic attacks on critical military targets, risking the slippery slope to nuclear conflict. For example, a Russian cyberattack on the U.S. power grid could trigger U.S. attacks on Russian energy and financial systems, causing widespread disorder in both countries and generating an impulse for even more devastating attacks. At some point, such attacks “could lead to major conflict and possibly nuclear war.”[14](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote14)

These are by no means the only pathways to escalation resulting from the offensive use of cyberweapons. Others include efforts by third parties, such as proxy states or terrorist organizations, to provoke a global nuclear crisis by causing early-warning systems to generate false readings (“spoofing”) of missile launches. Yet, they do provide a clear indication of the severity of the threat. As states’ reliance on cyberspace grows and cyberweapons become more powerful, the dangers of unintended or accidental escalation can only grow more severe.

#### Cyber-compromised NC3 causes nuclear war.

Klare 19, \*Michael T. Klare is a professor emeritus of peace and world security studies at Hampshire College and senior visiting fellow at the Arms Control Association; (November 19th, “Cyber Battles, Nuclear Outcomes? Dangerous New Pathways to Escalation”, <https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation>)

The Nuclear-Cyber Connection

These links exist because the NC3 systems of the United States and other nuclear-armed states are heavily dependent on computers and other digital processors for virtually every aspect of their operation and because those systems are highly vulnerable to cyberattack. Every nuclear force is composed, most basically, of weapons, early-warning radars, launch facilities, and the top officials, usually presidents or prime ministers, empowered to initiate a nuclear exchange. Connecting them all, however, is an extended network of communications and data-processing systems, all reliant on cyberspace. Warning systems, ground- and space-based, must constantly watch for and analyze possible enemy missile launches. Data on actual threats must rapidly be communicated to decision-makers, who must then weigh possible responses and communicate chosen outcomes to launch facilities, which in turn must provide attack vectors to delivery systems. All of this involves operations in cyberspace, and it is in this domain that great power rivals seek vulnerabilities to exploit in a constant struggle for advantage.

The use of cyberspace to gain an advantage over adversaries takes many forms and is not always aimed at nuclear systems. China has been accused of engaging in widespread cyberespionage to steal technical secrets from U.S. firms for economic and military advantages. Russia has been accused, most extensively in the Robert Mueller report, of exploiting cyberspace to interfere in the 2016 U.S. presidential election. Nonstate actors, including terrorist groups such as al Qaeda and the Islamic State group, have used the internet for recruiting combatants and spreading fear. Criminal groups, including some thought to be allied with state actors, such as North Korea, have used cyberspace to extort money from banks, municipalities, and individuals.[4](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote04) Attacks such as these occupy most of the time and attention of civilian and military cybersecurity organizations that attempt to thwart such attacks. Yet for those who worry about strategic stability and the risks of nuclear escalation, it is the threat of cyberattacks on NC3 systems that provokes the greatest concern.

This concern stems from the fact that, despite the immense effort devoted to protecting NC3 systems from cyberattack, no enterprise that relies so extensively on computers and cyberspace can be made 100 percent invulnerable to attack. This is so because such systems employ many devices and operating systems of various origins and vintages, most incorporating numerous software updates and “patches” over time, offering multiple vectors for attack. Electronic components can also be modified by hostile actors during production, transit, or insertion; and the whole system itself is dependent to a considerable degree on the electrical grid, which itself is vulnerable to cyberattack and is far less protected. Experienced “cyberwarriors” of every major power have been working for years to probe for weaknesses in these systems and in many cases have devised cyberweapons, typically, malicious software (malware) and computer viruses, to exploit those weaknesses for military advantage.[5](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote05)

Although activity in cyberspace is much more difficult to detect and track than conventional military operations, enough information has become public to indicate that the major nuclear powers, notably China, Russia, and the United States, along with such secondary powers as Iran and North Korea, have established extensive cyberwarfare capabilities and engage in offensive cyberoperations on a regular basis, often aimed at critical military infrastructure. “Cyberspace is a contested environment where we are in constant contact with adversaries,” General Paul M. Nakasone, commander of the U.S. Cyber Command (Cybercom), told the Senate Armed Services Committee in February 2019. “We see near-peer competitors [China and Russia] conducting sustained campaigns below the level of armed conflict to erode American strength and gain strategic advantage.”

Although eager to speak of adversary threats to U.S. interests, Nakasone was noticeably but not surprisingly reluctant to say much about U.S. offensive operations in cyberspace. He acknowledged, however, that Cybercom took such action to disrupt possible Russian interference in the 2018 midterm elections. “We created a persistent presence in cyberspace to monitor adversary actions and crafted tools and tactics to frustrate their efforts,” he testified in February. According to press accounts, this included a cyberattack aimed at paralyzing the Internet Research Agency, a “troll farm” in St. Petersburg said to have been deeply involved in generating disruptive propaganda during the 2016 presidential elections.[6](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote06)

Other press investigations have disclosed two other offensive operations undertaken by the United States. One called “Olympic Games” was intended to disrupt Iran’s drive to increase its uranium-enrichment capacity by sabotaging the centrifuges used in the process by infecting them with the so-called Stuxnet virus. Another left of launch effort was intended to cause malfunctions in North Korean missile tests.[7](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote07) Although not aimed at either of the U.S. principal nuclear adversaries, those two attacks demonstrated a willingness and capacity to conduct cyberattacks on the nuclear infrastructure of other states.

Efforts by strategic rivals of the United States to infiltrate and eventually degrade U.S. nuclear infrastructure are far less documented but thought to be no less prevalent. Russia, for example, is believed to have planted malware in the U.S. electrical utility grid, possibly with the intent of cutting off the flow of electricity to critical NC3 facilities in the event of a major crisis.[8](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote08) Indeed, every major power, including the United States, is believed to have crafted cyberweapons aimed at critical NC3 components and to have implanted malware in enemy systems for potential use in some future confrontation.

Pathways to Escalation

Knowing that the NC3 systems of the major powers are constantly being probed for weaknesses and probably infested with malware designed to be activated in a crisis, what does this say about the risks of escalation from a nonkinetic battle, that is, one fought without traditional weaponry, to a kinetic one, at first using conventional weapons and then, potentially, nuclear ones? None of this can be predicted in advance, but those analysts who have studied the subject worry about the emergence of dangerous new pathways for escalation. Indeed, several such scenarios have been identified.[9](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote09)

The first and possibly most dangerous path to escalation would arise from the early use of cyberweapons in a great power crisis to ~~paralyze~~ undermine the vital command, control, and communications capabilities of an adversary, many of which serve nuclear and conventional forces. In the “fog of war” that would naturally ensue from such an encounter, the recipient of such an attack might fear more punishing follow-up kinetic attacks, possibly including the use of nuclear weapons, and, fearing the loss of its own arsenal, launch its weapons immediately. This might occur, for example, in a confrontation between NATO and Russian forces in east and central Europe or between U.S. and Chinese forces in the Asia-Pacific region.

Speaking of a possible confrontation in Europe, for example, James N. Miller Jr. and Richard Fontaine wrote that “both sides would have overwhelming incentives to go early with offensive cyber and counter-space capabilities to negate the other side’s military capabilities or advantages.” If these early attacks succeeded, “it could result in huge military and coercive advantage for the attacker.” This might induce the recipient of such attacks to back down, affording its rival a major victory at very low cost. Alternatively, however, the recipient might view the attacks on its critical command, control, and communications infrastructure as the prelude to a full-scale attack aimed at neutralizing its nuclear capabilities and choose to strike first. “It is worth considering,” Miller and Fontaine concluded, “how even a very limited attack or incident could set both sides on a slippery slope to rapid escalation.”[10](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote10)

What makes the insertion of latent malware in an adversary’s NC3 systems so dangerous is that it may not even need to be activated to increase the risk of nuclear escalation. If a nuclear-armed state comes to believe that its critical systems are infested with enemy malware, its leaders might not trust the information provided by its early-warning systems in a crisis and might misconstrue the nature of an enemy attack, leading them to overreact and possibly launch their nuclear weapons out of fear they are at risk of a preemptive strike.

“The uncertainty caused by the unique character of a cyber threat could jeopardize the credibility of the nuclear deterrent and undermine strategic stability in ways that advances in nuclear and conventional weapons do not,” Page O. Stoutland and Samantha Pitts-Kiefer wrote in 2018 paper for the Nuclear Threat Initiative. “[T]he introduction of a flaw or malicious code into nuclear weapons through the supply chain that compromises the effectiveness of those weapons could lead to a lack of confidence in the nuclear deterrent,” undermining strategic stability.[11](https://www.armscontrol.org/act/2019-11/features/cyber-battles-nuclear-outcomes-dangerous-new-pathways-escalation#endnote11) Without confidence in the reliability of its nuclear weapons infrastructure, a nuclear-armed state may misinterpret confusing signals from its early-warning systems and, fearing the worst, launch its own nuclear weapons rather than lose them to an enemy’s first strike. This makes the scenario proffered in the 2018 NPR report, of a nuclear response to an enemy cyberattack, that much more alarming.

# 2AC

# 2AC---Round 6

## ADV 1

### 2AC---China Threat

#### Don’t over-analyze China’s behavior---they mean what they say, and their intentions to upend the international system are opaque.

Brands 20, \*Hal Brands is an American scholar of U.S. foreign policy. He is the Henry A. Kissinger Distinguished Professor of Global Affairs at the Johns Hopkins University School of Advanced International Studies and a Resident Scholar at the American Enterprise Institute; (May 20th, 2020, “What Does China Really Want? To Dominate the World”, https://www.bloomberg.com/opinion/articles/2020-05-20/xi-jinping-makes-clear-that-china-s-goal-is-to-dominate-the-world)

Can we pay the Chinese Communist Party the compliment of acknowledging that it means what it says and knows what it wants? That may be the key to understanding Beijing’s strategic ambitions in the coming decades.

A long-standing trope in the U.S. [debate](https://warontherocks.com/2018/12/wotr-podcast-full-steam-ahead-naval-competition-with-china/) on [that](https://warontherocks.com/2019/01/the-party-congress-test-a-minimum-standard-for-analyzing-beijings-intentions/) [subject](https://www.brookings.edu/wp-content/uploads/2018/10/fp_20181018_us_china_transcript.pdf) is that China itself doesn’t know what it seeks to achieve, that its leaders haven’t yet worked out how far Beijing’s influence should reach. Yet there is a growing body of evidence, assembled and interpreted by talented China experts, that the Chinese government is indeed aiming for global power and perhaps global primacy over the next generation — that it seeks to upend the American-led international system and create at least a competing, quasi-world order of its own.

It doesn’t take unparalleled powers of deduction to reach this conclusion. Top Chinese officials and members of the country’s foreign policy community are becoming increasingly explicit in saying so themselves.

President Xi Jinping more than hinted at this goal in his landmark address to the 19th Party Congress in October 2017. That speech represents one of the most authoritative statements of the party’s policy and aims; it reflects Xi’s [understanding](https://twitter.com/PLMattis/status/1259592233726205953) of what China has accomplished under Communist rule and how it must advance in the future.

Xi [declared](http://www.xinhuanet.com/english/download/Xi_Jinping's_report_at_19th_CPC_National_Congress.pdf) that China “has stood up, grown rich, and is becoming strong,” and that it was now “blazing a new trail for other developing countries” and offering “Chinese wisdom and a Chinese approach to solving the problems facing mankind.” By 2049, Xi promised, China would “become a global leader in terms of composite national strength and international influence” and would build a “stable international order” in which China’s “national rejuvenation” could be fully achieved.

This was the statement of a leader who sees his country not just participating in global affairs but setting the terms, and it testifies to two core themes in China’s foreign policy discourse.

The first is a deeply skeptical view of the existing international system. Chinese leaders recognize that the global trade regime has been indispensable to the country’s economic and military rise. Yet when they look at the key features of the world Washington and its allies have made, they see mostly [threats](https://tnsr.org/2018/11/xis-vision-for-transforming-global-governance-a-strategic-challenge-for-washington-and-its-allies/).

In their view, American alliances do not preserve peace and stability; they stunt China’s potential and prevent Asian nations from giving Beijing its due. Seen through that lens, promoting democracy and human rights is neither moral nor benign, but propaganda supporting a dangerous doctrine that threatens to delegitimize the Communist government and energize its domestic enemies. U.S.-led international institutions appear as tools for imposing America’s will on weaker states. The Communist Party recognizes that the liberal international order has brought benefits, [writes](https://www.nbr.org/wp-content/uploads/pdfs/publications/sr83_chinasvision_jan2020.pdf) Nadege Rolland, a senior fellow at the National Bureau of Asian Research, but “the party abhors and dreads” the principles on which it is based.

The second theme is that the international order must change — not a little, but a lot — for China to become fully prosperous and secure. Chinese leaders have, understandably, been somewhat opaque in describing the world they want, but the outlines are becoming easier to discern.

If one studies the statements of Xi and other top officials, China expert Liza Tobin [concludes](https://tnsr.org/2018/11/xis-vision-for-transforming-global-governance-a-strategic-challenge-for-washington-and-its-allies/), what emerges is a vision in which “a global network of partnerships centered on China would replace the U.S. system of treaty alliances” and the world would view Chinese authoritarianism as preferable to Western democracy.

Based on a similar analysis, Rolland [agrees](https://www.nbr.org/wp-content/uploads/pdfs/publications/sr83_chinasvision_jan2020.pdf) that China has “a yearning for partial hegemony,” a loose dominance over large swaths of the global south. When it comes to global governance, still other [examinations](https://www.tabletmag.com/sections/news/articles/china-plans-global-order) [show](https://www.americanprogress.org/issues/security/reports/2019/02/28/466768/mapping-chinas-global-governance-ambitions/), Beijing wants a system in which international institutions buttress rather than batter repressive regimes. Meanwhile, Chinese strategists and academics are talking openly about building a “new China-centric global economic order.”

There is little indication, in any of this, that Beijing’s strategic horizon is limited to the Western Pacific or even Asia. Xi’s [invocation](http://www.xinhuanet.com/english/2019-10/03/c_138445509.htm) of a “community with a shared future for humanity” [indicates](https://warontherocks.com/2019/01/the-party-congress-test-a-minimum-standard-for-analyzing-beijings-intentions/) a [global](https://tnsr.org/2018/11/xis-vision-for-transforming-global-governance-a-strategic-challenge-for-washington-and-its-allies/) tableau for Chinese influence. One hardly has to read between the lines to understand that this agenda will require fundamentally resetting the current geopolitical balance. As Xi remarked several years ago, China must work resolutely toward “a future where we will win the initiative and have the dominant position.”

Of course, there’s not need to take literally everything national leaders say, or even everything that makes it into official speeches. In Beijing’s case, however, Chinese leaders are actually saying less than what the country is doing.

Whether it is the naval shipbuilding program that is churning out vessels at astonishing rate; the drive to [control](https://www.bloomberg.com/opinion/articles/2020-03-31/china-s-influence-operation-goes-beyond-who-taiwan-and-covid-19) existing international organizations and build new ones; the projection of military power in the [Arctic](https://www.cambridge.org/core/books/china-as-a-polar-great-power/22493FFC041E6739DAED329CCB71F688#fndtn-information), the Indian Ocean and points beyond; the quest to [dominate](https://www.pbs.org/wgbh/frontline/article/made-in-china-2025-the-industrial-plan-that-china-doesnt-want-anyone-talking-about/) the world’s high-tech industries; the ever-more [systematic](https://halbrands.org/wp-content/uploads/2018/09/60-5-07-Brands.pdf) efforts to support authoritarian regimes and weaken democratic institutions; or the Belt and Road Initiative that [encompasses](https://tnsr.org/2019/07/unlocking-the-gates-of-eurasia-chinas-belt-and-road-initiative-and-its-implications-for-u-s-grand-strategy/) multiple continents, China is hardly acting like a country that lacks a grand geopolitical design.

As with so many aspects of the U.S.-China competition, there is a Cold War parallel. During the 1970s, some leading American Sovietologists insisted that Moscow was becoming a satisfied, status quo power. Yet that claim required ignoring what Soviet leaders [said](https://www.google.com/books/edition/What_Good_Is_Grand_Strategy/nGqoAgAAQBAJ?hl=en&gbpv=1&bsq=%22we%20make%20no%20secret%22) about detente and peaceful coexistence — that it was a way of ensuring the triumph of socialism without war — as well as their efforts to build military superiority and positions of strength in the Third World. The warning signs were evident then, as they are today.

China probably doesn’t have a step-by-step checklist for achieving global primacy, any more than the Soviet Union did in the 1970s. Chinese leaders aren’t insensitive to costs and obstacles: Xi may ritualistically restate the importance of unifying the Chinese nation, but that [doesn’t mean](https://twitter.com/resplinodell/status/1259883799254634498) he’s hell-bent on war over Taiwan.

Beijing may not even have decided which of its two paths to global influence is preferable: Establishing dominance in the Western Pacific and then expanding outward from there, or outflanking the U.S. position in the region by building up economic and political power around the world. Finally, China may ultimately fail to accomplish any of this. Perhaps the coronavirus will so weaken the U.S. and the liberal order that China’s ascent will be accelerated. Or perhaps China will run into so many internal problems, and so much external resistance, that its drive will stall.

Yet we ought to recognize that the debate about what China wants is growing stale, because China’s leaders and behavior have increasingly answered that question. When a proud and powerful challenger starts to advertise its global ambitions, Americans should probably err on the side of taking those ambitious seriously.

## K---Capitalism

### 2AC---Extinction

#### Extinction is worth avoiding---it’s unwanted and causes immense pain.

Finneron 17 – PhD, faculty University of Warwick, Politics & International Studies, Coventry, UK (Elizabeth Finneron-Burns, “What’s wrong with human extinction?,” *Canadian Journal of Philosophy*, 47.2)

2.3. Existing people would endure physical pain and/or painful and/or premature deaths

Thinking about the ways in which human extinction might come about brings to the fore two more reasons it might be wrong. It could, for example, occur if all humans (or at least the critical number needed to be unable to replenish the population, leading to eventual extinction) underwent a sterilization procedure. Or perhaps it could come about due to anthropogenic climate change or a massive asteroid hitting the Earth and wiping out the species in the same way it did the dinosaurs millions of years ago. Each of these scenarios would involve significant physical and/or non-physical harms to existing people and their interests. Physically, people might suffer premature and possibly also painful deaths, for example. It is not hard to imagine examples in which the process of extinction could cause premature death. A nuclear winter that killed everyone or even just every woman under the age of 50 is a clear example of such a case. Obviously, some types of premature death themselves cannot be reasons to reject a principle. Every person dies eventually, sometimes earlier than the standard expected lifespan due to accidents or causes like spontaneously occurring incurable cancers. A cause such as disease is not a moral agent and therefore it cannot be wrong if it unavoidably kills a person prematurely. Scanlon says that the fact that a principle would reduce a person’s well-being gives that person a reason to reject the principle: ‘components of well-being figure prominently as grounds for reasonable rejection’ (Scanlon 1998, 214). However, it is not settled yet whether premature death is a setback to well-being. Some philosophers hold that death is a harm to the person who dies, whilst others argue that it is not.7 I will argue, however, that regardless of who is correct in that debate, being caused to die prematurely can be reason to reject a principle when it fails to show respect to the person as a rational agent. Scanlon says that recognizing others as rational beings with interests involves seeing reason to preserve life and prevent death: ‘appreciating the value of human life is primarily a matter of seeing human lives as something to be respected, where this involves seeing reasons not to destroy them, reasons to protect them, and reasons to want them to go well’ (Scanlon 1998, 104). The ‘respect for life’ in this case is a respect for the person living, not respect for human life in the abstract. This means that we can sometimes fail to protect human life without acting wrongfully if we still respect the person living. Scanlon gives the example of a person who faces a life of unending and extreme pain such that she wishes to end it by committing suicide. Scanlon does not think that the suicidal person shows a lack of respect for her own life by seeking to end it because the person whose life it is has no reason to want it to go on. This is important to note because it emphasizes the fact that the respect for human life is person-affecting. It is not wrong to murder because of the impersonal disvalue of death in general, but because taking someone’s life without their permission shows disrespect to that person. This supports its inclusion as a reason in the contractualist formula, regardless of what side ends up winning the ‘is death a harm?’ debate because even if death turns out not to harm the person who died, ending their life without their consent shows disrespect to that person. A person who could reject a principle permitting another to cause his or her premature death presumably does not wish to die at that time, or in that manner. Thus, if they are killed without their consent, their interests have not been taken into account, and they have a reason to reject the principle that allowed their premature death.8 This is as true in the case of death due to extinction as it is for death due to murder. However, physical pain may also be caused to existing people without killing them, but still resulting in human extinction. Imagine, for example, surgically removing everyone’s reproductive organs in order to prevent the creation of any future people. Another example could be a nuclear bomb that did not kill anyone, but did painfully render them infertile through illness or injury. These would be cases in which physical pain (through surgery or bombs) was inflicted on existing people and the extinction came about as a result of the painful incident rather than through death. Furthermore, one could imagine a situation in which a bomb (for example) killed enough people to cause extinction, but some people remained alive, but in terrible pain from injuries. It seems uncontroversial that the infliction of physical pain could be a reason to reject a principle. Although Scanlon says that an impact on well-being is not the only reason to reject principles, it plays a significant role, and indeed, most principles are likely to be rejected due to a negative impact on a person’s well-being, physical or otherwise. It may be queried here whether it is actually the involuntariness of the pain that is grounds for reasonable rejection rather than the physical pain itself because not all pain that a person suffers is involuntary. One can imagine acts that can cause physical pain that are not rejectable — base jumping or life-saving or improving surgery, for example. On the other hand, pushing someone off a cliff or cutting him with a scalpel against his will are clearly rejectable acts. The difference between the two cases is that in the former, the person having the pain inflicted has consented to that pain or risk of pain. My view is that they cannot be separated in these cases and it is involuntary physical pain that is the grounds for reasonable rejection. Thus, the fact that a principle would allow unwanted physical harm gives a person who would be subjected to that harm a reason to reject the principle.

### 2AC---AT Warming

#### Yes decoupling – study

Pao 18 (Hsiao-Tien Pao, PhD, Department of Management Science, National Chiao Tung University; Chun-Chih Chen, PhD, Department of Management Science, National Chiao Tung University; “Decoupling strategies: CO emissions, energy resources, and economic growth in 2 the Group of Twenty”, Journal of Cleaner Production, September 2018, DOI: 10.1016/j.jclepro.2018.09.190) \*Brackets added which provide the full version of each of these abbreviations: Hydro = hydropower; CKC = carbon kuznets curve; Ren = new renewable energy consumption; FF = fossil fuels energy consumption; 3Es = environment, energy, and economy, Nuc = nuclear energy consumption, TCE = total clean energy consumption, EG = economic growth

This study selects the G20 as a representative sample of global economic development to assess the CKC [carbon Kuznets curve], the 3Es dynamics, substitutability between Ren [new renewable energy consumption]/Hydro [hydropower] /Nuc [nuclear energy consumption] and FF [fossil fuels energy consumption], and thus to propose decoupling strategies for sustainable development. We extend the literature on the emission-growth nexus in the case of G20 to the 3Es dynamics by examining the rule of Ren [new renewable energy consumption]/Hydro [hydropower] /Nuc [nuclear energy consumption] and FF [fossil fuels energy consumption]. The descriptive statistical analysis suggests the absolute decoupling effect seems to have occurred with the drop in related environmental pressure and the continuation of economic growth. Within a panel EEO model framework, the per capita TCE [total clean energy consumption] /FF [fossil fuels energy consumption] elasticity of demand for carbon emissions is -0.021/1.04. The existence of the CKC [carbon kuznets curve] is consistent with the results of the descriptive statistical analysis. The results of panel VECM models support the Hydroled and Nuc-led growth hypotheses and the feedback hypothesis between EG [economic growth] and Ren [new renewable energy consumption]/FF and suggest the potential substitutability/symbiosis between Ren/Hydro and FF as evidenced by the negative/positive bidirectional causal relationship between them. Also, note that the use of nuclear energy is a key means of dealing with carbon emissions as evidenced by the positive unidirectional causal relationship running from emissions to Nuc [nuclear energy consumption].

Based on the growing global awareness of environmental protection, these interdependencies between 3Es are not surprising. That provides the main directions of each in the design of energy and energy conservation policies to ensure a diversified, sustainable energy consumption mix and a decoupling of environmental pressure from EG [economic growth]. Policymakers can introduce a wide range of complementary strategies for renewable energy and nuclear energy to improve energy efficiency and safety, reduce CO2 intensity, maintain stable economic growth, and implement the 2030 sustainable development agenda, thus lead the world to absolute decoupling. Absolute decoupling is the only way to achieve a truly sustainable future.

#### Clean disruption solves – zero-emissions by 2030.

Seba 14 - MBA @ Stanford, lecturer in distribution and clean energy @ Stanford (Tony, “Clean Disruption of energy and transportation: How silicon valley will make oil, nuclear, natural gas, coal, electric utilities and conventional cars obsolete by 2030,” pg. 2-17)

The Stone Age did not end because humankind ran out of stones. It ended because rocks were disrupted by a superior technology: bronze. Stones didn't just disappear. They just became obsolete for tool-making purposes in the Bronze Age. The horse and carriage era did not end because we ran out of horses. It ended because horse transportation was disrupted by a superior technology, the internal combustion engine, and a new, disruptive 20th century business model. Horses didn't just disappear. They became obso ete for the purposes of mass transportation. The age of centralized, command-and-control, extraction-resource-based energy sources (oil, gas, coal and nuclear) will not end because we run out of petroleum, natural gas, coal, or uranium. It will end because these energy sources, the business models they employ, and the products that sustain them will be disrupted by superior technologies, product architectures, and business models. Compelling new technologies such as solar, wind, electric vehicles, and autonomous (self-driving) cars will disrupt and sweep away the energy industry as we know it. The same Silicon Valley ecosystem that created bit-based technologies that have disrupted atom-based industries is now creating bit- and electron-based technologies that will disrupt atom-based energy industries.

Clean Disruption of Energy and Transportation.

The industrial era of energy and transportation is giving way to an information technology and knowledge-based energy and transportation era. The combination of bit-based and electron-based technologies will put an end to conventional atom-based energy and transportation industries. The disruption will be a clean one and have the following characteristics:

1. Technology-based disruption.

The clean disruption is about digital (bit) and clean energy (electron) technologies disrupting resource-based (atom-based) industries. Clean energy (solar and wind) is free. Clean transportation is electric and uses clean energy derived from the sun and wind. The key to the disruption of energy lies in the exponential cost and performance improvement of technologies that convert, manage, store, and share clean energy. The clean disruption is also about software and business model innovation.

2. Flipping the architecture of energy.

Just as the Internet and the cell phone turned the architecture of information upside-down, the clean disruption will create an energy architecture that is different from the one we know today. The new energy architecture will be distributed, mobile, intelligent, and participatory. It will overturn the existing energy architecture, which is centralized, command-and-control oriented, secretive, and extractive. The conventional energy model is about Big Banks financing Big Energy to build Big Power Plants or refineries in a few selected places. The new architecture is about everyone financing everyone to build smaller, distributed power plants everywhere.

3. Abundant, cheap, and participatory energy.

The clean disruption will be about abundant, cheap, and participatory energy. The existing energy business model is based on scarcity, depletion, and command-and-control monopolies. The clean disruption is similar to the information technology revolution that overturned the old publishing and information model and made information abundant, participatory, and essentially free.

4. Clean disruption is inevitable.

The clean disruption of energy and transportation is inevitable when you consider the exponential cost improvement of disrupting technologies; the creation of new business models; the democratization of generation, finance, and access; and the exponential market growth.

5. Clean disruption will be swift.

It will be over by 2030. Maybe before. Oil, natural gas (methane), coal, and uranium will simply become obsolete for the purposes of generating significant amounts of electricity and powering the automobile. These energy sources will still have uses. For example, uranium will be used to make nuclear weapons and natural gas will be used for cooking and producing fertilizer. Obsolescence and clean disruption will not put an end to incumbent industries. We still have vinyl records, sailboats and jukeboxes. These niche market products will survive, but energy and transportation will not be the multi-trillion dollar energy heavyweights that they are today.

In twenty years we'll wonder how we put up with the horrendous consequences of the incumbent, conventional, $8 trillion-a-year energy industry. If Nikola Tesla and Thomas Alva Edison rose from the dead, they would recognize the industry that they helped build a century ago and they would be disappointed at how little it has changed. Today's versions of Tesla and Edison are creating technologies, products, and business models that will dismantle the extractive, centralized, dirty- energy age in which we live. The first wave of energy disruption has already begun with distributed solar and wind generation. It won't be long before the next wave crashes over the remains of the first one. Transportation is a $4 trillion industry globally. The transportation industry is inextricably linked with energy. As this book explains, the internal combustion engine automobile will soon be disrupted, an event which will, in turn, send disruptive shockwaves through the oil industry. The first wave of disruption of the century-old automotive industry is well underway with electric vehicles. The second disruptive wave, the self-driving car, will hit before the first wave is finished crashing. Transportation will never be the same again. This book is about how a new technology-based infrastructure and a set of products and services governed by the economics that have made Silicon Valley a source of market disruption over the last generation will disrupt energy industries that have barely evolved over the past hundred years.

#### 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.

### 2AC---AT Walt

#### Walt is unsure at best- he says short term conflicts unlikely not long term economic decline

1NC Walt ‘20

Kansas reads blue

(Robert and Renée Belfer professor of international relations at Harvard University. (Stephen M., 5/13/20, “Will a Global Depression Trigger Another World War?”, *Foreign Policy*, https://foreignpolicy.com/2020/05/13/coronavirus-pandemic-depression-economy-world-war/)

If one takes a longer-term perspective, however, a sustained economic depression could make war more likely by strengthening fascist or xenophobic political movements, fueling protectionism and hypernationalism, and making it more difficult for countries to reach mutually acceptable bargains with each other. The history of the 1930s shows where such trends can lead, although the economic effects of the Depression are hardly the only reason world politics took such a deadly turn in the 1930s. Nationalism, xenophobia, and authoritarian rule were making a comeback well before COVID-19 struck, but the economic misery now occurring in every corner of the world could intensify these trends and leave us in a more war-prone condition when fear of the virus has diminished.

1nc walt starts here

On balance, however, I do not think that even the extraordinary economic conditions we are witnessing today are going to have much impact on the likelihood of war. Why? First of all, if depressions were a powerful cause of war, there would be a lot more of the latter. To take one example, the United States has suffered 40 or more recessions since the country was founded, yet it has fought perhaps 20 interstate wars, most of them unrelated to the state of the economy. To paraphrase the economist Paul Samuelson’s famous quip about the stock market, if recessions were a powerful cause of war, they would have predicted “nine out of the last five (or fewer).”   
Second, states do not start wars unless they believe they will win a quick and relatively cheap victory. As John Mearsheimer showed in his classic book Conventional Deterrence, national leaders avoid war when they are convinced it will be long, bloody, costly, and uncertain. To choose war, political leaders have to convince themselves they can either win a quick, cheap, and decisive victory or achieve some limited objective at low cost. Europe went to war in 1914 with each side believing it would win a rapid and easy victory, and Nazi Germany developed the strategy of blitzkrieg in order to subdue its foes as quickly and cheaply as possible. Iraq attacked Iran in 1980 because Saddam believed the Islamic Republic was in disarray and would be easy to defeat, and George W. Bush invaded Iraq in 2003 convinced the war would be short, successful, and pay for itself.

The fact that each of these leaders miscalculated badly does not alter the main point: No matter what a country’s economic condition might be, its leaders will not go to war unless they think they can do so quickly, cheaply, and with a reasonable probability of success.

Third, and most important, the primary motivation for most wars is the desire for security, not economic gain. For this reason, the odds of war increase when states believe the long-term balance of power may be shifting against them, when they are convinced that adversaries are unalterably hostile and cannot be accommodated, and when they are confident they can reverse the unfavorable trends and establish a secure position if they act now. The historian A.J.P. Taylor once observed that “every war between Great Powers [between 1848 and 1918] … started as a preventive war, not as a war of conquest,” and that remains true of most wars fought since then.

The bottom line: Economic conditions (i.e., a depression) may affect the broader political environment in which decisions for war or peace are made, but they are only one factor among many and rarely the most significant. Even if the COVID-19 pandemic has large, lasting, and negative effects on the world economy—as seems quite likely—it is not likely to affect the probability of war very much, especially in the short term.

[NEWSCHOOLS reading ends here]

To be sure, I can’t rule out another powerful cause of war—stupidity—especially when it is so much in evidence in some quarters these days. So there is no guarantee that we won’t see misguided leaders stumbling into another foolish bloodletting. But given that it’s hard to find any rays of sunshine at this particular moment in history, I’m going to hope I’m right about this one.

### 2AC---Save the Bees

#### Capitalism is key to stop beemageddon

**Regan 17** (Shawn Regan – research fellow at PERC and the director of outreach and publications. He holds a M.S. in Applied Economics from Montana State University and degrees in economics and environmental science from Berry College. His writing has appeared in a variety of publications, including the Wall Street Journal, Quartz, High Country News, National Review, Reason, Regulation, Grist, and Distinctly Montana. Shawn is also a former backcountry ranger for the National Park Service. <KEN> "How Capitalism Saved the Bees," Reason. June 20, 2017. DOA: 12/14/19. https://reason.com/2017/07/19/how-capitalism-saved-the-bees/)

You've heard the story: Honeybees are disappearing. Beginning in 2006, beekeepers began reporting mysteriously large losses to their honeybee hives over the winter. The bees weren't just dying—they were abandoning their hives altogether. The strange phenomenon, dubbed colony collapse disorder, soon became widespread. Ever since, beekeepers have reported higher-than-normal honeybee deaths, raising concerns about a coming silent spring. The media swiftly declared disaster. Time called it a "bee-pocalypse"; Quartz went with "beemageddon." By 2013, National Public Radio was declaring "a crisis point for crops" and a Time cover was foretelling "a world without bees." A share of the blame has gone to everything from genetically modified crops, pesticides, and global warming to cellphones and high-voltage electric transmission lines. The Obama administration created a task force to develop a "national strategy" to promote honeybees and other pollinators, calling for $82 million in federal funding to address pollinator health and enhance 7 million acres of land. This year both Cheerios and Patagonia have rolled out save-the-bees campaigns; the latter is circulating a petition calling on the feds to "protect honeybee populations" by imposing stricter regulations on pesticide use. A threat to honeybees should certainly raise concerns. They pollinate a wide variety of important food crops—about a third of what we eat—and add about $15 billion in annual value to the economy, according to the U.S. Department of Agriculture. And beekeepers are still reporting above-average bee deaths. In 2016, U.S. beekeepers lost 44 percent of their colonies over the previous year, the second-highest annual loss reported in the past decade. But here's what you might not have heard. Despite the increased mortality rates, there has been no downward trend in the total number of honeybee colonies in the United States over the past 10 years. Indeed, there are more honeybee colonies in the country today than when colony collapse disorder began. Beekeepers have proven incredibly adept at responding to this challenge. Thanks to a robust market for pollination services, they have addressed the increasing mortality rates by rapidly rebuilding their hives, and they have done so with virtually no economic effects passed on to consumers. It's a remarkable story of adaptation and resilience, and the media has almost entirely ignored it. The Bee Business The chief reason commercial beekeeping exists is to help plants have sex. Some crops, such as corn and wheat, can rely on the wind to transfer pollen from stamen to pistil. But others, including a variety of fruits and nuts, need assistance. And since farmers can't always depend solely on bats, birds, and other wild pollinators to get the job done, they turn to honeybees for help with artificial insemination. Unleashed by the thousands, the bees improve the quality and quantity of the farms' yields; in return, the plants provide nectar, which the bees use to produce honey. Honeybees are essentially livestock. Their owners breed them, rear them, and provide proper nutrition and veterinary care to them. Unlike bumblebees and wasps, honeybees are not native to North America; the primary commercial species, the European honeybee, is thought to have been introduced by English settlers in the 17th century. Commercial beekeepers are migratory. They truck their hives across the country in tractor trailers on a journey to "follow the bloom," stacking their hives on semis and moving at night while the bees are at rest. Most travel to California in the early spring to pollinate almonds. After that, they take their own routes. Some go to Oregon and Washington for apples, pears, and cherries; others to the apple orchards of New York. Some pollinate fruits and vegetables in Florida in the early spring, followed by blueberries in Maine. Like any such transit project, accidents happen—as when one beekeeper, Lane Miller, crashed his truck in a canyon near Bozeman, Montana, in 2014. More than 500 hives—about 9 million sleepy, angry bees—spilled onto the roadway. "The bees were so agitated you could barely see the beekeepers or the wreckage itself," said the local fire chief at the time. After 14 hours, hundreds of stings, and a crew of emergency beekeepers, the road finally reopened. Still, the migration is mostly uneventful. After blooming season, beekeepers shift their focus from pollinating crops to making honey. Many commercial crops that require honeybee pollination, such as almonds and apples, do not provide enough nectar for the bees to produce surplus honey. So in the summer, beekeepers often head to the Midwest, where they essentially pasture the bees, turning their hives loose in fields near sunflower, clover, or wildflowers, which supply large amounts of nectar and allow the bees to make plenty of honey. When summer ends, the beekeepers truck their bees back south to spend the winter in warmer climates. Some observers claim that this annual migration is contributing to colony collapse. As the food writer Michael Pollan put it in The New York Times in 2007, "the lifestyle of the modern honeybee leaves the insects so stressed out and their immune systems so compromised that, much like livestock on factory farms, they've become vulnerable to whatever new infectious agent happens to come along." But it is precisely this modern-livestock lifestyle and the active markets for pollination services that have allowed non-native honeybees to flourish on our continent. They are the reason honeybee populations have remained steady even in the face of disease and other afflictions. The Fable of the Bees Before the 1970s, it was widely believed among academics that the pollination industry's very existence was a problem. In a 1952 paper, the appropriately named economist J.E. Meade argued that honeybee pollination was an "unpaid factor" in apple farming, since orchard owners and beekeepers did not coordinate their production decisions. Both produce what economists call "positive externalities," or spillover benefits for the other, causing inefficiencies. Since "the apple-farmer cannot charge the beekeeper for the bee's food, which the former produces for the latter," Meade believed that certain "subsidies and taxes must be imposed." (Indeed, Washington established a honey price-support program in 1952 with the goal of promoting pollination. The program was briefly eliminated in 1996, but has since been resurrected.) But then another economist, Steven Cheung, investigated how the honeybee pollination market actually worked. In a 1973 study, he found plenty of contracting between beekeepers and orchard owners to overcome the problem Meade had identified. All he had to do was open the yellow pages of the phone book to find listings for pollination services. "The fable of the bees," as Cheung called it, was blackboard theorizing. Real-life farmers and beekeepers were solving this problem on their own. Sometimes the farmers paid the beekeepers to pollinate their crops; other times the beekeepers paid the farmers for the right to place hives in their orchards. It all depended on which activity—pollination or honey production—generated more value in that instance. Sometimes the exchange involved both money and honey. Meade, meanwhile, had gotten his central example backward: Apple pollination does not yield much honey, so the beekeeper charges the apple farmer, not the other way around. The details differ, but markets for pollination services clearly exist and work quite well. Today, commercial beekeeping is a $600–$700 million industry that spans all regions of the country. And now the beekeepers and farmers are working together to overcome another apiary challenge: dead bees. Adaptation There have been 23 episodes of major colony losses since the late 1860s. Two of the most recent bee killers are Varroa mites and tracheal mites, two parasites that first appeared in North America in the 1980s. The latter, which attack their hosts' breathing tubes, devastated hives in many states before honeybees began to develop a genetic resistance. The former—tick-like parasites that suck bees' blood—remain a scourge for beekeepers today. Other threats to bee colonies include American foulbrood (which attacks bee larvae), nosema (which invades bees' intestinal tracts), and chalkbrood (which infests bees' guts, causing them to starve). Beekeepers have developed a variety of strategies to combat these afflictions, including the use of miticides, fungicides, and other treatments. While colony collapse disorder presents new challenges and higher mortality rates, the industry has found ways to adapt. Rebuilding lost colonies is a routine part of modern beekeeping. The most common method involves splitting a healthy colony into multiple hives—a process that beekeepers call "making increase." The new hives, known as "nucs" or "splits," require a new fertilized queen bee, which can be purchased from a commercial queen breeder. These breeders produce hundreds of thousands of queen bees each year. A new fertilized queen typically costs about $19 and can be shipped to beekeepers overnight. (One breeder's online ad touts its queens as "very prolific, known for their rapid spring buildup, and…extremely gentle.") As an alternative to purchasing queens, beekeepers can produce their own queens by feeding royal jelly to larvae.

#### Extinction

**Halter 10** (Reese, Founder of Global Forest Science, Prof @ Alabama, Has done studies and written books on honeybees and the importance of their pollination, "VIEWPOINTS: Humble honeybees are vital to human survival", February 10, <http://blog.al.com/birmingham-news-commentary/2010/02/viewpoints_humble_honeybees_ar.html>)

VIEWPOINTS: Humble honeybees are vital to human survival Over the past three years, more than 50 billion honeybees have died. Scientists understand the causes, and now, we need everyone to lend a helping hand. bee.jpgThe humble honeybee has been inextricably linked to humankind since prehistoric times. At first, we were drawn to this remarkable creature because of its sweet honey. Honey is to a bee what electricity is for humans: energy. One teaspoon of honey weighing 21 grams contains 16 grams of sugar, or 60 calories, and it took 12 bees their entire foraging lives, combined flying time of about 6,000 miles, to produce 21 grams of honey. To understand the importance of honeybees, consider that every third bite on your plate is a result of their primary role on the planet as pollinators, the most important group on Earth. Honeybees contribute at least $44 billion a year to the U.S. economy. In Alabama, bees from 2,500 beekeepers in all 67 counties pollinate crops like apples, blueberries, blackberries, cantaloupes, cucumbers, grapes, honeydew, peaches, persimmons, plums, pumpkins, strawberries, squash, sunflowers, tomatoes, vegetable seeds, watermelons; alfalfa and clover for beef and dairy industries; cotton for our clothes; and, of course, bees give us honey, candles and medicines. Bees have been on the planet for more than 100 million years, or about 14 times longer than the first human progenitor. Bees have a memory: They vote, are being trained to count and are helping people as an early detector of disease by sniffing skin and lung cancers, diabetes and tuberculosis. The Red Cross estimates there are 40,000 new land mines being deployed weekly. Each year, these brutal weapons of destruction maim tens of thousands of children. Researchers from the University of Montana are using bees to find TNT residue -- the primary ingredients in land mines. Many blue-chip corporations depend on honeybees for their products. A combination of factors has collided to create the conditions for memory loss, appetite loss and autoimmune system collapse resulting in the rapid decline in honeybee populations worldwide. Each year, 5 billion pounds of pesticides are applied globally, and these chemicals are known to poison nerves causing symptoms similar to Parkinson's or Alzheimer's. In 2008, researchers from Penn State found 43 different pesticides in a Pennsylvania apple orchard. Many farmers combine or stack their chemicals to reduce applications cost. However, stacking chemicals is known to increase toxicity levels in some cases by 1,000 times. Research from Europe showed that bees exposed to electromagnetic radiation from cellular towers made 21 percent less honeycomb, and that 36 percent of those bees, taken a half mile from the hive, were unable to navigate home. In 2006, the honeybee genome was decoded, and genetics revealed only half as many genes for detoxification and immunity compared to other known insects. Bees evolved to feed on a wide assortment of pollens, but today, we use them in monoculture fields. Pollens provide their only source of protein. Proteins grow eggs, larvae, brains and autoimmune systems. The abnormally high temperatures of 2006 were likely the tipping point for bees in North America. The searing springtime temperatures during the onset of flowering are believed to have caused sterile pollen in many plants. Sterile pollen produces little, if any, protein. In 2007, almond, plum, kiwi and cherry pollen that was tested exhibited little if any protein content. Infertile soils lacking essential nutrients, bacteria, fungi, protozoa along with climate change were implicated. Beekeepers around the globe are now feeding their hives a form of a protein shake with eggs, brewer's yeast, pollen and honey. Clearly, agriculture must reduce the levels in toxicity from pesticides, herbicides and miticides globally. There is hope on the horizon, as organics are the fastest-growing sector in the United States at $24 billion a year. First lady Michelle Obama has an organic garden on the White House lawn with two honeybee hives close by. Each of us can help by buying organic foods and cottons, and support local beekeepers by buying organic honey. Do not use herbicides, insecticides or miticides in your yard. Plant a wide variety of native yellow and blue flowers and take part by helping scientists in the U.S. National Phenology Network (www.usanpn.org). Without bees, we cannot survive.

### 2AC---Food

#### Cap key to food

Bandler 17 (Aaron, staff writer for The Daily Wire, 3/18/17, “This AMAZING Chart Shows Just How Capitalism Has Alleviated Global Hunger”, https://www.dailywire.com/news/16621/amazing-chart-shows-just-how-capitalism-has-aaron-bandler, AZG)

A truly remarkable chart has surfaced that reveals that capitalism has sharply curtailed the scourge of global hunger. The chart, provided by Human Progress, shows that the number of undernourished persons sharply declined from nearly 960 million to under 700 million: There is clearly still work that needs to be done to ameliorate global hunger — as a little under 700 million malnourished people is still too high — but a decline of over 260 million malnourished people in a span of over 20 years is nevertheless amazing. This Human Progress chart actually disproves two leftist myths: capitalism is causing hunger, and overpopulation threatens essential resources. For instance, businessman Drew Hanson argued in a February 2016 Forbes piece that "capitalism will starve humanity by 2050," citing misleading statistics and claiming that capitalism would dry up the world's resources as the population continues to increase. "How do we expect to feed that many people while we exhaust the resources that remain?" Hanson wrote. Another leftist who claimed something similar is environmentalist fear-mongerer Paul Ehrlich, as he actually argued in favor of population control. But economist Julian Simon believed that a rising population would result in more resources, not less, and Simon was proven right: Simon and Ehrlich made a bet in 1980: if Ehrlich was correct, then commodities price would drastically increase with population growth, as a dearth of resources would naturally lead to less supply. However, as population has increased from 2 billion to 7 billion over the past 100 years, the commodities prices have actually decreased, according to The Federalist. This is because, as economist Phillip Verlerger once said, "Technology moves so quickly today that any looming resource constraint will be nothing more than a blip. We adjust." Indeed, the beauty of capitalism is that its respect for individual liberty and private property allows a free and prosperous people to produce goods that balances their skill set with market demand, creating a system that while imperfect, has created wealth that vastly improved society and made it easier to lift the poor and the hungry out of poverty. Even as Western societies have started to embrace the welfare state, capitalism has still managed to touch the globe through free trade and globalization, allowing those who have never tasted freedom to have a chance at improving their living situations. Despite what the Left would have you believe, capitalism is the most humane system on the face of the Earth and is the true answer to alleviating global hunger and poverty, as the Human Progress graph illustrates.

#### Food wars- escalate go nuclear

FDI 12 (Future Directions International, “International Conflict Triggers and Potential Conflict Points Resulting from Food and Water Insecurity Global Food and Water Crises Research Programme”, May 25, <http://www.futuredirections.org.au/files/Workshop_Report_-_Intl_Conflict_Triggers_-_May_25.pdf>)

There is a growing appreciation that the conflicts in the next century will most likely be fought over a lack of resources. Yet, in a sense, this is not new. Researchers point to the French and Russian revolutions as conflicts induced by a lack of food. More recently, Germany’s World War Two efforts are said to have been inspired, at least in part, by its perceived need to gain access to more food. Yet the general sense among those that attended FDI’s recent workshops, was that the scale of the problem in the future could be significantly greater as a result of population pressures, changing weather, urbanisation, migration, loss of arable land and other farm inputs, and increased affluence in the developing world. In his book, Small Farmers Secure Food, Lindsay Falvey, a participant in FDI’s March 2012 workshop on the issue of food and conflict, clearly expresses the problem and why countries across the globe are starting to take note. . He writes (p.36), “…if people are hungry, especially in cities, the state is not stable – riots, violence, breakdown of law and order and migration result.” “Hunger feeds anarchy.” This view is also shared by Julian Cribb, who in his book, The Coming Famine, writes that if “large regions of the world run short of food, land or water in the decades that lie ahead, then wholesale, bloody wars are liable to follow.” He continues: “An increasingly credible scenario for World War 3 is not so much a confrontation of super powers and their allies, as a festering, self-perpetuating chain of resource conflicts.” He also says: “The wars of the 21st Century are less likely to be global conflicts with sharply defined sides and huge armies, than a scrappy mass of failed states, rebellions, civil strife, insurgencies, terrorism and genocides, sparked by bloody competition over dwindling resources.” As another workshop participant put it, people do not go to war to kill; they go to war over resources, either to protect or to gain the resources for themselves. Another observed that hunger results in passivity not conflict. Conflict is over resources, not because people are going hungry. A study by the International Peace Research Institute indicates that where food security is an issue, it is more likely to result in some form of conflict. Darfur, Rwanda, Eritrea and the Balkans experienced such wars. Governments, especially in developed countries, are increasingly aware of this phenomenon. The UK Ministry of Defence, the CIA, the US Center for Strategic and International Studies [CSIS] and the Oslo Peace Research Institute, all identify famine as a potential trigger for conflicts and possibly even nuclear war.

### 2AC---War

#### Capitalist peace theory is true.

**Gartzke 7** (Eric, associate professor of political science @ Columbia and a member of the Saltzman Institute of War and Peace Studies, Jan. 2007, "The Capitalist Peace," Midwest Political Science Association, http://www.jstor.org/stable/pdf/4122913.pdf?refreqid=excelsior%3A6da465ba14ba238f87e23e8cf4f9b5fa)//KEN

The discovery that democracies seldom fight each other has led, quite reasonably, to the conclusion that democ- racy causes peace, at least within the community of liberal polities. Explanations abound, but a consensus account of the dyadic democratic peace has been surprisingly slow to materialize. I offer a theory of liberal peace based on capitalism and common interstate interests. Economic development, capital market integration, and the compatibility of foreign policy preferences supplant the effect of democ- racy in standard statistical tests of the democratic peace. In fact, after controlling for regional heterogeneity, any one of these three variables is sufficient to account for effects previously attributed to regime type in standard samples of wars, militarized interstate disputes (MIDs), and fatal disputes.' If war is a product of incompatible interests and failed or abortive bargaining, peace ensues when states lack dif- ferences worthy of costly conflict, or when circumstances favor successful diplomacy. Realists and others argue that state interests are inherently incompatible, but this need be so only if state interests are narrowly defined or when conquest promises tangible benefits. Peace can result from at least three attributes of mature capitalist economies. First, the historic impetus to territorial expansion is tempered by the rising importance of intellectual and financial capital, factors that are more expediently enticed than conquered. Land does little to increase the worth of the advanced economies while resource competition is more cheaply pursued through markets than by means of military occupation. At the same time, development actually increases the ability of states to project power when incompatible policy objectives exist. Development affects who states fight (and what they fight over) more than the overall frequency of warfare. Second, substantial overlap in the foreign policy goals of developed nations in the post-World War II period further limits the scope and scale of conflict. Lacking territorial tensions, consensus about how to order the international system has allowed liberal states to cooperate and to accommodate minor differences. Whether this affinity among liberal states will persist in the next century is a question open to debate. Finally, the rise of global capital markets creates a new mechanism for competition and communication for states that might otherwise be forced to fight. Separately, these processes influence patterns of warfare in the modern world. Together, they explain the absence of war among states in the developed world and account for the dyadic observation of the democratic peace.

### 2AC---Alt---Elites

#### Elites – they block a transition

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

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

### 2AC---AT: Alt---Fascism DA

#### Fascism DA

Büchs and Koch, 19, Milena Büchs, Sustainability Research Institute, School of Earth and Environment, University of Leeds, Leeds, LS2 9JT, UK, Max Koch, Faculty of Social Sciences, Socialhögskolan, Lund University, Box 23, 22100 Lund, Sweden, “Challenges for the degrowth transition: The debate about wellbeing”, <https://www.sciencedirect.com/science/article/pii/S0016328718300715>

3.2. Implications of rapidly transforming social systems The social practices lens is also useful for thinking about possible wellbeing implications of rapid social change more generally, and a transition away from a growth-based economy specifically. While the concept of social practices inherently implies the possibility of change (with its focus on agency and creativity), it equally strongly highlights the structural aspects of practices which provide stability and orientation. During times of rapid social transitions, social norms and ‘mental infrastructures’ often lag behind, creating disorientation, social conflict, and negative impacts on wellbeing ([Büchs & Koch, 2017: ch. 6](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0060)). Stability of structural dimensions of social practices offers orientation and some extent of predictability of how oneself and other people are likely to act in the future, providing a framework within which flexibility and change are possible. This orienting function of structural dimensions of practices is likely to be an important condition for people to form reasonably stable identities and relationships – key ingredients for wellbeing. Examples from classical and contemporary [sociological and psychological research](https://www.sciencedirect.com/topics/social-sciences/sociological-research) suggest that different speeds of changing social structures can establish misalignments and disruptions of social practices which can, in turn, negatively influence health and other wellbeing outcomes. For instance, in his classical study, Durkheim presents suicide at least partly as an outcome of a failure of cultural resources to provide meaning and orientation in the context of other, more rapid social changes ([Durkheim, 2006](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0125); [Vega & Rumbaut, 1991: 375](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0455)). This idea also links to Bourdieu’s concept of the “hysteresis effect”. Here, Bourdieu emphasises that, especially during phases of social transition, people’s habitus and “objective” social circumstances can become disjointed: as a result of [hysteresis](https://www.sciencedirect.com/topics/social-sciences/hysteresis), dispositions can be “out of line with the field and with the ‘collective expectations’ which are constitutive of its normality. This is the case, in particular, when a field undergoes a major crisis and its regularities (even its rules) are profoundly changed” ([Bourdieu, 2000: 160](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0040)). This can contribute to a deterioration of people’s wellbeing as it makes them feel “out of place” or let them be perceived that way, “plung[ing] them deeper into failure” ([Bourdieu, 2000: 161](https://www.sciencedirect.com/science/article/pii/S0016328718300715#bib0040)) because they cannot make use of new opportunities or are mistreated or socially excluded by others. Empirical research which partly builds on the idea of hysteresis has shown that wide-ranging organisational change can have a range of negative effects on people’s health and mortality ([Ferrie et al., 1998](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0150); [McDonough & Polzer, 2012](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0315)). One study found that across 174 countries, several measures of wellbeing and social performance, including life satisfaction, health, safety and trust, voice and accountability, were highest in periods of economic stability, but lower in times of GDP growth or contraction ([O’Neill, 2015](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0355)); and other studies concluded that life expectancy can be negatively affected by both rapid economic growth and contraction ([Notzon et al., 1998](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0345); [Szreter, 1999](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0445)). Several scholars have recently highlighted the potential for social conflict inherent in (rapid) social change. For instance, Maja [Göpel (2016: 49)](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0185) remarks: “Unsurprisingly, the navigation or transition phase in shifting paradigms as well as governance solutions is marked by chaos, politicization, unease and power-ridden struggles”. Wolfgang Streeck has issued similar warnings ([Streeck et al., 2016: 169](https://www.sciencedirect.com/science/article/pii/S0016328718300715" \l "bib0435)). It is not difficult to see how such scenarios bear the potential of undermining some of the fundamental conditions that are necessary for the satisfaction of basic needs as discussed above, and hence the danger of generating substantial wellbeing losses for current and near-future generations. In the current context, it is very difficult to imagine that we might be able to observe a rapid and radical cultural change in which people adopt identities and related lifestyles that value intrinsically motivated activities over pursuing satisfaction and status through careers and consumption. Even more worryingly, political events in Europe, the United States and elsewhere since the ‘Great Crash’ of 2008 indicate that times of negative or stagnant growth can provide a breeding ground for populist, nationalistic and anti-democratic movements. Economic insecurity, a perceived threat of established identities through migrants, and deep mistrust against ‘elite’ politicians are amongst the main explanations for previously unimaginable events such as the [Brexit](https://www.sciencedirect.com/topics/social-sciences/brexit) vote, Trump presidency, and recent electoral successes for far right-wing parties in a range of European countries.

### 2AC---AT: Alt---Movements

#### Militaries crush insurrection

Fredrik deBoer 16, Limited-Term Lecturer, Introductory Composition at Purdue Program, 3/15/16, “c’mon, guys,” http://fredrikdeboer.com/2016/03/15/cmon-guys/

I could be wrong about the short-term dangers, and the stakes are incredibly high. But in the end we’re left with the same old question: what tactics will **actually work to secure a better world?** In a sharp, sober piece about the meaning of left-wing political violence in the 1970s, Tim Barker writes “If you can’t acknowledge radical violence, radicals are reduced to mere victims of repression, rather than political actors who made definite tactical choices under given political circumstances.” **The problem**, as Barker goes on to imply, is those tactical choices: in today’s America they will essentially **never break on the side of armed opposition against the state**. The government knows everything about you, I’m sorry to say, your movements and your associations and the books you read and the things you buy and what you’re saying to the people you communicate with. That’s simply on the level of information, before we even get to the state’s incredible capacity to inflict violence. Look, **the world has changed**. The relative military capacity of regular people compared to establishment governments has changed, especially in fully developed, technology-enabled countries like the United States. The Czar had his armies, yes, but the Czar’s armies depended on manpower above and beyond everything else. The fighting was still mostly different groups of people with rifles shooting at each other. If tomorrow you could rally as many people as the Bolsheviks had at their revolutionary peak, you’re still left **in a world of F-15s, drones, and cluster bombs**. And that’s to say nothing of the fact that establishment governments in the developed world can rely on the **numbing agents of capitalist luxuries** and the American dream to damper revolutionary enthusiasm even among the many millions who have been marginalized and impoverished. **This just isn’t 1950s Cuba**, guys. **It’s just not**. In a very real way, modern technology effectively lowers the odds of armed political revolution in a country like the United States **to zero**, and so much the worse for us. **This isn’t fatalism**. It doesn’t mean there’s no hope. It means that there is **little alternative to organization**, to changing minds through **committed political action** and using the available nonviolent means to create change: a concert of grassroots organizing, labor tactics, and **partisan politics**. Those things aren’t exactly likely to work, either, but they’re a **hell of a lot more plausible than us dweebs taking the Pentagon**. Bernie Sanders isn’t really a socialist, but he’s a social democrat that moves the conversation to the left, and if people are **dedicated and committed to organizing**, the local, state, and national candidates he inspires will **move it further to the left still**. You got any better suggestions? Listen, commie nerds. My people. I love you guys. I really do. And I want to build a better world. **Not incrementally, either**, but with the kind of **sweeping and transformative change** that is required to fix a world of such deep injustice. But **seriously**: none of us are ever going to take to the barricades. And it’s a good thing, too, because we’d probably find a way to shoot in the wrong direction. I can’t dribble a basketball without falling down. American socialism is largely made up of bookish dreamers. I love those people but they’re not for fighting. And even if you have a particular talent for combat, you’re looking at fighting the combined forces of Google, Goldman Sachs, and the defense industry. Violence is hard. Soldiering is hard. In an era of the NSA and military robots, it’s really, really hard. **“Should we condone revolutionary violence?” is dorm room, pass-the-bong conversation fodder**, of **precisely the moral and intellectual weight** of “should we torture a guy if we know there’s a bomb and we know he knows where it is and we know we can stop it if we do?” It’s built on **absurd hypotheticals**, propped up by the power of anxious machismo, and undertaken to **no practical political end**. It’s understandable. I get it, I really do. But it’s got nothing to do with us. The only way forward is the **grubby, unsexy work of building coalitions** and asking people to climb on board

# 1AR

## 1AR- Adv 1

### 1AR-AT: ! run

#### No impact to threat con also answers linguistics

Eric A. **Posner and** Adrian **Vermeule 3**, law profs at Chicago and Harvard, Accommodating Emergencies, September, <http://www.law.uchicago.edu/files/files/48.eap-av.emergency.pdf>

Against the view that panicked government officials overreact to an emergency, and unnecessarily curtail civil liberties, we suggest a more constructive theory of the role of fear. Before the emergency, government officials are complacent. They do not think clearly or vigorously about the potential threats faced by the nation. After the terrorist attack or military intervention, their complacency is replaced by fear. Fear stimulates them to action. Action may be based on good decisions or bad: fear might cause officials to exaggerate future threats, but it also might arouse them to threats that they would otherwise not perceive. **It is impossible to say in the abstract whether decisions and actions provoked by fear are likely to be better than decisions and actions made in a state of calm**. But our limited point is that there is no reason to think that the fear-inspired decisions are likely to be worse. For that reason, the existence of fear during emergencies does not support the antiaccommodation theory that the Constitution should be enforced as strictly during emergencies as during non-emergencies. C. The Influence of Fear during Emergencies Suppose now that the simple view of fear is correct, and that it is an unambiguously negative influence on government decisionmaking. Critics of accommodation argue that this negative influence of fear justifies skepticism about emergency policies and strict enforcement of the Constitution. However, this argument is implausible. It is doubtful that fear, so understood, has more influence on decisionmaking during emergencies than decisionmaking during non-emergencies. The panic thesis, implicit in much scholarship though rarely discussed in detail, holds that citizens and officials respond to terrorism and war in the same way that an individual in the jungle responds to a tiger or snake. The national response to emergency, because it is a standard fear response, is characterized by the same circumvention of ordinary deliberative processes: thus, (i) the response is instinctive rather than reasoned, and thus subject to error; and (ii) the error will be biased in the direction of overreaction. While the flight reaction was a good evolutionary strategy on the savannah, in a complex modern society the flight response is not suitable and can only interfere with judgment. Its advantage—speed—has minimal value for social decisionmaking. No national emergency requires an immediate reaction—except by trained professionals who execute policies established earlier—but instead over days, months, or years people make complex judgments about the appropriate institutional response. And the asymmetrical nature of fear guarantees that people will, during a national emergency, overweight the threat and underweight other things that people value, such as civil liberties. But if decisionmakers rarely act immediately, then the tiger story cannot bear the metaphoric weight that is placed on it. Indeed, the flight response has nothing to do with the political response to the bombing of Pearl Harbor or the attack on September 11. The people who were there—the citizens and soldiers beneath the bombs, the office workers in the World Trade Center—no doubt felt fear, and most of them probably responded in the classic way. They experienced the standard physiological effects, and (with the exception of trained soldiers and security officials) fled without stopping to think. It is also true that in the days and weeks after the attacks, many people felt fear, although not the sort that produces a irresistible urge to flee. **But this kind of fear is not the kind in which cognition shuts down**. (Some people did have more severe mental reactions and, for example, shut themselves in their houses, but these reactions were rare.) The fear is probably better described as a general anxiety or jumpiness, an anxiety that was probably shared by government officials as well as ordinary citizens.53 While, as we have noted, there is psychological research suggesting that normal cognition partly shuts down in response to an immediate threat, we are aware of no research suggesting that people who feel anxious about a non-immediate threat are incapable of thinking, or thinking properly, or systematically overweight the threat relative to other values. Indeed, it would be surprising to find research that clearly distinguished “anxious thinking” and “calm thinking,” given that anxiety is a pervasive aspect of life. People are anxious about their children; about their health; about their job prospects; about their vacation arrangements; about walking home at night. No one argues that people’s anxiety about their health causes them to take too many precautions—to get too much exercise, to diet too aggressively, to go to the doctor too frequently—and to undervalue other things like leisure. So it is hard to see why anxiety about more remote threats, from terrorists or unfriendly countries with nuclear weapons, should cause the public, or elected officials, to place more emphasis on security than is justified, and to sacrifice civil liberties. Fear generated by immediate threats, then, causes instinctive responses that are not rational in the cognitive sense, not always desirable, and not a good basis for public policy, but it is not this kind of fear that leads to restrictions of civil liberties during wartime. The internment of Japanese Americans during World War II may have been due to racial animus, or to a mistaken assessment of the risks; it was not the direct result of panic; indeed there was a delay of weeks before the policy was seriously considered.54 Post-9/11 curtailments of civil liberties, aside from immediate detentions, came after a significant delay and much deliberation. The civil libertarians’ argument that fear produces bad policy trades on the ambiguity of the word “panic,” which refers both to real fear that undermines rationality, and to collectively harmful outcomes that are driven by rational decisions, such as a bank run, where it is rational for all depositors to withdraw funds if they believe that enough other depositors are withdrawing funds. Once we eliminate the false concern about fear, it becomes clear that the panic thesis is indistinguishable from the argument that during an emergency people are likely to make mistakes. But if the only concern is that during emergencies people make mistakes, there would be no reason for demanding that the constitution be enforced normally during emergencies. Political errors occur during emergencies and nonemergencies, but the stakes are higher during emergencies, and that is the conventional reason why constitutional constraints should be relaxed.

#### Nuclear colonialism ended AT worst no impact

Collina & Kimball 12, director of policy at Ploughshares Fund and co-author, with former Defense Secretary William Perry, of “The Button: The New Nuclear Arms Race and Presidential Power from Truman to Trump,”; Executive Director of the Arms Control Association (Tom Z. Collina; Daryl G. Kimball, 9-20-2012, "No Going Back: 20 Years Since the Last U.S. Nuclear Test," Arms Control, Vol. 3, Issue 14, <https://www.armscontrol.org/issue-briefs/2012-09/going-back-20-years-since-last-us-nuclear-test>)

On September 23, 1992, under the surface of the Nevada Test Site, the United States conducted its 1,030th--and last--nuclear weapon test explosion. At the time, there were serious questions about whether the United States could indefinitely extend the service lives of its nuclear warheads without regular nuclear testing. But today, with the help of two decades of hard data and problem-solving through the nuclear weapons Stockpile Stewardship Program, those questions have been answered. As Bruce T. Goodwin, principal associate director for weapons at Livermore National Laboratory told The Washington Post in November 2011: "We have a more fundamental understanding of how these weapons work today than we ever imagined when we were blowing them up." It is now widely recognized that the United States no longer has any need for, nor any interest in, conducting nuclear explosive tests. Four presidential administrations have determined that it remains in the U.S. national security interests to refrain from resuming nuclear explosive testing: George H.W. Bush, Bill Clinton, George W. Bush and Barack Obama. The more time passes the more it becomes clear: the days of U.S. nuclear testing are over.

The Test Ban and Stockpile Stewardship

The 1992 U.S. testing halt was triggered by Congressional approval of the Exon-Hatfield-Mitchell 9-month test moratorium legislation--a bipartisan initiative that was prompted by the end of the Cold War, the closure of the Soviet test site in Kazakhstan in 1989, and Russia's unilateral test moratorium announced on October 5, 1991. The Senate approved the measure on August 3, 1992 by a 68-32 vote. The House adopted it on September 24 by a 224-151 margin. The legislation limited the number and purpose of any additional testing and set a September 30, 1996 end date for U.S. testing. On July 3, 1993, after an extensive interagency review, President Bill Clinton announced he would extend the U.S. moratorium and pursue multilateral negotiations for a Comprehensive Test Ban Treaty (CTBT). Negotiations began in 1994 and concluded in mid-1996. The treaty, which was opened for signature in September 1996, prohibits "any nuclear weapon test explosion," provides for an extensive global monitoring system and the option for short-notice, on-site inspections to detect and deter surreptitious nuclear weapons testing. Before signing the CTBT on September 24, 1996, President Clinton created the Stockpile Stewardship Program to maintain the U.S. nuclear arsenal in the absence of nuclear test explosions. Before the program would be able to show concrete results, the Senate rejected the CTBT in 1999 after a hasty and abbreviated debate, in part because some senators were concerned that the new approach might not work. Now, the stewardship program has proven so successful over the years that many informed observers who were initially skeptical believe that the United States does not need nuclear tests. As Linton Brooks, former director of the National Nuclear Security Administration (NNSA) under President George W. Bush, said in November 2011, "as a practical matter, it is almost certain that the United States will not test again... I have been in and out of government for a long time. And in recent years I never met anybody who advocated that we seek authorization to return to testing." And George Shultz, President Ronald Reagan's Secretary of State, said in April 2009, "[Republicans] might have been right voting against [the CTBT] some years ago, but they would be right voting for it now, based on these new facts.... [There are] new pieces of information that are very important and that should be made available to the Senate."

That Was Then, This Is Now

During the Congressional debate on the proposed nuclear test moratorium legislation in June 1992, then-Rep. Jon Kyl (R-Ariz.) argued: "... as long as we have a nuclear deterrent, we have got to test it in order to ensure that it is safe and it is reliable." Times have changed since 1992 and many of the old assumptions and beliefs about nuclear weapons and nuclear testing no longer apply. We now have almost two decades of experience with the Stockpile Stewardship Program, which has exceeded all expectations. The recent National Academy of Sciences (NAS) report, "The Comprehensive Nuclear Test Ban Treaty--Technical Issues for the United States," lays out a compelling technical case, based on the latest information, that the United States does not need nuclear tests to maintain its arsenal. The NAS report finds that "The technical capabilities for maintaining the U.S. stockpile absent nuclear-explosion testing are better now than anticipated" when the NAS issued its previous report in 2002, and that "the United States has the technical capabilities to maintain a safe, secure, and reliable stockpile of nuclear weapons into the foreseeable future without nuclear-explosion testing." The technical strategy for maintaining the U.S. nuclear stockpile without explosive testing has been in place for almost two decades. Since 1994, each warhead type in the U.S. nuclear arsenal has been determined to be safe and reliable through a rigorous annual certification process. The Stockpile Stewardship Program includes nuclear weapons surveillance and maintenance, non-nuclear and subcritical nuclear experiments, and increasingly sophisticated supercomputer modeling. Life extension programs have successfully refurbished existing types of nuclear warheads and can continue to do so indefinitely. A 2009 study by JASON, the independent technical review panel, concluded that the "lifetimes of today's nuclear warheads could be extended for decades, with no anticipated loss in confidence." Arguments for resuming U.S. nuclear testing have become weaker and weaker with time, as the stockpile is certified year-after-year and more warhead types have their service lives extended. Moreover, NNSA has more resources than ever before to perform core stockpile stewardship work. Since 2009, funding for the nuclear weapons complex has increased by 13%. The Obama administration's $7.6 billion budget request for fiscal year 2013 would boost NNSA weapons programs funding even more, by 5% over last year's appropriation of $7.2 billion. As Sen. Dianne Feinstein noted at a March 21, 2012 appropriations committee hearing, "Regarding nuclear weapons activities, I believe the fiscal year 2013 budget request provides more than sufficient funding to modernize the nuclear weapons stockpile." Nevertheless, some die-hard CTBT critics say that the United States might someday need to test to develop a new type of nuclear weapon. First, there is no military requirement for new types of nuclear weapons. Second, in the exceedingly unlikely event that nuclear testing is needed in the distant future, the United States has the option to exercise the CTBT's "supreme national interest clause" and withdraw from the treaty. Given that the United States already has the most advanced nuclear arsenal in the world, setting off another round of global nuclear tests would only serve to undermine U.S. security by helping other nuclear-armed states improve their nuclear capabilities.

Time To Finish The Job

The CTBT has now been signed by 183 nations and ratified by 157. The treaty has already improved U.S. and global security. Both Russia and China halted nuclear testing as a result of the CTBT and only one nation (North Korea) has conducted nuclear tests since 1998. In order for the CTBT to formally enter into force, however, it must still be ratified by the remaining eight "holdout" states listed in Annex 2 of the Treaty. Ratification by the United States and China is crucial. By signing the treaty and ending nuclear testing, Washington and Beijing have already taken on most CTBT-related responsibilities, yet their failure to ratify has denied them-and others-the full security benefits of the Treaty. U.S. ratification would reinforce the taboo against testing and prompt other key states--such as China, India, and Pakistan--to ratify the treaty. Without positive action on the CTBT, however, the risk that one or more states could resume nuclear testing will only grow. Nuclear testing is a dangerous and unnecessary vestige of the Cold War that the United States rightly abandoned in 1992. After 1,030 tests, the United States does not need further nuclear explosive testing, but those who would seek to improve their arsenals do. It is past time to take another look at the CTBT. The Senate has a responsibility to reconsider the treaty and to do so on the basis of an honest and up-to-date analysis of the facts and the issues at stake.

#### Foreclosing representations of the nuclear apocalypse prevents rational action to prevent nuclear war

Saint-Amour 2000

(Paul, professor of English at Pomona College, Diacritics, 30.4, projectmuse)

The call for papers that initiated both the 1984 colloquium on nuclear criticism and the subsequent *Diacritics* issue invited, among other varieties, "the sort [of criticism] that reads other critical or canonical texts for the purpose of uncovering the unknown shapes of our unconscious nuclear fears" ["Nuclear" 3]. This essay has undertaken such a reading, though without appealing directly to the notion of "unconscious fears"—by appealing, rather, to the notion of a mass trauma brought about by the conspicuously increasing vulnerability of civilian populations to incineration in total war since 1900. The "nuclear condition" in which I have seen this trauma culminating is the doctrine of Mutually Assured Destruction (MAD), whereby the Cold War superpowers held one another's civilians hostage with nuclear arsenals large enough to survive a first-strike and devastatingly retaliate against the aggressor's cities. The MAD doctrine held out the possibility of an "apocalypse without revelation" to which the first examples of nuclear criticism responded. Since 1989, the focus of the nuclear debate has shifted to the growth of the "nuclear club"; the rise of nuclear programs in so-called rogue states such as Libya, Iraq, Iran, Syria, and North Korea; the trimming, detargeting, and retargeting of superpower nuclear arsenals; the theft of fissionable materials from Russian and other former Soviet states' storage facilities; the aging of the remaining arsenals and the growing danger of accidental launches; the prospect of a brain drain of both Eastern bloc and US nuclear scientists and workers; the destabilizing influence of US "Star Wars II" missile shield development; the US withdrawal from the 1972 Anti-Ballistic Missile Treaty and revised deterrence posture; and the possibility of nuclear terrorism. Since September 11, 2001, the phrase "ground zero" has been revived, but in the context of an explicitly non-nuclear catastrophe. Yet despite the apparent waning of images of nuclear holocaust in the global imaginary, a nuclear condition still exists, and **[End Page 80]** one that retains the fundamental logic of Mutually Assured Destruction beneath these shifts in focus and terminology. But because a full nuclear exchange seems less imminent in the current climate, it is easy to ignore the persistence of arsenals and defense policies that continue to hold such an exchange open as a possible, even foundational, scenario. Meanwhile, many supposedly nonrogue states continue to accept a severe degree of civilian "collateral damage" in conventional military action. And while international humanitarian law prohibits the use of nuclear weapons in most scenarios, it leaves open a loophole case—one of desperate self-defense—in which nuclear weapons use might still be considered legal, and nuclear states continue to maintain overkill-sized arsenals, in the name of such a slim eventuality. 13 Nuclear criticism, or whatever undertaking succeeds that problematic but prematurely decommissioned enterprise, will need not only to investigate the cultural prehistories of the nuclear epoch but to meditate on the reasons for the near-invisibility of present nuclear politics and nuclear stockpiles, the dangers these stockpiles entail, and the costs they exact—to begin the future anterior work of determining what *this* nuclear condition will have been when it is really over.

### 1AR- Escalation

#### Yes escalation- any wars go nuclear

Swaine et al 15

(Ph.D., senior associate at the Carnegie Endowment for International Peace, former senior policy analyst at the RAND Corporation, Michael, Nicholas Eberstadt, Ph.D. is a political economist and a demographer by training and is also a senior adviser to the National Bureau of Asian Research; M. Taylor Fravel, Ph.D. is an associate professor of political science and member of the Security Studies Program at MIT; Mikkal Herberg is research director of the National Bureau of Asian Research’s Energy Security Program; Albert Keidel is a nonresident senior fellow at the Atlantic Council and an adjunct graduate professor in the Georgetown University Public Policy Institute; Evans J. R. Revere is a nonresident senior fellow at the Brookings Institution’s Center for East Asia Policy Studies; Alan D. Romberg is distinguished fellow and the director of the East Asia program at the Stimson Center; Eleanor Freund, junior fellow in the Asia Program at the Carnegie Endowment for International Peace; Rachel Esplin Odell, Junior fellow at Carnegie, Audrye Wong, Junior fellow at Carnegie Endowment for international peace, “Conflict and Cooperation in the Asia-Pacific Region: A Strategic Net Assessment,” April 2015, pg. 208-2011)

This overall approach, if successfully implemented, would signal a clear and convincing commitment to a continued strong—indeed, superior—U.S. military capability and close set of alliance relationships as the basis for security in the Western Pacific well into the future. As a result, this strategy could facilitate the creation of a more stable, long-term regional security environment, assuming that its likely deficiencies were resolved. On the negative side, the implementation of either of the muscular operational doctrines outlined above would likely make it much more difficult to put in place the cooperative, reassurance- focused dimensions of this strategy. Such doctrines could fuel a level of Chinese hostility and distrust that would make virtually meaningless any efforts at establishing credible, inclusive multilateral security assurances. Indeed, an economically robust China that continues to devote considerable sums of resources to the defense sector would almost certainly respond to the military aspects of this strategy by developing more potent, and escalatory, countermeasures. These could include less “asymmetric” capabilities, with an emphasis on long-range stealth bombers, enhanced aerial refueling capacity, and aircraft carrier battle groups of a sufficient number and size to enable the PLA to project and sustain power to the first island chain (including the Japanese home islands) and well beyond. The overall result could be heightened levels of security competition, a major move toward genuine regional polarization, and a resulting increased likelihood of crises over the next fifteen to twenty years. Moreover, such an outcome could become even more probable if no appreciable progress is made toward reducing existing tensions over the most likely sources of such crises, including disputes over territorial issues such as the Senkaku/Diaoyu Islands, energy exploration in the East and South China Seas, and foreign military activities within the EEZs of China, Japan, and other nearby nations. As suggested above, this strategy would most likely not emphasize efforts to reduce such tensions through mutual accommodation or other means. To the contrary, it likely would rely more on strengthening alliance ties and relations with other Asian friends and allies than on overcoming tensions through negotiation and compromise. This robust approach could also empower hardline leaders in Beijing, who could more easily rationalize their arguments for adopting a more assertive approach toward Japan and other U.S. allies by pointing to evidence that the alliance is being used in an effort to contain and encircle China. This would be particularly true if the Chinese Communist Party has to cope simultaneously with leadership struggles and domestic unrest. In addition, from a capabilities perspective, it is quite probable that the United States and Japan will lack the financial resources, technological capacity, and political willpower necessary for such an ambitious military approach, especially during the time frame examined in this report. A variety of U.S. and Japanese economic and political problems are likely to continue for several years at least, even under the best-case scenario of continued U.S. and Japanese military superiority.5 This could prevent the acquisition of the most costly elements of a robust force structure oriented toward the ASB concept or an Offshore Control approach, including costly new and unproven platforms such as a large number of next-generation stealth bombers, stealth unmanned aerial vehicles, conventional prompt global strike, and improved littoral combat ships. Moreover, even if ample levels of funding were to become available in the United States, long-standing problems in weapon development and procurement times, combined with the very significant challenges confronting interservice and United States–Japan/allied force integration, could delay or prevent the fielding of an effective force structure and infrastructure capable of fully supporting the above-mentioned operational doctrines.6 In the absence of major catalyzing provocations or incidents, Tokyo is also unlikely to make the level of financial commitments and push the type of major political and policy changes (including prior permission for a greatly expanded level of access by U.S. forces to U.S. and Japanese bases on the home islands) likely required to support such a robust operational approach. Indeed, except under the most extreme and unlikely regional scenarios, domestic political-economic constraints are likely to keep Japanese military responses focused on enhanced C4ISR**,** defense of the southwest islands, reararea support, and base-hardening measures. Moreover, even under conditions of a much higher level of urgency **in** Tokyo in response to perceived Chinese threats, doubts could very likely persist in Japan regarding both the operational realities and limits of a muscular military doctrine, and the risks of being entrapped in an antagonistic or openly confrontational relationship with China. Finally, from a purely military perspective, even if implemented as designed, this strategy could prove to be an ineffective deterrent and might aggravate instability in a crisis. Under an ASB concept, for example, it is by no means clear that the United States could identify and target the large number of critical PLA assets (

many mobile) that would need to be struck in the early stages of a conflict. Even a barrage of cyberattacks, counter-space attacks, and inland bombing could still leave some critical C4ISR networks intact, along with many mobile missile launchers. At the same time, the United States would remain, to some extent, reliant on immobile aircraft shelters and runways at a few forward bases, in Japan or Guam or elsewhere in the Western Pacific; static or passive defenses would not be able to guarantee the safety of these fragile assets against the sort of powerful, accurate, and sophisticated ballistic missiles China possesses. Likewise, even under a high-capacity U.S. trajectory, American aircraft carriers might remain highly vulnerable to Chinese ballistic and cruise missiles and PLAN submarines, thereby significantly reducing their utility as part of the ASB concept. Also, though proponents argue that a robust ASB concept could create more options in a crisis, in fact, the likely need to carry out deep strikes early in a conflict could make escalation control far more problematic. The stress on early preemptive strikes against the PLA would likely compress the time available to decisionmakers in a crisis. In addition, early, conventional deep strikes against Chinese C4ISR assets in a conflict could easily be misconstrued in Beijing as an attempt at destroying preemptively China’s retaliatory nuclear options. Under intense pressure, it would be hard to limit a dramatic escalation of such a conflict—including, in the worst case, up to and beyond the nuclear thresholdDAZ.7 The Offshore Control approach exhibits similar shortcomings. Notably, it suffers from the reality that Chinese nationalism would be inflamed by the apparent actualization of the long-held accusation that Washington is seeking to contain Beijing. Such an approach would catalyze intense, unifying sentiment against the United States, giving domestic Chinese leaders additional leeway and a mandate to take aggressive actions to counter U.S. hegemony. At a strategic level, such an explicitly containment-oriented force posture would worsen the security dilemma and probably increase the likelihood of crises and incidents at sea and between the respective air forces. Moreover, the level of Japanese militarization likely required under this approach would deeply trouble Beijing, increasing threat perceptions and potentially destabilizing political and diplomatic relations, with likely second-order effects throughout the region. Indeed, measures to reassure Beijing while deterring aggression would be fraught with the difficulty of establishing both credibility and stability.

### 1AR- AT: China

#### Assessing Chinese motivation is possible and epistemologically useful---

Joseph K. Clifton 11, Claremont McKenna College, “DISPUTED THEORY AND SECURITY POLICY: RESPONDING TO “THE RISE OF CHINA”, <http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1164&context=cmc_theses>

First, motives can be known. Mearsheimer is correct in observing that assessing motives can be difficult, but this does not mean that the task is impossible. There clearly are ways of finding out information about the goals of states and the means with which they plan to achieve them. One of the most important roles of intelligence analysts, for example, is to determine state interests and expected behavior based on obtained information. The possibility that information may be flawed should not lead to a rejection of all information. People make decisions based on less than perfect knowledge all of the time. This ability to know motives extends to future motives, because an analyst can use information such as historical trends to observe consistencies or constant evolutions of motives. Prediction of the future is necessarily less certain in its accuracy, but the prediction can still be made.104¶ Second, even if there is still some uncertainty of motives, the rational response is not to assume absolute aggression. Assuming aggressive motive in a situation of uncertainty ignites the security dilemma, which could actually decrease a state’s security. Mearsheimer calls this tragic, but it is not necessary. An illustrative example is Mearsheimer’s analysis of the German security situation were the United States to withdraw its military protection. Mearsheimer argues that it would be rational for Germany to develop nuclear weapons, since these weapons would provide a deterrent, and it would also be rational for nuclear European powers to wage a preemptive war against Germany to prevent it from developing a nuclear deterrent. 105 This scenario is not rational for either side because it ignores motives. If Germany knows that other states will attack if it were to develop nuclear weapons, then it would not be rational for it to develop nuclear weapons. And if other states know that Germany’s development of nuclear weapons is only as a deterrent, then it would not be rational to prevent German nuclear development. The point is that the security dilemma exists because of a lack of motivational knowledge, so the proper response is to try to enhance understanding of motives, not discard motivational knowledge altogether. Misperception is certainly a problem in international politics, but reducing misperception would allow states to better conform to defensive realist logic, which results in preferable outcomes relative to offensive realism. 106¶ Assessing motives is vital in the case of the rise of China, because mutually preferable outcomes can be achieved § Marked 19:56 § if China is not an aggressive power, as offensive realism would have to assume, but is actually a status quo power with aims that have limited effect on the security of the U.S. and other potentially affected countries. I do not mean here to claim with certainty that China is and will always be a status quo power, and policymakers likely have access to more intentional information than what is publicly known. At the very least, valuing motivational assessments empowers policymakers to act on this knowledge, which is preferable because of the possibility of reducing competition and conflict.