# 1AC – Northwestern

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#### Advantage One is Innovation

#### The Ninth Circuit’s Decision in Qualcomm has barred antitrust from cases involving Standard Essential Patents (SEPs). That gives patent holders undue bargaining leverage against implementers.

Sullivan 20 [Sullivan & Cromwell LLP, Leading Firm in Business Law “Ninth Circuit Holds That Qualcomm’s Patent Licensing Program Does Not Violate U.S. Antitrust Law”. 8/12/20. https://www.sullcrom.com/files/upload/sc-publication-ninth-circuit-holds-qualcomm-patent-licensing-program-does-not-violate-us-antitrust-law.pdf]

The Ninth Circuit’s decision, unless modified by the Supreme Court, affirms Qualcomm’s SEP licensing model for OEMs (and its refusal to license rival chipmakers), at least with respect to any challenge under U.S. antitrust laws. Because Qualcomm’s model has driven the cellular modem licensing and sale landscape for chip suppliers and handset makers alike, the court’s decision will likely quiet concerns on the part of some that the district court’s decision would upend that market, although it perhaps makes it less likely that the market will see increased competition or that chip prices will drop as may have been the case if Judge Koh’s injunction had been upheld.

Although the court confirmed that an SEP holder has no antitrust duty to deal with rivals outside the limited Aspen Skiing exception, the Ninth Circuit left open the possibility that an SEP holder’s FRAND commitments may obligate it to deal with its rivals.39 Importantly, however, the Ninth Circuit clarified that a company’s breach of its FRAND commitments does not amount to anticompetitive conduct in violation of the Sherman Act. Instead, the remedy for such conduct lies in contract law. Moreover, the court’s decision to vacate as moot the district court’s summary judgment decision—which found that Qualcomm was required by its FRAND commitments to license rival chipmakers—removes what some had considered to be persuasive judicial authority in the U.S. supporting a claim that FRAND requires licensing at all levels of a product distribution chain which implement a standard. This is noteworthy for SEP holders because it returns U.S. jurisprudence to the status quo, and at least one court in the Eastern District of Texas interpreted a comparable FRAND commitment as not requiring a SEP holder to license all comers at any level of the supply chain. This issue continues to be litigated in the U.S., notwithstanding the Department of Justice Antitrust Division general view that the market, not FRAND, should determine license structures.

The court’s refusal to force licensing at the chip level (rather than the OEM level) also may ease concerns that patent-exhaustion considerations could be used to limit SEP licensors’ ability to maximize profits if licenses were required at the chip level. The Ninth Circuit confirmed that royalty rates are not required to be set strictly using the SSPPU and recognized that “OEM-level licensing is now the industry norm.”40 The Ninth Circuit also recognized that “[t]here are good reasons for SEP owners to structure their licensing programs to license end-user products.”41 The court’s findings appear consistent with current flexibility in structuring FRAND licensing programs.

The Ninth Circuit’s decision also recognizes that royalty rate determinations, and particularly the determination of a FRAND rate, are an issue that sounds in patent law, not antitrust law. The court “decline[d] to adopt a theory of antitrust liability that would presume anticompetitive conduct any time a company could not prove that the ‘fair value’ of its SEP portfolios corresponds to” what the market is willing to pay for those SEPs in royalty rates.42 Arguably, the Ninth Circuit’s decision will impact negotiation power between patent owners and technology implementers by clarifying the circumstances under which patent licensing conduct will give rise to antitrust liability.

Finally, the Ninth Circuit’s decision is noteworthy beyond its application to SEP licensing because it recognizes and demonstrates that courts should be reluctant to ascribe antitrust liability based on conduct occurring in a dynamic, rapidly evolving market—a characterization that will apply to many existing and emerging technology markets.

#### Three internal links

#### 1 – SEP holders refuse to license their patents on fair, reasonable, and non-discriminatory (FRAND) terms– that kills innovation and locks SMEs out of emerging tech markets

* Note – Refusal to license and rate hikes are encompassed in the concept of patent hold-up

FTC 18 [Federal Trade Commission, Signed by ACT, Auto Alliance, CCIA, HTIA, NRF, SIIA Organizations. “Standards, Licensing, and Innovation: A Response to DOJ AAG’s Comments on Antitrust Law and Standard-Setting”. 08/2018. https://www.ftc.gov/system/files/documents/public\_comments/2018/08/ftc-2018-0055-d-0031-155033.pdf]

2. Standardization Gives Rise to Patent Hold-Up

As the Antitrust Division, other federal agencies, and U.S. courts have long recognized, patent hold-up creates risks to competition.17 Characterizing hold-up as a “unilateral” problem that antitrust law should not be concerned about ignores that the power to hold up arises from concerted multilateral action by participants, often competitors, in a standard-setting organization agreeing on specific technologies to use in the industry. Standardization forecloses alternatives that would otherwise compete in the marketplace, and the FRAND commitment is intended to be a constraint on market power that standardization can create. Efforts by patentees to evade promises they made to license on FRAND terms comprise the abuse of monopoly power that the FRAND commitment is intended to limit. 18 Such unearned monopoly power derives not necessarily from the patentee’s “superior skill, foresight, and industry,” 19 but may derive instead from the fact that it is impossible to design around SEPs while maintaining compliance with the standard, creating a “lock-in” effect.20

Before the adoption of a standard, alternative technological solutions generally exist to provide a particular functionality for which the standard-setting process seeks a uniform, market-wide solution.21 Companies with patents that may cover these alternative solutions compete vigorously for inclusion of their preferred technologies into each standard. Once a standard is set, ex ante competition ceases. Patents that cover the chosen technology become essential because they must be used to comply with the standard. And once a standard achieves commercial acceptance, compliance with the standard becomes a matter of commercial necessity, as failing to comply with the standard would render a product incompatible with other companies’ products. This creates a “lock-in” effect, whereby companies that make or use standard compliant products must use the SEPs that are incorporated into the standards that they implement.22 The degree of lock-in reflects what may be the prohibitive costs of switching away from the standardized technology.

Incorporation of a patent into a standard therefore changes the balance of power between patent holders and prospective licensees dramatically, as the Ninth Circuit explained in Microsoft Corp. v. Motorola, Inc.:

[O]nce a standard becomes widely adopted, SEP holders obtain substantial leverage over new product developers, who have little choice but to incorporate SEP technologies into their products. Using that standard-development leverage, the SEP holders are in a position to demand more for a license than the patented technology, had it not been adopted by the SSO, would be worth. The tactic of withholding a license unless and until a manufacturer agrees to pay an unduly high royalty rate for an SEP is referred to as “hold-up.”23

The SEP holder’s strengthened bargaining position after adoption of a standard is directly attributable to the elimination of alternatives to the SEP resulting from the adoption of a standard. Because license negotiations typically do not take place until after a standard has been adopted, when the SEP holder is no longer competing to have its technology included in the standard, the prospective licensee is “at the patentee’s mercy.”24 Prospective licensees therefore may be willing to pay a much higher royalty for use of the patented technology than they would have been willing to pay ex ante, when the SEP holder faced competition from other technologies. Further, while large corporations familiar with SEP licensing may be able to absorb the cost of an unreasonable license or seek redress in court at significant cost to their own innovative efforts, the same opportunities may not be available to small and medium enterprises. These innovators may be forced to abandon business plans in standard-dependent markets entirely.

As a result, the Antitrust Division has recognized that, unless constrained, a SEP holder can exploit its unearned market power to obtain unfair licensing terms, including access to a licensee’s patents at unreasonable prices or supra-competitive royalties that are significantly higher than the SEP holder could have obtained before its patent was incorporated into the standard.

#### SMEs are the lynchpin of emerging tech innovation

Corl 19 [Eric, Business News Expert, Entreprenuer, Founder and CEO of IdeaBuyer. “How Startups Drive the Economy”. 3/14/19. https://medium.com/@ericcorl/how-startups-drive-the-economy-69b73cfbae1]

According to a 2016 report from the Kauffman Foundation, transformation startups have been launched at a faster rate in recent years but still has a way to go.

These “high” growth firms make up just 15% of all companies. But they contribute an estimate of 50% of total jobs created. These young companies comparably invest more in research and development (R&D) than older ones.

The focus of this article is on Transformational startups.

The Big Small Impacts

Startups may be small. But they create ripples in the economy that change people’s way of living.

Here are the ways startups disrupt the economy and forces it to evolve, taking technology one -or several steps- higher.

1. Advance Technology

Older companies or incumbents are more likely to invest in R&D on existing technologies and incremental innovation. While startups are more focused on new technologies and cutting-edge innovation.

Free from a multilayered corporate bureaucracy, startups are more agile and able to build an idea into a product and improve it upon consumer demand with faster decision-making communications. Its high stakes deeply motivate its employees to do whatever it takes to succeed.

Giant companies like Google and Microsoft often acquire startups and use their size and distribution channels to improve the innovation and boost its sales.

However, a member of Harvard’s Labor and Worklife Program, Vivek Wadhwa argues that “when technology’s top guns join these companies, they seem to make a smaller impact than those that don’t get hired.” He then advised that startups must be armed with seed financing in order for the economy get more technological innovation.

2. Open New Markets

Startups create new markets or completely transform old markets by introducing products that change the world. Giants today like Apple, Facebook and Google were once small but ambitious startups.

New technologies often create new opportunities that startups take advantage of. Startups then create a massive value over mature businesses, inspiring competition and disrupting the economy to evolve.

However, not all startups succeed. According to James Surowiecki of MIT Technology Review, the reason behind this is the increased power of established incumbents. Though incumbents have been toppled before, the American industry has grown more concentrated over the last 30 years.

3. Boost Production of Goods and Services

According to Bryan Ritchie and Nick Swisher of IDEA Center, startups disproportionately have higher technology. This drives up production of goods and services.

In a 2017 report by the Center for Economic Studies at the US Census Bureau, they have found that firms that have a high growth output are disproportionately young and “makes disproportionate contributions to output and productivity growth.”

In another paper published on 2011 by Small Business Administration, startups were discovered to generate more revenue with the same number of capital inputs than older companies.

4. Increase Employment

Startups create jobs. These “high-growth” firms are companies that add jobs at a rate of 25 plus percent.

Wadhwa states, “Without startups, there would be no net job growth in the US economy. From 1977 to 2005, existing companies were net job destroyers, losing 1 million net jobs per year. New businesses in their first year added an average of 3 million jobs annually.”

In a 2017 report by the Progressive Policy Institute, the private sector job growth is significantly higher where the startup activity is high. In contrast, regions with few startup activity experience less than half the job growth.

5. Direct Local Impacts

Startups also have a direct change on the cities where they are located such as how Microsoft has transformed Redmond and Google has changed Mountain View California. They bring in wealth and a large inflow of graduates and experienced professionals from other locations who are looking for job opportunities.

Startups are a Driving Economic Force

Startups are engines of growth. To avoid economic stagnation, methods must be sought to foster competition and assist transformational entrepreneurs.

While it is important to get support in a federal level, the effort must be focused in a local level. Cities need to foster programs that encourage entrepreneurship. It is absolutely critical for growth at a local and national level and legislative and political motives can no longer take entrepreneurs into account as an after-thought.

Removing barriers. Facilitating connections. Empowering startups. These are just the few ways for civic leaders to give a better edge to entrepreneurs.

Over the years, I’ve gotten more and more involved in advocating for other entrepreneurs and I’ve been introduced to some great organizations. For one, the SBE Council (http://www.SBECouncil.org) is doing a wonderful job on the federal level advocating for entrepreneurs and small businesses to make sure our voices are heard. Please follow them and support them online.

The Small Business Administration is also doing great work with their main street leaders program to connect local businesses to Washington, DC. If you have a business, they want to hear your voice.

Remember, startups are the driving force behind our economy — we must advocate for the entrepreneurs behind them and continue to foster innovation.

#### 2 – Excessive sham litigation plagues standard patent disputes – only the federal legal clarity of the plan solves

Hovenkamp 19 [Herbert, James B. Dinan University Professor, University of Pennsylvania Law School and The Wharton School. “FRAND and Antitrust”. 9/2019. https://awards.concurrences.com/IMG/pdf/2.\_frand\_and\_antitrust.pdf?55742/742050234fc2871a2db38c61d1e7936e388e6cc9]

Abuses of the Judicial Process

Should the owner of FRAND encumbered patents be accountable under the antitrust laws for the way it employs judicial processes? For example, suppose that the owner of a FRAND patent seeks an injunction against a manufacturer of a good that employs the patent and participates in the standard. Patentees have a statutory right to obtain an injunction against proven infringers.193 As a result, seeking injunctive relief from a court should not ordinarily be an antitrust violation.

Nevertheless, there are important qualifications. If someone files a suit that no reasonable litigant would have brought with the expectation of success, then antitrust liability can attach. In such cases the litigation plaintiff’s expectation of success comes not from winning the lawsuit, but rather from depleting the defendant’s assets, delaying its market entry, or otherwise injuring it in ways unrelated to the outcome of the litigation.

The grandparent of these cases is Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.194 The patentee had a patent that it knew to be unenforceable under the statutory on sale bar,195 but it attempted to exclude a competitor from the market anyway via a patent infringement suit. The Walker Process case applied the so called “sham” litigation exception that holds that the filing of a law suit loses its First Amendment protected status if the lawsuit is a “sham,” which means that it was filed without a realistic prospect of success from the litigation itself, but rather to intimidate, harass, or deplete the resources of the litigation defendant.196

One important precondition to the sham litigation exception is that existing law be sufficiently “settled” that a lawsuit filed in conflict with it should be regarded as “objectively meritless.”197 That is, a reasonable person in the plaintiff’s position should have known that the lawsuit would not succeed. For example, if there is a conflict in the Federal Circuit Courts of Appeal respecting a particular issue, a plaintiff should be entitled to convince the appellate courts to apply one interpretation rather than the other one.198 Issues of first impression or those that could reasonably come out either way can of course be the subject of litigation.

There is no obvious reason that the sham litigation rule should not apply in the FRAND context, and under these same constraints. Once it has become a matter of settled law that a SEP owner is not entitled to an injunction under a given set of circumstances – that is, that a knowledgeable person would realize that there was no genuine prospect of relief -- then further lawsuits under those circumstances may give rise to antitrust liability.199 If the lawsuit is plainly in violation of an enforceable contract obligation, Walker Process liability should be appropriate. On the other hand, if the issue remains open to legal doubt, then filing a lawsuit is appropriate, even if the suit is ultimately unsuccessful.

Sham litigation establishes the conduct element of an antitrust offense. In order to establish an antitrust violation, the challenger would still have to make out the other elements of an antitrust cause of action – namely, power and unreasonable exclusion for §2 cases, or a restraint of trade for §1 cases. 200

For example, once the FRAND obligation for a patent or set of patents has been established to require licensing to all implementers operating on the standard, a firm that files infringement lawsuits seeking injunctions against firms simply because they are product market competitors should generate the conduct basis for antitrust liability. While this road to antitrust liability might seem narrow, it becomes broader as litigation clarifies issues so that they can be regarded as settled.

#### Just the threat of sham injunctions stifles innovation by hiking licensing rates and legal costs

Wood 13 [Chris Wood and Joseph Kattan, partners in the Antitrust and Trade Regulation practice of Gibson, Dunn & Crutcher LLP. “Standard-Essential Patents and the Problem of Hold-Up”. 12/13/13. http://awa2014.concurrences.com/IMG/pdf/standard\_essential\_patent\_kattan-wood.pdf]

The threat of an injunction is an extraordinarily powerful weapon when asserted by a SEP holder, as the potential licensee faces the prospect of its product being excluded from the market. As one federal court framed the issue, “[i]t would seem clear that a negotiation where one party … must either come to an agreement or cease its sales … fundamentally places that party at a disadvantage.”51 Similarly, the European Commission has noted that “the threat of injunction, the seeking of an injunction or indeed the actual enforcement of an injunction granted against a good faith potential licensee, may significantly impede effective competition by, for example, forcing the potential licensee into agreeing to potentially onerous licensing terms which it would otherwise not have agreed to.”52 As a result, a rational implementer faced with an injunction threat may well conclude that paying an unreasonable royalty is less risky than fending off infringement litigation.53

The use of injunctive relief against willing licensees, or the threat of seeking such relief, is fundamentally incompatible with the FRAND promise. Injunctive relief is an extraordinary remedy that is available only where a patent holder would be “irreparabl[y]” harmed due to a lack of available monetary relief.”54 By contrast, a SEP holder that makes a FRAND commitment agrees to license its SEPs to any standard implementer willing to pay a FRAND compliant royalty, thereby acknowledging that monetary compensation constitutes adequate remuneration for its SEPs.55 As Judge Posner has observed, “[b]y committing to license its patents on FRAND terms, [the SEP holder] committed to license … to anyone willing to pay a FRAND royalty and thus implicitly acknowledged that a royalty is adequate compensation for a license to use that patent.”

Some authors have argued that the language of FRAND commitments “cannot be read to suggest abdication of injunctive relief.”57 But the plain meaning of the FRAND language used by leading SSOs requires that SEP holders grant a license to every willing licensee. For example, the bylaws of the U.S.-based IEEE, which is responsible for the development of the Wi-Fi standard for wireless networking, state that a FRAND commitment must provide “that a license for a compliant implementation of the standard will be made available to an unrestricted number of applicants on a worldwide basis …. under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination.”58 In analyzing the virtually identical FRAND commitment of the International Telecommunications Union (“ITU”), the U.S. Court of Appeals for the Ninth Circuit determined that “[t]his language admits of no limitations as to who or how many applicants could receive a license.” 59 Similarly, the Intellectual Property Rights (IPR) Policy of ETSI, which is responsible for the development of the 3G and 4G telecommunications standards, while framed in different language, also requires that FRAND commitments guarantee a license to every willing licensee. It requires “an irrevocable undertaking in writing” to grant irrevocable licenses on FRAND terms to “manufacture, including the right to make or have made customized components and sub-systems to the licensee’s own design,” “sell, lease, or otherwise dispose of equipment so manufactured,” “repair, use, or operate equipment,” and “use methods.”60 By mandating a license for every potential application of a patent— from manufacture to sale to lease to use or repair—this policy contemplates that the FRAND commitment exclude no potential licensee that is ready to take a license on FRAND terms.

Given that injunctions are designed to provide a remedy where monetary compensation cannot, injunctions should be reserved for the limited circumstances in which monetary damages are an insufficient remedy for patent infringement.61 If a standard implementer is either unwilling or unable to pay a judicially-determined FRAND royalty, or is outside the court’s jurisdiction so that monetary relief could not be enforced, monetary compensation may not be an adequate remedy, in which case an injunction should be available. Whenever the SEP holder is able to secure monetary compensation, however, the threat of injunctive relief serves no purpose other than to give the SEP holders leverage to extract royalties above the FRAND levels that they contractually agreed to accept.

#### 3 – Agency flip-flopping triggers mass investment uncertainty and confirms fears that enforcement will switch on the president’s whim

Syrett 19 [Timothy, partner at WilmerHale, is an intellectual property and antitrust litigator. “The FTC’s Qualcomm Case Reveals Concerning Divide with DOJ on Patent Hold-Up”. 6/28/19. https://www.ipwatchdog.com/2019/06/28/ftcs-qualcomm-case-reveals-concerning-divide-doj-patent-hold/id=110764/]

The DOJ’s turn away from its long-held position on the risks of patent hold-up is a cause for serious concern.

First, it is bad policy. In explaining the DOJ’s about-face, Delrahim has referred to a “so-called ‘hold-up’ problem in the context of SSOs” and contended that concerns with hold-up “rely on models devoid of economic or empirical evidence that hold-up is a real phenomenon.” But the DOJ’s prior recognition of the risks of patent hold-up was well supported.

U.S. courts have long recognized that SEPs pose a hold-up threat. In 2007, for example, the Third Circuit observed that “[t]o guard against anticompetitive patent hold-up, most [standards development organizations] require firms supplying essential technologies for inclusion in a prospective standard to commit to licensing their technologies on FRAND terms.” Broadcom Corp. v. Qualcomm Inc., 501 F.3d 297, 313 (3d Cir. 2007). More recently, the Ninth Circuit explained that “[t]he development of standards . . . creates an opportunity for companies to engage in anti-competitive behavior” and that “[u]sing that standard-development leverage, the SEP holders are in a position to demand more for a license than the patented technology, had it not been adopted by the SSO, would be worth.” Microsoft Corp. v. Motorola, Inc., 795 F.3d 1024, 1031 (9th Cir. 2015); see also, e.g., Ericsson, Inc. v. D-Link Sys., Inc., 773 F.3d 1201, 1209 (Fed. Cir. 2014) (“SEPs pose two potential problems that could inhibit widespread adoption of the standard: patent hold-up and royalty stacking”).

As to the economics of patent hold-up, the DOJ observed in a 2015 business review letter that the “economic bargaining model underlying claims of hold-up has been studied extensively and applied to the standard-setting context,” citing scholarship dating back decades. That conclusion echoed the views of the DOJ and FTC in their 2007 report that patent hold-up is simply a “variant of the classic ‘hold-up problem’.” The DOJ also noted in its 2015 letter that “litigated cases demonstrate the potential for hold up when owners of RAND-encumbered standards-essential patents make royalty demands significantly above the adjudicated RAND rate” and provided examples where licensors’ demands were on the order of about 170 to 230 times what courts determined were RAND rates.

Recognition of the dangers of hold-up is thus well supported as a matter of law and economics. To be sure, if competitors collude in an SSO to fix the terms on which they will license technology, antitrust enforcement would be appropriate. But simply because one can envision the possibility of an alternative form of anticompetitive conduct relating to standard setting does not mean that the DOJ should simply ignore the well-documented existence of another form of harm.

Second, the DOJ’s abrupt shift away from over a decade of guidance on hold-up creates uncertainty for the many industries that rely on standards. While the shift in policy has been cast as being motivated by a concern for fostering innovation, it threatens to have the opposite effect. Companies planning investments in standardized products now face greater uncertainty about whether they can count on established rules, particularly as articulated in the DOJ’s business review letters, to safeguard their ability to license SEPs on FRAND terms.

Third, that a change in administration has led the DOJ to turn away from a long-held, bipartisan approach plays into the perception that antitrust enforcement is increasingly a political tool. While there may be higher profile examples of the politicization of antitrust enforcement, any step that suggests that a change in administration, not law and economics, will lead to wholesale departure from existing antitrust policy is troubling.

#### Tech investment certainty is the maker or breaker of broader innovation– only the plan stabilizes patent and antitrust certainty

Michel 17 [Hon. Paul R. Michel, Former Chief Judge, U.S. Court of Appeals for the Federal Circuit; Matthew J. Dowd, founder Dowd PLLC, "THE NEED FOR “INNOVATION CERTAINTY” AT THE CROSSROADS OF PATENT AND ANTITRUST LAW", April 2017, [https://www.competitionpolicyinternational.com/wp-content/uploads/2017/04/CPI-Michel-Dowd.pdf](https://www.google.com/url?q=https://www.competitionpolicyinternational.com/wp-content/uploads/2017/04/CPI-Michel-Dowd.pdf&sa=D&source=hangouts&ust=1631479189098000&usg=AOvVaw15b1X_q2CCXmXzm69Ur4_h)]

Innovation has long been the driving force of the U.S. economy.2 From the early days of our nation, inventors played a pivotal role in creating wealth for a growing nation, and this innovation continues today. Quantum computing research being funded by Google, IBM, Intel, and Microsoft; Genetic engineering, such as CRISPR; Autonomous vehicles, such as Otto’s self-driving trucks: The nation’s continued success in innovation is critical for maintaining the United States as an economic leader.

Successful innovation requires the proper environment. Innovators need intellectual capital, an educated workforce, and access to financial capital. These resources enable innovators to conduct the research and development and to optimize products for the commercial marketplace.

Equally important is a sufficient degree of what we call “innovation certainty.” Innovation certainty considers those legal, regulatory, and political factors that affect the degree of risk. The lower the degree of innovation certainty, the less hospitable the system is for innovators and investors. The less stable the legal and political rules, the more inimical the jurisdiction is to the investors who ultimately finance the innovative work.

During the past ten years, innovation certainty in the United States has decreased dramatically, and the decrease is directly attributable to two general trends: The destabilization of patent law, and the increased uncertainty in antitrust law. Both patent law and antitrust law, when properly implemented, contribute to an optimal level of innovation certainty. Patent law incentivizes innovation by awarding exclusive rights, thereby encouraging investment in and public disclosure of inventions.3 Antitrust law incentivizes innovation by maximizing competition in a free marketplace and allowing startup innovators to disrupt markets and avoid monopolies created by market power. Working within these legal regimes, private firms innovate and commercialize. They also create efficient transaction mechanisms, such as standard setting organizations (“SSOs”) and FRAND (“fair, reasonable, and non-discriminatory”) licensing agreements for standard essential patents (“SEPs”), so that innovators and their investors can efficiently obtain a return on their capital.

#### Winning the commercial tech innovation race solidifies military overmatch BUT the lead is razor-thin now

Molling 18 [Christian, research director of DGAP, German Council on Foreign Relations. “Defense Innovation and the Future of Transatlantic Strategic Superiority: A German Perspective”. 3/23/18. https://www.gmfus.org/news/defense-innovation-and-future-transatlantic-strategic-superiority-german-perspective]

Technological superiority is key for the West’s military power. But the reality of how to maintain this superiority is changing. Instead of innovation in defense technology coming predominately from national programs linked to the military, innovation is now increasingly generated by the private sector and takes place around the globe. The competition of commercial companies for their consumers has also led to shorter innovation cycles, especially in the area of information technology, and to a geographical diversification of centers of innovation — with new hubs especially in Asia. The ability of non-Western actors to increasingly incorporate civilian innovation into defense applications has led, among other things, to the perception of a growing erosion of conventional deterrence and defense capabilities in relation to rising powers and new actors of international security.

#### Loss of leadership on emerging tech causes nuclear transition wars in Taiwan and Eastern Europe.

Kroenig & Gopalaswamy 18, \*Associate Professor of Government and Foreign Service at Georgetown University and Deputy Director for Strategy in the Scowcroft Center for Strategy and Security at the Atlantic Council. \*\*Director of the South Asia Center at the Atlantic Council. He holds a PhD in mechanical engineering with a specialization in numerical acoustics from Trinity College, Dublin. (Matthew & Bharath, 11-12-2018, "Will disruptive technology cause nuclear war?", *Bulletin of the Atomic Scientists*, https://thebulletin.org/2018/11/will-disruptive-technology-cause-nuclear-war/)

Rather, we should think more broadly about how new technology might affect global politics, and, for this, it is helpful to turn to scholarly international relations theory. The dominant theory of the causes of war in the academy is the “bargaining model of war.” This theory identifies rapid shifts in the balance of power as a primary cause of conflict.

International politics often presents states with conflicts that they can settle through peaceful bargaining, but when bargaining breaks down, war results. Shifts in the balance of power are problematic because they undermine effective bargaining. After all, why agree to a deal today if your bargaining position will be stronger tomorrow? And, a clear understanding of the military balance of power can contribute to peace. (Why start a war you are likely to lose?) But shifts in the balance of power muddy understandings of which states have the advantage.

You may see where this is going. New technologies threaten to create potentially destabilizing shifts in the balance of power.

For decades, stability in Europe and Asia has been supported by US military power. In recent years, however, the balance of power in Asia has begun to shift, as China has increased its military capabilities. Already, Beijing has become more assertive in the region, claiming contested territory in the South China Sea. And the results of Russia’s military modernization have been on full display in its ongoing intervention in Ukraine.

Moreover, China may have the lead over the United States in emerging technologies that could be decisive for the future of military acquisitions and warfare, including 3D printing, hypersonic missiles, quantum computing, 5G wireless connectivity, and artificial intelligence (AI). And Russian President Vladimir Putin is building new unmanned vehicles while ominously declaring, “Whoever leads in AI will rule the world.”

If China or Russia are able to incorporate new technologies into their militaries before the United States, then this could lead to the kind of rapid shift in the balance of power that often causes war.

If Beijing believes emerging technologies provide it with a newfound, local military advantage over the United States, for example, it may be more willing than previously to initiate conflict over Taiwan. And if Putin thinks new tech has strengthened his hand, he may be more tempted to launch a Ukraine-style invasion of a NATO member.

Either scenario could bring these nuclear powers into direct conflict with the United States, and once nuclear armed states are at war, there is an inherent risk of nuclear conflict through limited nuclear war strategies, nuclear brinkmanship, or simple accident or inadvertent escalation.

This framing of the problem leads to a different set of policy implications. The concern is not simply technologies that threaten to undermine nuclear second-strike capabilities directly, but, rather, any technologies that can result in a meaningful shift in the broader balance of power. And the solution is not to preserve second-strike capabilities, but to preserve prevailing power balances more broadly.

#### Licensing hikes and lack of legal clarity decimate AI innovation and threaten broader adoption

Ghafele 21 [Roya, visiting Professor in IP Law with the School of Law of Brunel University, Director of Oxfirst. “The Role of Standards and Patents in Artificial Intelligence”. 3/24/21. https://www.linkedin.com/pulse/role-standards-patents-artificial-intelligence-roya-ghafele?trk=public\_profile\_article\_view]

AI systems label a specific model of innovation that benefits from a wide range of contributors; be they inside or outside the firm. The role of patent law as an organizational principle of this type of ‘networked innovation’ remains yet to be adequately governed. In AI business thrives because of the interconnected framework in which it is embedded in.

The technological transformations enabled have triggered drastic modifications of the nature of economic exchange; making novel ways of doing business possible; not necessarily by owning devices protected by patents, but by owning access to a multitude of devices and facilitating easy interacting and exchange between them. Hence, the classical value proposition, whereby a single invention is protected through patent law and by consequence its owner has the right to exclude third parties from accessing it may risk to harm the nurturing eco system emerging from the standardization process.[1] In that regard, public policy formulation will need to play a major role, so to provide a governance structure that allows all players, be they large or small, to succeed. In particular it will require to study at greater length the role that patents that read on standards will and can play in this promising ecosystem.

This new economic context asks for a differentiated governance structure that assures in particular the functioning interplay between patents and standards. Against this background, this proposal suggests that the role of the FRAND (fair, reasonable and non-discriminatory) commitment should be further studied. Within a UK context in particular, it should be discussed to what extent it would not be appropriate to run another ‘Heargraves Review’ that addresses in greater detail the role of standard essential patents in the novel business environment provided by AI.

The Novel Economic Framework Provided by Artificial Intelligence

AI is still at its early stage and the opportunities it can offer have not even been seized yet to its full extent. At present, we do not even know the many different creative ways in which entrepreneurs will take AI forward. Entrepreneurs are experimenting with leveraging the AI in areas as vast as fashion or primary healthcare. Which businesses will ultimately prove viable remains still to be seen. AI is also big business. Investors expect growth rates as high as 20%.

In AI it is not the single device that creates value, but the ability to connect a sheer infinite number of devices with each other. The worth relies in the continuous expansion of the connection. It is the interconnectivity that creates value, not just the simple ownership of a single device.

At present most connected devices or telecom networks are controlled by humans. However, a key feature of the AI is that devices will be controlled by other devices (the controllers). These again can be classified in various ways, so to reflect the specific features of the controller. In the networked architecture of the AI various devices are at the same time receivers and suppliers of information; making it increasingly difficult to untangle the net of who provides and who receives proprietary technology and who adds value to the technology.

As such, Artificial Intelligence is a prototypical technology space, where Small and Medium Sized Enterprises (SMEs), universities and their spin-outs as well as big corporations alike could constitute a fruitful innovation ecosystem. All these players could thrive in the spirit of collaborative exchange, so to collectively re-invent the future of society, provided that adequate foundations are set for the role of patents within the context of AI.

The Need for Standards

Standard setting will be instrumental for the success of AI. It is only through a common language, the adoption of an interoperable and connected system that the wide spread use of AI can succeed. The process of standardisation will enhance innovation efficiency because it enhances compatibility and increases the credibility of technological solution. This standardisation process will likely be highly beneficial to the widespread dissemination of AI.

The success of a standard is based on its wide dissemination; its value derives from its vast usage. This stands in sharp contrast to patents, which are negative rights built around exclusivity. Contrary to a standard, the value of a patent derives from its strength to exclude to the best extent possible third parties from using it; unless obviously a third party is willing to pay for its usage.

This is why the inherent dilemma between patents and standards is hard to overcome. It is a tension between ‘free access and tight control.[2]’ This tensions is well pronounced in the standard essential patents debate. A patent declared essential to a standard is a strange hybrid that combines patent laws’ negative right’s aspect with a standard’s capability to disseminate a technology as wide as possible. As this formula bears the potential to accrue exceptional market power in the hands of patent owners, while at the same time rendering access to proprietary technology potentially very expensive, the (F)RAND (fair, reasonable and non- discriminatory) promise was introduced.

The (F)RAND rationale at its the core seeks to counter anti-competitive aspects of the licensing of standard essential patents. The (F)RAND commitment obligates SEPs owners to make their patents available on fair, reasonable and non-discriminatory terms. The reason why it does this, is because in the absence of doing so, there is a strong concern that opportunist behaviour can arise and by consequence competition in technology markets can be distorted.

Due to technical standard setting, there often arise only a handful of patent holders in a particular standard. This may be due to first mover advantages or because some firms have the necessary innovation capabilities to capture the patent landscape. It is alleged that these patent holders – having claimed an important position in the patent landscape – can charge abnormally high licensing rates to standard essential patent implementers; a phenomenon known as hold up.

Alongside those undesired consequences, royalty stacking can be another means to prevent downstream innovation. Royalty stacking can be defined as ‘situations in which a single product potentially infringes on many patents, and thus may bear multiple royalty burdens. The term 'royalty stacking' reflects the fact that, from the perspective of the firm making the product in question, all of the different claims for royalties must be added or 'stacked' together to determine the total royalty burden borne by the product if the firm is to sell that product free of patent litigation.’[3]

Research Questions

Nonetheless the (F)RAND commitment translates into an insufficiently complete contract between licensors and licensees. This is because of a built-in ambiguity over what “fair, reasonable and non-discriminatory” means; an ambiguity that is not addressed by means of the policies themselves but is expected to be resolved by “others”. This has led commentators such as Swanson & Baumol to argue that the (F)RAND commitment is of limited value in the absence of objective benchmarks that make clear the concrete terms or range of terms that are deemed to be reasonable and non- discriminatory.[4] This vagueness can lead to abuse and antitrust issues.[5] The situation is furthermore complicated by clandestine licensing markets and the absence of publicly available royalty rates that could be used as benchmarks to determine the value of a royalty rate of a SEPs.

Further issues pertain to a lack of clarity on ownership and distribution of patents that read on standards. Equally, there is lack of consistency as it pertains to the valuation of standard essential patents. Lack of clarity can also lead to a host of other unresolved challenges, such as negotiations taking potentially place in the shadow of the law and potential asymmetrical bargaining power between SEPs owners and downstream innovators.

#### AI innovation solves next gen cyberattacks

Dixon 19 [William, Head of Future Networks and Technology, World Economic Forum, Nicole Eagan, Chief Executive Officer, Darktrace. “3 ways AI will change the nature of cyber attacks”. 6/19/19. https://www.weforum.org/agenda/2019/06/ai-is-powering-a-new-generation-of-cyberattack-its-also-our-best-defence/]

Cyberattacks are becoming ubiquitous and have been recognized as one of the most strategically significant risks facing the world today. In recent years, we have witnessed digital assaults against governments and the owners of critical infrastructure, large private corporations and smaller ones, educational institutions and non-profit organizations. Not only is no sector immune from cyberattacks, the level of sophistication of the threats they face is continually increasing.

The future of cybersecurity will be driven by a new class of subtle and stealthy attackers that has recently emerged. Their aim is not to steal data, but rather to manipulate or change it. There is little doubt that artificial intelligence (AI) will be used by attackers to drive the next major upgrade in cyber weaponry and will ultimately pioneer the malicious use of AI. AI’s fundamental ability to learn and adapt will usher in a new era in which highly-customised and human-mimicking attacks are scalable. ’Offensive AI’ – highly sophisticated and malicious attack code – will be able to mutate itself as it learns about its environment, and to expertly compromise systems with minimal chance of detection.

Prototype-AI attacks: a glimpse into the future

AI-powered cyberattacks are not a hypothetical future concept. All the required building blocks for the use of offensive AI already exist: highly sophisticated malware, financially motivated – and ruthless – criminals willing to use any means possible to increase their return on investment, and open-source AI research projects which make highly valuable information available in the public domain.

One of the most notorious pieces of contemporary malware – the Emotet trojan – is a prime example of a prototype-AI attack. Emotet’s main distribution mechanism is spam-phishing, usually via invoice scams that trick users into clicking on malicious email attachments. The Emotet authors have recently added another module to their trojan, which steals email data from infected victims. The intention behind this email exfiltration capability was previously unclear, but Emotet has recently been observed sending out contextualized phishing emails at scale. This means it can automatically insert itself into pre-existing email threads, advising the victim to click on a malicious attachment, which then appears in the final, malicious email. This insertion of the malware into pre-existing emails gives the phishing email more context, thereby making it appear more legitimate.

Yet the criminals behind the creation of Emotet could easily leverage AI to supercharge this attack. Currently, the message on the final phishing email is usually highly generic - “Please see attached”, for instance - and this may sometimes arouse suspicion. However, by leveraging an AI’s ability to learn and replicate natural language by analysing the context of the email thread, these phishing emails could become highly tailored to individuals. This would mean that an AI-powered Emotet trojan could create and insert entirely customized, more believable phishing emails. Crucially, it would be able to send these out at scale, which would allow criminals to increase the yield of their operations enormously.

The consequences of these developing attack methods could be highly destructive, and even life-threatening. By undermining data integrity, these stealthy attacks cause trust in organizations to falter, and may even cause systemic failures to occur. Imagine an oil rig using faulty geo-prospection data to drill for oil in the wrong place, or a physician making a diagnosis using compromised medical records. As the AI arms race continues, we can only expect this circle of innovation to escalate.

Offensive AI: a paradigm shift in cyberattacks

In 2017, the WannaCry ransomware attack hit organizations in over 150 countries around the world, marking the beginning of a new era in cyberattack sophistication. Its success lay in its ability to move laterally through an organization in a matter of seconds while paralysing hard drives, and the incident went on to inspire multiple copycat attacks. This cycle of “innovation” will continue, and attackers have already moved on to cryptocurrency mining malware, which secretly steals processing power to mine for digital currencies such as bitcoin, and banking trojans, a type of malware that steals financial data while masquerading as a genuine application.

The use of adversarial artificial intelligence will impact the security landscape in three key ways:

1 - Impersonation of trusted users

AI attacks will be highly tailored yet operate at scale. These malwares will be able to learn the nuances of an individual’s behaviour and language by analysing email and social media communications. They will be able to use this knowledge to replicate a user’s writing style, crafting messages that appear highly credible. Messages written by AI malware will therefore be almost impossible to distinguish from genuine communications. As the majority of attacks get into our systems through our inboxes, even the most cyber-aware computer user will be vulnerable.

2 - Blending into the background

Sophisticated threat actors can often maintain a long-term presence in their target environments for months at a time, without being detected. They move slowly and with caution, to evade traditional security controls and are often targeted to specific individuals and organizations. AI will also be able to learn the dominant communication channels and the best ports and protocols to use to move around a system, discretely blending in with routine activity. This ability to disguise itself amid the noise will mean that it is able to expertly spread within a digital environment, and stealthily compromise more devices than ever before. AI malware will also be able to analyse vast volumes of data at machine speed, rapidly identifying which data sets are valuable and which are not. This will save the (human) attacker a great deal of time and effort.

3 - Faster attacks with more effective consequences

Today’s most sophisticated attacks require skilled technicians to conduct research on their target and identify individuals of interest, understand their social network and observe over time how they interact with digital platforms. In tomorrow’s world, an offensive AI will be able to achieve the same level of sophistication in a fraction of the time, and at many times the scale.

Not only will AI-driven attacks be much more tailored and consequently more effective, their ability to understand context means they will be even harder to detect. Traditional security controls will be impotent against this new threat, as they can only spot predictable, pre-modelled activity. AI is constantly evolving and will become ever-more resistant to the categorization of threats that remains fundamental to the modus operandi of legacy security approaches.

Incorporating AI in the digital ecosystem

As we increasingly rely on connected systems and devices, we are quickly developing a highly advanced and heavily connected digital ecosystem. We will require partnerships and capabilities that prioritize winning the strategic battles that count – and safeguard not only economically valuable data held by the public and private sectors, but the confidence in digital systems that underpins social cohesion and democratic institutions.

Investment in new technology will play a critical role in this emerging reality and evolving ecosystem. According to Forrester’s Using AI for Evil report, “mainstream AI-powered hacking is just a matter of time”. Indeed, as we begin to see AI become part of the cyber attacker’s toolkit, the only way that we will be able to combat this malicious use of AI is with AI itself. Therefore, incorporating the technology into this ecosystem is crucial.

Counterattack: Fighting machine with machine

The cybersecurity community is already heavily investing in this new future, and is using AI solutions to rapidly detect and contain any emerging cyberthreats that have the potential to disrupt or compromise key data. Defensive AI is not merely a technological advantage in fighting cyberattacks, but a vital ally on this new battlefield. Rather than rely on security personnel to respond to incidents manually, organizations will instead use AI to fight back against a developing problem in the short term, while human teams will oversee the AI’s decision-making and perform remedial work that improves overall resilience in the long term.

AI-powered attacks will outpace human response teams and outwit current legacy-based defenses; therefore, the mutually-dependent partnership of human and AI will be the bedrock of defense strategies in the future. The battleground of the future is digital, and AI is the undisputed weapon of choice. There is no silver bullet to the generational challenge of cybersecurity, but one thing is clear: only AI can play AI at its own game. The technology is available, and the time to prepare is now.

#### Cyber war goes nuclear

Erik Gartzke &Jon R. Lindsay 17. Gartzke is at the Department of Political Science, University of California, San Diego; Lindsay is at the Munk School of Global Affairs, University of Toronto. 03/01/2017. “Thermonuclear Cyberwar.” Journal of Cybersecurity, vol. 3, no. 1, pp. 37–48.

Cyber warfare is routinely overhyped as a new weapon of mass destruction, but when used in conjunction with actual weapons of mass destruction, severe, and underappreciated, dangers emerge. One side of a stylized debate about cybersecurity in international relations argues that offensive advantages in cyberspace empower weaker nations, terrorist cells, or even lone rogue operators to paralyze vital infrastructure [4–8]. The other side argues that operational difficulties and effective deterrence restrains the severity of cyber attack, while governments and cybersecurity firms have a pecuniary interest in exaggerating the threat [9–13]. Although we have contributed to the skeptical side of this debate [14–16], \*\*\*BEGIN FOOTNOTE\*\*\* 14. Gartzke E. The myth of cyberwar: bringing war in cyberspace back down to earth. Int Security 2013;38:41–73. Google ScholarCrossRef 15 Lindsay JR. Stuxnet and the limits of cyber warfare. Security Stud 2013;22:365–404. Google ScholarCrossRef 16 Lindsay JR. The impact of China on cybersecurity: fiction and friction. Int Security 2014;39:7–47. Google ScholarCrossRef \*\*\*END FOOTNOTE\*\*\* the same strategic logic that leads us to view cyberwar as a limited political instrument in most situations also leads us to view it as incredibly destabilizing in rare situations. In a recent Israeli wargame of a regional scenario involving the United States and Russia, one participant remarked on “how quickly localized cyber events can turn dangerously kinetic when leaders are ill-prepared to deal in the cyber domain” [17]. Importantly, this sort of catalytic instability arises not from the cyber domain itself but through its interaction with forces and characteristics in other domains (land, sea, air, etc.). Further, it arises only in situations where actors possess, and are willing to use, robust traditional military forces to defend their interests. Classical deterrence theory developed to explain nuclear deterrence with nuclear weapons, but different types of weapons or combinations of operations in different domains can have differential effects on deterrence and defense [18, 19]. Nuclear weapons and cyber operations are particularly complementary (i.e. nearly complete opposites) with respect to their strategic characteristics. Theorists and practitioners have stressed the unprecedented destructiveness of nuclear weapons in explaining how nuclear deterrence works, but it is equally, if not more, important for deterrence that capabilities and intentions are clearly communicated. As quickly became apparent, public displays of their nuclear arsenals improved deterrence.x At the same time, disclosing details of a nation’s nuclear capabilities did not much degrade the ability to strike or retaliate, given that defense against nuclear attack remains extremely difficult. Knowledge of nuclear capabilities is necessary to achieve a deterrent effect [20]. Cyber operations, in contrast, rely on undisclosed vulnerabilities, social engineering, and creative guile to generate indirect effects in the information systems that coordinate military, economic, and social behavior. Revelation enables crippling countermeasures, while the imperative to conceal capabilities constrains both the scope of cyber operations and their utility for coercive signaling [21, 22]. The diversity of cyber operations and confusion about their effects also contrast with the obvious destructiveness of nuclear weapons. The problem is that transparency and deception do not mix well. An attacker who hacks an adversary’s nuclear command and control apparatus, or the weapons themselves, will gain an advantage in warfighting that the attacker cannot reveal, while the adversary will continue to believe it wields a deterrent that may no longer exist. Most analyses of inadvertent escalation from cyber or conventional to nuclear war focus on “use it or lose it” pressures and fog of war created by attacks that become visible to the target [23, 24]. In a US–China conflict scenario, for example, conventional military strikes in conjunction with cyber attacks that blind sensors and confuse decision making could generate incentives for both sides to rush to preempt or escalate [25–27]. These are plausible concerns, but the revelation of information about a newly unfavorable balance of power might also cause hesitation and lead to compromise. Cyber blinding could potentially make traditional offensive operations more difficult, shifting the advantage to defenders and making conflict less likely. Clandestine attacks that remain invisible to the target potentially present a more insidious threat to crisis stability. There are empirical and theoretical reasons for taking seriously the effects of offensive cyber operations on nuclear deterrence, and we should expect the dangers to vary with the relative cyber capabilities of the actors in a crisis interaction. Nuclear command and control vulnerability General Robert Kehler, commander of US Strategic Command (STRATCOM) in 2013, stated in testimony before the Senate Armed Services Committee, “we are very concerned with the potential of a cyber-related attack on our nuclear command and control and on the weapons systems themselves” [28]. Nuclear command, control, and communications (NC3) form the nervous system of the nuclear enterprise spanning intelligence and early warning sensors located in orbit and on Earth, fixed and mobile command and control centers through which national leadership can order a launch, operational nuclear forces including strategic bombers, land-based intercontinental missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and the communication and transportation networks that tie the whole apparatus together [29, 30]. NC3 should ideally ensure that nuclear forces will always be available if authorized by the National Command Authority (to enhance deterrence) and never used without authorization (to enhance safety and reassurance). Friendly errors or enemy interference in NC3 can undermine the “always-never” criterion**,** weakening deterrence [31, 32]. NC3 has long been recognized as the weakest link in the US nuclear enterprise. According to a declassified official history, a Strategic Air Command (SAC) task group in 1979 “reported that tactical warning and communications systems … were ‘fragile’ and susceptible to electronic countermeasures, electromagnetic pulse, and sabotage, which could deny necessary warning and assessment to the National Command Authorities” [33]. Two years later, the Principal Deputy Under Secretary of Defense for Research and Engineering released a broad-based, multiservice report that doubled down on SAC’s findings: “the United States could not assure survivability, endurability, or connectivity of the national command authority function” due to: major command, control, and communications deficiencies: in tactical warning and attack assessment where existing systems were vulnerable to disruption and destruction from electromagnetic pulse, other high altitude nuclear effects, electronic warfare, sabotage, or physical attack; in decision making where there was inability to assure national command authority survival and connection with the nuclear forces, especially under surprise conditions; and in communications systems, which were susceptible to the same threats above and which could not guarantee availability of even minimum-essential capability during a protracted war. [33] The nuclear weapons safety literature likewise provides a number of troubling examples of NC3 glitches that illustrate some of the vulnerabilities attackers could, in principle, exploit [34–36]. The SAC history noted that NORAD has received numerous false launch indications from faulty computer components, loose circuits, and even a nuclear war training tape loaded by mistake into a live system that produced erroneous Soviet launch indications [33]. In a 1991 briefing to the STRATCOM commander, a Defense Intelligence Agency targeteer confessed, “Sir, I apologize, but we have found a problem with this target. There is a mistake in the computer code … . Sir, the error has been there for at least the life of this eighteen-month planning cycle. The nature of the error is such that the target would not have been struck” [37]. It would be a difficult operation to intentionally plant undetected errors like this, but the presence of bugs does reveal that such a hack is possible. Following many near-misses and self-audits during and after the Cold War, American NC3 improved with the addition of new safeguards and redundancies. As General Kehler pointed out in 2013, “the nuclear deterrent force was designed to operate through the most extreme circumstances we could possibly imagine” [28]. Yet vulnerabilities remain. In 2010, the US Air Force lost contact with 50 Minuteman III ICBMs for an hour because of a faulty hardware circuit at a launch control center [38]. If the accident had occurred during a crisis, or the component had been sabotaged, the USAF would have been unable to launch and unable to detect and cancel unauthorized launch attempts. As Bruce Blair, a former Minuteman missileer, points out, during a control center blackout the antennas at unmanned silos and the cables between them provide potential surreptitious access vectors [39]. The unclassified summary of a 2015 audit of US NC3 stated that “known capability gaps or deficiencies remain” [40]. Perhaps more worrisome are the unknown deficiencies. A 2013 Defense Science Board report on military cyber vulnerabilities found that while the: nuclear deterrent is regularly evaluated for reliability and readiness … , most of the systems have not been assessed (end-to-end) against a [sophisticated state] cyber attack to understand possible weak spots. A 2007 Air Force study addressed portions of this issue for the ICBM leg of the U.S. triad but was still not a complete assessment against a high-tier threat. [41] If NC3 vulnerabilities are unknown, it is also unknown whether an advanced cyber actor would be able to exploit them. As Kehler notes, “We don’t know what we don’t know” [28]. Even if NC3 of nuclear forces narrowly conceived is a hard target, cyber attacks on other critical infrastructure in preparation to or during a nuclear crisis could complicate or confuse government decision making. General Keith Alexander, Director of the NSA in the same Senate hearing with General Kehler, testified that: our infrastructure that we ride on, the power and the communications grid, are one of the things that is a source of concern … we can go to backup generators and we can have independent routes, but … our ability to communicate would be significantly reduced and it would complicate our governance … . I think what General Kehler has would be intact … [but] the cascading effect … in that kind of environment … concerns us. [28] Kehler further emphasized that “there’s a continuing need to make sure that we are protected against electromagnetic pulse and any kind of electromagnetic interference” [28]. Many NC3 components are antiquated and hard to upgrade, which is a mixed blessing. Kehler points out, “Much of the nuclear command and control system today is the legacy system that we’ve had. In some ways that helps us in terms of the cyber threat. In some cases it’s point to point, hard-wired, which makes it very difficult for an external cyber threat to emerge” [28]. The Government Accountability Office notes that the “Department of Defense uses 8-inch floppy disks in a legacy system that coordinates the operational functions of the nation’s nuclear forces” [42]. While this may limit some forms of remote access, it is also indicative of reliance on an earlier generation of software when security engineering standards were less mature. Upgrades to the digital Strategic Automated Command and Control System planned for 2017 have the potential to correct some problems, but these changes may also introduce new access vectors and vulnerabilities [43]. Admiral Cecil Haney, Kehler’s successor at STRATCOM, highlighted the challenges of NC3 modernization in 2015: Assured and reliable NC3 is fundamental to the credibility of our nuclear deterrent. The aging NC3 systems continue to meet their intended purpose, but risk to mission success is increasing as key elements of the system age. The unpredictable challenges posed by today’s complex security environment make it increasingly important to optimize our NC3 architecture while leveraging new technologies so that NC3 systems operate together as a core set of survivable and endurable capabilities that underpin a broader, national command and control system. [44] In no small irony, the internet itself owes its intellectual origin, in part, to the threat to NC3 from large-scale physical attack. A 1962 RAND report by Paul Baran considered “the problem of building digital communication networks using links with less than perfect reliability” to enable “stations surviving a physical attack and remaining in electrical connection … to operate together as a coherent entity after attack” [45]. Baran advocated as a solution decentralized packet switching protocols, not unlike those realized in the ARPANET program. The emergence of the internet was the result of many other factors that had nothing to do with managing nuclear operations, notably the meritocratic ideals of 1960s counterculture that contributed to the neglect of security in the internet’s founding architecture [46, 47]. Fears of NC3 vulnerability helped to create the internet, which then helped to create the present-day cybersecurity epidemic, which has come full circle to create new fears about NC3 vulnerability. NC3 vulnerability is not unique to the United States. The NC3 of other nuclear powers may even be easier to compromise, especially in the case of new entrants to the nuclear club like North Korea. Moreover, the United States has already demonstrated both the ability and willingness to infiltrate sensitive foreign nuclear infrastructure through operations such as Olympic Games (Stuxnet), albeit targeting Iran’s nuclear fuel cycle rather than NC3. It would be surprising to learn that the United States has failed to upgrade its Cold War NC3 attack plans to include offensive cyber operations against a wide variety of national targets. Hacking the deterrent The United States included NC3 attacks in its Cold War counterforce and damage limitation war plans, even as contemporary critics perceived these options to be destabilizing for deterrence [48]. The best known example of these activities and capabilities is a Special Access Program named Canopy Wing. East German intelligence obtained the highly classified plans from a US Army spy in Berlin, and the details began to emerge publicly after the Cold War. An East German intelligence officer, Markus Wolf, writes in his memoir that Canopy Wing “listed the types of electronic warfare that would be used to neutralize the Soviet Union and Warsaw Pact’s command centers in case of all-out war. It detailed the precise method of depriving the Soviet High Command of its high-frequency communications used to give orders to its armed forces” [49]. It is easy to see why NC3 is such an attractive target in the unlikely event of a nuclear war. If for whatever reason deterrence fails and the enemy decides to push the nuclear button, it would obviously be better to disable or destroy missiles before they launch than to rely on possibly futile efforts to shoot them down, or to accept the loss of millions of lives. American plans to disable Soviet NC3 with electronic warfare, furthermore, would have been intended to complement plans for decapitating strikes against Soviet nuclear forces. Temporary disabling of information networks in isolation would have failed to achieve any important strategic objective. A blinded adversary would eventually see again and would scramble to reconstitute its ability to launch its weapons, expecting that preemption was inevitable in any case. Reconstitution, moreover, would invalidate much of the intelligence and some of the tradecraft on which the blinding attack relied. Capabilities fielded through Canopy Wing were presumably intended to facilitate a preemptive military strike on Soviet NC3 to disable the ability to retaliate and limit the damage of any retaliatory force that survived, given credible indications that war was imminent. Canopy Wing included [50]: “Measures for short-circuiting … communications and weapons systems using, among other things, microscopic carbon-fiber particles and chemical weapons.” “Electronic blocking of communications immediately prior to an attack, thereby rendering a counterattack impossible.” “Deployment of various weapons systems for instantaneous destruction of command centers, including pin-point targeting with precision-guided weapons to destroy ‘hardened bunkers’.” “Use of deception measures, including the use of computer-simulated voices to override and substitute false commands from ground-control stations to aircraft and from regional command centers to the Soviet submarine fleet.” “Us[e of] the technical installations of ‘Radio Free Europe/Radio Liberty’ and ‘Voice of America,’ as well as the radio communications installations of the U.S. Armed Forces for creating interference and other electronic effects.” Wolf also ran a spy in the US Air Force who disclosed that the Americans had managed to penetrate the [Soviet air base at Eberswalde]’s ground-air communications and were working on a method of blocking orders before they reached the Russian pilots and substituting their own from West Berlin. Had this succeeded, the MiG pilots would have received commands from their American enemy. It sounded like science fiction, but, our experts concluded, it was in no way impossible that they could have pulled off such a trick, given the enormous spending and technical power of U.S. military air research. [49] One East German source claimed that Canopy Wing had a $14.5 billion budget for research and operational costs and a staff of 1570 people, while another claimed that it would take over 4 years and $65 million to develop “a prototype of a sophisticated electronic system for paralyzing Soviet radio traffic in the high-frequency range” [50]. Canopy Wing was not cheap, and even so, it was only a research and prototyping program. Operationalization of its capabilities and integration into NATO war plans would have been even more expensive. This is suggestive of the level of effort required to craft effective offensive cyber operations against NC3. Preparation comes to naught when a sensitive program is compromised. Canopy Wing was caught in what we describe below as the cyber commitment problem, the inability to disclose a warfighting capability for the sake of deterrence without losing it in the process. According to New York Times reporting on the counterintelligence investigation of the East German spy in the Army, Warrant Officer James Hall, “officials said that one program rendered useless cost hundreds of millions of dollars and was designed to exploit a Soviet communications vulnerability uncovered in the late 1970's” [51]. This program was probably Canopy Wing. Wolf writes, “Once we passed [Hall’s documents about Canopy Wing] on to the Soviets, they were able to install scrambling devices and other countermeasures” [49]. It is tempting to speculate that the Soviet deployment of a new NC3 system known as Signal-A to replace Signal-M (which was most likely the one targeted by Canopy Wing) was motivated in part by Hall’s betrayal [50]. Canopy Wing underscores the potential and limitations of NC3 subversion. Modern cyber methods can potentially perform many of the missions Canopy Wing addressed with electronic warfare and other means, but with even greater stealth and precision. Cyber operations might, in principle, compromise any part of the NC3 system (early warning, command centers, data transport, operational forces, etc.) by blinding sensors, injecting bogus commands or suppressing legitimate ones, monitoring or corrupting data transmissions, or interfering with the reliable launch and guidance of missiles. In practice, the operational feasibility of cyber attack against NC3 or any other target depends on the software and hardware configuration and organizational processes of the target, the intelligence and planning capacity of the attacker, and the ability and willingness to take advantage of the effects created by cyber attack [52, 53]. Cyber compromise of NC3 is technically plausible though operationally difficult, a point to which we return in a later section. To understand which threats are not only technically possible but also probable under some circumstance, we further need a political logic of cost and benefit [14]. In particular, how is it possible for a crisis to escalate to levels of destruction more costly than any conceivable political reward? Canopy Wing highlights some of the strategic dangers of NC3 exploitation. Warsaw Pact observers appear to have been deeply concerned that the program reflected an American willingness to undertake a surprise decapitation attack: they said that it “sent ice-cold shivers down our spines” [50]. The Soviets designed a system called Perimeter that, not unlike the Doomsday Device in Dr. Strangelove, was designed to detect a nuclear attack and retaliate automatically, even if cut off from Soviet high command, through an elaborate system of sensors, underground computers, and command missiles to transmit launch codes [54]. Both Canopy Wing and Perimeter show that the United States and the Soviet Union took nuclear warfighting seriously and were willing to develop secret advantages for such an event. By the same token, they were not able to reveal such capabilities to improve deterrence to avoid having to fight a nuclear war in the first place. Nuclear deterrence and credible communication Nuclear weapons have some salient political properties. They are singularly and obviously destructive. They kill in more, and more ghastly, ways than conventional munitions through electromagnetic radiation, blast, firestorms, radioactive fallout, and health effects that linger for years. Bombers, ICBMs, and SLBMs can project warheads globally without significantly mitigating their lethality, steeply attenuating the conventional loss-of-strength gradient [55]. Defense against nuclear attack is very difficult, even with modern ballistic missile defenses, given the speed of incoming warheads and use of decoys; multiple warheads and missile volleys further reduce the probability of perfect interception. If one cannot preemptively destroy all of an enemy’s missiles, then there is a nontrivial chance of getting hit by some of them. When one missed missile can incinerate millions of people, the notion of winning a nuclear war starts to seem meaningless for many politicians. As defense seemed increasingly impractical, early Cold War strategists championed the threat of assured retaliation as the chief mechanism for avoiding war [56–59]. Political actors have issued threats for millennia, but the advent of nuclear weapons brought deterrence as a strategy to center stage. The Cold War was an intense learning experience for both practitioners and students of international security, rewriting well-worn realities more than once [60–62]. A key conundrum was the practice of brinkmanship. Adversaries who could not compete by “winning” a nuclear war could still compete by manipulating the “risk” of nuclear annihilation, gambling that an opponent would have the good judgment to back down at some point short of the nuclear brink. Brinkmanship crises—conceptualized as games of Chicken where one cannot heighten tensions without increasing the hazard of the mutually undesired outcome—require that decision makers behave irrationally, or possibly that they act randomly, which is difficult to conceptualize in practical terms [63]. The chief concern in historical episodes of chicken, such as the Berlin Crisis and Cuban Missile Crisis, was not whether a certain level of harm was possible, but whether an adversary was resolved enough, possibly, to risk nuclear suicide. The logical inconsistency of the need for illogic to win led almost from the beginning of the nuclear era to elaborate deductive contortions [64–66]. Both mutually assured destruction (MAD) and successful brinksmanship depend on a less appreciated, but no less fundamental, feature of nuclear weapons: political transparency. Most elements of military power are weakened by disclosure [67]. Military plans are considerably less effective if shared with an enemy. Conventional weapons become less lethal as adversaries learn what different systems can and cannot do, where they are located, how they are operated, and how to devise countermeasures and array defenses to blunt or disarm an attack. In contrast, relatively little reduction in destruction follows from enemy knowledge of nuclear capabilities. For most of the nuclear era, no effective defense existed against a nuclear attack. Even today, with evolving ABM systems, one ICBM still might get through and annihilate the capital city. Nuclear forces are more robust to revelation than other weapons, enabling nuclear nations better to advertise the harm they can inflict. The need for transparency to achieve an effective deterrent is driven home by the satirical Cold War film, Dr. Strangelove: “the whole point of a Doomsday Machine is lost, if you keep it a secret! Why didn’t you tell the world, eh?” During the real Cold War, fortunately, Soviet leaders paraded their nuclear weapons through Red Square for the benefit of foreign military attaches and the international press corps. Satellites photographed missile, bomber, and submarine bases. While other aspects of military affairs on both sides of the Iron Curtain remained closely guarded secrets, the United States and the Soviet Union permitted observers to evaluate their nuclear capabilities. This is especially remarkable given the secrecy that pervaded Soviet society. The relative transparency of nuclear arsenals ensured that the superpowers could calculate risks and consequences within a first-order approximation, which led to a reduction in severe conflict and instability even as political competition in other arenas was fierce [61, 68]. Recent insights about the causes of war suggest that divergent expectations about the costs and consequences of war are necessary for contests to occur [69–73]. These insights are associated with rationalist theories, such as deterrence theory itself. Empirical studies and psychological critiques of the rationality assumption have helped to refine models and bring some circumspection into their application, but the formulation of sound strategy (if not the execution) still requires the articulation of some rational linkage between cause and effect [19, 62, 74]. Many supposedly nonrational factors, moreover, simply manifest as uncertainty in strategic interaction. Our focus here is on the effect of uncertainty and ignorance on the ability of states and other actors to bargain in lieu of fighting. Many wars are a product of what adversaries do not know or what they misperceive, whether as a result of bluffing, secrecy, or intrinsic uncertainty [75, 76]. If knowledge of capabilities or resolve is a prerequisite for deterrence, then one reason for deterrence failure is the inability or unwillingness to credibly communicate details of the genuine balance of power, threat, or interests. Fighting, conversely, can be understood as a costly process of discovery that informs adversaries of their actual relative strength and resolve. From this perspective, successful deterrence involves instilling in an adversary perceptions like those that result from fighting, but before fighting actually begins. Agreement about the balance of power can enable states to bargain (tacit or overt) effectively without needing to fight, forging compromises that each prefers to military confrontation or even to the bulk of possible risky brinkmanship crises. Despite other deficits, nuclear weapons have long been considered to be stabilizing with respect to rational incentives for war(the risk of nuclear accidents is another matter) [77]. If each side has a secure second strike—or even a minimal deterrent with some nonzero chance of launching a few missiles—then each side can expect to gain little and lose much by fighting a nuclear war. Whereas the costs of conventional war can be more mysterious because each side might decide to hold something back and meter out its punishment due to some internal constraint or a theory of graduated escalation, even a modest initial nuclear exchange is recognized to be extremely costly. As long as both sides understand this and understand (or believe) that the adversary understands this as well, then the relationship is stable. Countries engage nuclear powers with considerable deference, especially over issues of fundamental national or international importance. At the same time, nuclear weapons appear to be of limited value in prosecuting aggressive action, especially over issues of secondary or tertiary importance, or in response to aggression from others at lower levels of dispute intensity. Nuclear weapons are best used for signaling a willingness to run serious risks to protect or extort some issue that is considered of vital national interest. As mentioned previously, both superpowers in the Cold War considered the warfighting advantages of nuclear weapons quite apart from any deterrent effect, and the United States and Russia still do. High-altitude bursts for air defense, electromagnetic pulse for frying electronics, underwater detonations for anti-submarine warfare, hardened target penetration, area denial, and so on, have some battlefield utility. Transparency per se is less important than weapon effects for warfighting uses, and can even be deleterious for tactics that depend on stealth and mobility. Even a single tactical nuke, however, would inevitably be a political event. Survivability of the second strike deterrent can also militate against transparency, as in the case of the Soviet Perimeter system, as mobility, concealment, and deception can make it harder for an observer to track and count respective forces from space. Counterforce strategies, platform diversity and mobility, ballistic missile defense systems, and force employment doctrine can all make it more difficult for one or both sides in a crisis to know whether an attack is likely to succeed or fail. The resulting uncertainty affects not only estimates of relative capabilities but also the degree of confidence in retaliation. At the same time, there is reason to believe that platform diversity lowers the risk of nuclear or conventional contests, because increasing the number of types of delivery platforms heightens second strike survivability without increasing the lethality of an initial strike [78]. While transparency is not itself a requirement for nuclear use, stable deterrence benefits to the degree to which retaliation can be anticipated, as well as the likelihood that the consequences of a first strike are more costly than any benefit. Cyber operations, in contrast, are neither robust to revelation nor as obviously destructive. The cyber commitment problem Deterrence (and compellence) uses force or threats of force to “warn” an adversary about consequences if it takes or fails to take an action. In contrast, defense (and conquest) uses force to “win” a contest of strength and change the material distribution of power. Sometimes militaries can change the distribution of information and power at the same time. Military mobilization in a crisis signifies resolve and displays a credible warning, but it also makes it easier to attack or defend if the warning fails. Persistence in a battle of attrition not only bleeds an adversary but also reveals a willingness to pay a higher price for victory. More often, however, the informational requirements of winning and warning are in tension. Combat performance often hinges on well-kept secrets, feints, and diversions. Many military plans and capabilities degrade when revealed. National security involves trade-offs between the goals of preventing war, by advertising capabilities or interests, and improving fighting power should war break out, by concealing capabilities and surprising the enemy. The need to conceal details of the true balance of power to preserve battlefield effectiveness gives rise to the military commitment problem [79, 80]. Japan could not coerce the United States by revealing its plan to attack Pearl Harbor because the United States could not credibly promise to refrain from reorienting defenses and dispersing the Pacific Fleet. War resulted not just because of what opponents did not know but because of what they could not tell each other without paying a severe price in military advantage. The military benefits of surprise (winning) trumped the diplomatic benefits of coercion (warning). Cyber operations, whether for disruption and intelligence, are extremely constrained by the military commitment problem. Revelation of a cyber threat in advance that is specific enough to convince a target of the validity of the threat also provides enough information potentially to neutralize it. Stuxnet took years and hundreds of millions of dollars to develop but was patched within weeks of its discovery. The Snowden leaks negated a whole swath of tradecraft that the NSA took years to develop. States may use other forms of covert action, such as publicly disavowed lethal aid or aerial bombing (e.g. Nixon’s Cambodia campaign), to discretely signal their interests, but such cases can only work to the extent that revelation of operational details fails to disarm rebels or prevent airstrikes [81]. Cyber operations, especially against NC3, must be conducted in extreme secrecy as a condition of the efficacy of the attack. Cyber tradecraft relies on stealth, stratagem, and deception [21]. Operations tailored to compromise complex remote targets require extensive intelligence, planning and preparation, and testing to be effective. Actions that alert a target of an exploit allow the target to patch, reconfigure, or adopt countermeasures that invalidate the plan. As the Defense Science Board points out, competent network defenders: can also be expected to employ highly-trained system and network administrators, and this operational staff will be equipped with continuously improving network defensive tools and techniques (the same tools we advocate to improve our defenses). Should an adversary discover an implant, it is usually relatively simple to remove or disable. For this reason, offensive cyber will always be a fragile capability. [41] The world’s most advanced cyber powers, the United States, Russia, Israel, China, France, and the United Kingdom, are also nuclear states, while India, Pakistan, and North Korea also have cyber warfare programs. NC3 is likely to be an especially well defended part of their cyber infrastructures. NC3 is a hard target for offensive operations, which thus requires careful planning, detailed intelligence, and long lead-times to avoid compromise. Cyberspace is further ill-suited for signaling because cyber operations are complex, esoteric, and hard for commanders and policymakers to understand. Most targeted cyber operations have to be tailored for each unique target (a complex organization not simply a machine), quite unlike a general purpose munition tested on a range. Malware can fail in many ways and produce unintended side effects, as when the Stuxnet code was accidentally released to the public. The category of “cyber” includes tremendous diversity: irritant scams, hacktivist and propaganda operations, intelligence collection, critical infrastructure disruption, etc. Few intrusions create consequences that rise to the level of attacks such as Stuxnet or BlackEnergy, and even they pale beside the harm imposed by a small war. Vague threats are less credible because they are indistinguishable from casual bluffing. Ambiguity can be useful for concealing a lack of capability or resolve, allowing an actor to pool with more capable or resolved states and acquiring some deterrence success by association. But this works by discounting the costliness of the threat. Nuclear threats, for example, are usually somewhat veiled because one cannot credibly threaten nuclear suicide. The consistently ambiguous phrasing of US cyber declaratory policy (e.g. “we will respond to cyber-attacks in a manner and at a time and place of our choosing using appropriate instruments of U.S. power” [82]) seeks to operate across domains to mobilize credibility in one area to compensate for a lack of credibility elsewhere, specifically by leveraging the greater robustness to revelation of military capabilities other than cyber. This does not mean that cyberspace is categorically useless for signaling, just as nuclear weapons are not categorically useless for warfighting. Ransomware attacks work when the money extorted to unlock the compromised host is priced below the cost of an investigation or replacing the system. The United States probably gained some benefits in general deterrence (i.e. discouraging the emergence of challenges as opposed to immediate deterrence in response to a challenge) through the disclosure of Stuxnet and the Snowden leaks. Both revelations compromised tradecraft, but they also advertised that the NSA probably had more exploits and tradecraft where they came from. Some cyber operations may actually be hard to mitigate within tactically meaningful timelines (e.g. hardware implants installed in hard-to-reach locations). Such operations might be revealed to coerce concessions within the tactical window created by a given operation, if the attacker can coordinate the window with the application of coercion in other domains. As a general rule, however, the cyber domain on its own is better suited for winning than warning [83]. Cyber and nuclear weapons fall on extreme opposite sides of this spectrum. Dangerous complements Nuclear weapons have been used in anger twice—against the Japanese cities Hiroshima and Nagasaki—but cyberspace is abused daily. Considered separately, the nuclear domain is stable and the cyber domain is unstable. In combination, the results are ambiguous. The nuclear domain can bound the intensity of destruction that a cyber attacker is willing to inflict on an adversary. US declaratory policy states that unacceptable cyber attacks may prompt a military response; while nuclear weapons are not explicitly threatened, neither are they withheld. Nuclear threats have no credibility at the low end, where the bulk of cyber attacks occur. This produces a cross-domain version of the stability–instability paradox, where deterrence works at the high end but is not credible, and thus encourages provocation, at low intensities. Nuclear weapons, and military power generally, create an upper bound on cyber aggression to the degree that retaliation is anticipated and feared [22, 83, 84]. In the other direction, the unstable cyber domain can undermine the stability of nuclear deterrence. Most analysts who argue that the cyber–nuclear combination is a recipe for danger focus on the fog of crisis decision making [85–87]. Stephen Cimbala points out that today’s relatively smaller nuclear arsenals may perversely magnify the attractiveness of NC3 exploitation in a crisis: “Ironically, the downsizing of U.S. and post-Soviet Russian strategic nuclear arsenals since the end of the Cold War, while a positive development from the perspectives of nuclear arms control and nonproliferation, makes the concurrence of cyber and nuclear attack capabilities more alarming” [88]. Cimbala focuses mainly on the risks of misperception and miscalculation that emerge when a cyber attack muddies the transparent communication required for opponents to understand one another’s interests, redlines, and willingness to use force, and to ensure reliable control over subordinate commanders. Thus a nuclear actor “faced with a sudden burst of holes in its vital warning and response systems might, for example, press the preemption button instead of waiting to ride out the attack and then retaliate” [85]. The outcome of fog of decision scenarios such as these depend on how humans react to risk and uncertainty, which in turn depends on bounded rationality and organizational frameworks that might confuse rational decision making [89, 90]. These factors exacerbate a hard problem. Yet within a rationalist framework, cyber attacks that have already created their effects need not trigger an escalatory spiral. While being handed a fait accompli may trigger an aggressive reaction, it is also plausible that the target’s awareness that its NC3 has been compromised in some way would help to convey new information that the balance of power is not as favorable as previously thought. This in turn could encourage the target to accommodate, rather than escalate. While defects in rational decision making are a serious concern in any cyber–nuclear scenario, the situation becomes even more hazardous when there are rational incentives to escalate. Although “known unknowns” can create confusion, to paraphrase Donald Rumsfeld, the “unknown unknowns” are perhaps more dangerous. A successful clandestine penetration of NC3 can defeat the informational symmetry that stabilizes nuclear relationships. Nuclear weapons are useful for deterrence because they impose a degree of consensus about the distribution of power; each side knows the other can inflict prohibitive levels of damage, even if they may disagree about the precise extent of this damage. Cyber operations are attractive precisely because they can secretly revise the distribution of power. NC3 neutralization may be an expensive and rarified capability in the reach of only a few states with mature signals intelligence agencies, but it is much cheaper than nuclear attack. Yet the very usefulness of cyber operations for nuclear warfighting ensure that deterrence failure during brinksmanship crises is more likely. Nuclear states may initiate crises of risk and resolve to see who will back down first, which is not always clear in advance. Chicken appears viable, ironically, because each player understands that a nuclear war would be a disaster for all, and thus all can agree that someone can be expected swerve. Nuclear deterrence should ultimately make dealing with an adversary diplomatically more attractive than fighting, provided that fighting is costly—as would seem evident for the prospect of nuclear war—and assuming that bargains are available to states willing to accept compromise rather than annihilation. If, however, one side knows, but the other does not, that the attacker has disabled the target’s ability to perceive an impending military attack, or to react to one when it is underway, then they will not have a shared understanding of the probable outcome of war, even in broad terms. Consider a brinksmanship crisis between two nuclear states where only one has realized a successful penetration of the rival’s NC3. The cyber attacker knows that it has a military advantage, but it cannot reveal the advantage to the target, lest the advantage be lost. The target does not know that it is at a disadvantage, and it cannot be told by the attacker for the same reason. The attacker perceives an imbalance of power while the target perceives a balance. A dangerous competition in risk taking ensues. The first side knows that it does not need to back down. The second side feels confident that it can stand fast and raise the stakes far beyond what it would be willing to if it understood the true balance of power. Each side is willing to escalate to create more risk for the other side, making it more likely that one or the other will conclude that deterrence has failed and move into warfighting mode to attempt to limit the damage the other can inflict. The targeted nature and uncertain effects of offensive cyber operations put additional pressure on decision makers. An intrusion will probably disable only part of the enemy’s NC3 architecture, not all of it (which is not only operationally formidable to achieve but also more likely to be noticed by the target). Thus the target may retain control over some nuclear forces, or conventional forces. The target may be tempted to use some of them piecemeal to signal a willingness to escalate further, even though it cannot actually escalate because of the cyber operation. The cyber attacker knows that it has escalation dominance, but when even a minor demonstration by the target can cause great damage, it is tempting to preempt this move or others like it. This situation would be especially unstable if only second strike but not primary strike NC3 was incapacitated. Uncertainty in the efficacy of the clandestine penetration would discount the attacker’s confidence in its escalation dominance, with a range of possible outcomes. Enough uncertainty would discount the cyber attack to nothing, which would have a stabilizing effect by returning the crisis to the pure nuclear domain. A little bit of uncertainty about cyber effectiveness would heighten risk acceptance while also raising the incentives to preempt as an insurance measure. Adding allies into the mix introduces additional instability. An ally emboldened by its nuclear umbrella might run provocative risks that it would be much more reluctant to embrace if it was aware that the umbrella was actually full of holes. Conversely, if the clandestine advantage is held by the state extending the umbrella, allies could become unnerved by the willingness of their defender to run what appear to be outsize risks, oblivious of the reasons for the defender’s confidence, creating discord in the alliance and incentives for self-protective action, leading to greater uncertainty about alliance solidarity. The direction of influence between the cyber and nuclear realms depends to large degree on which domain is the main arena of action. Planning and conducting cyber operations will be bounded by the ability of aggressors to convince themselves that attacks will remain secret, and by the confidence of nuclear nations in their invulnerability. Fears of cross-domain escalation will tend to keep instability in cyberspace bounded. However, if a crisis has risen to the point where nuclear threats are being seriously considered or made, then NC3 exploitation will be destabilizing. Brinksmanship crises seem to have receded in frequency since the Cuban Missile Crisis but may be more likely than is generally believed. President Vladimir Putin of Russia has insinuated more than once in recent years that his government is willing to use tactical nuclear weapons if necessary to support his policies. Cyber power and nuclear stability Not all crises are the same. Indeed, their very idiosyncrasies create the uncertainties that make bargaining failure more likely [75]. So far our analysis would be at home in the Cold War, with the technological novelty of cyber operations. Yet not every state has the same cyber capabilities or vulnerabilities. Variation in cyber power relations across dyads should be expected to affect the strategic stability of nuclear states. The so-called second nuclear age differs from superpower rivalry in important ways [91]. There are fewer absolute numbers of warheads in the world, down from a peak of over 70 000 in the 1980s to about 15 000 today (less than 5000 deployed), but they are distributed very unevenly [92]. The United States and Russia have comparably sized arsenals, each with a fully diversified triad of delivery platforms, while North Korea only has a dozen or so bombs and no meaningful delivery system (for now). China, India, Pakistan, Britain, France, and Israel have modest arsenals in the range of several dozen to a couple hundred weapons, but they have very different doctrines, conventional force complements, domestic political institutions, and alliance relationships. The recent nuclear powers lack the hard-won experience and shared norms of the Cold War to guide them through crises, and even the United States and Russia have much to relearn. Cyber warfare capacity also varies considerably across contemporary nuclear nations. The United States, Russia, Israel, and Britain are in the top tier, able to run sophisticated, persistent, clandestine penetrations. China is a uniquely active cyber power with ambitious cyber warfare doctrine, but its operational focus is on economic espionage and political censorship, resulting in less refined tradecraft and more porous defenses for military purposes [16]. France, India, and Pakistan also have active cyber warfare programs, while North Korea is the least developed cyber nation, depending on China for its expertise [93]. It is beyond the scope of this article to assess crisis dyads in detail, and data on nuclear and cyber power for these countries are shrouded in secrecy. Here, as a way of summing up the arguments above, we offer a few conjectures about how stylized aspects of cyber power affect crisis stability through incentives and key aspects of decision making. We do not stress relative nuclear weapon capabilities on the admittedly strong (and contestable) assumption that nuclear transparency in the absence of cyber operations would render nuclear asymmetry irrelevant for crisis bargaining because both sides would agree about the terrible consequences of conflict [94]. We also omit domestic or psychological variables that affect relative power assessments, although these are obviously important. Even if neither India nor Pakistan have viable cyber–nuclear capabilities, brinksmanship between them is dangerous for many other reasons, notably compressed decision timelines, Pakistan’s willingness to shoot first, and domestic regime instability. Our focus is on the impact of offensive and defensive cyber power on nuclear deterrence above and beyond the other factors that certainly play a role in real-world outcomes. First, does the cyber attacker have the organizational capacity, technical expertise, and intelligence support to “compromise” the target’s NC3? Can hackers access critical networks, exploit technical vulnerabilities, and confidently execute a payload to disrupt or exploit strategic sensing, command, forces, or transport capacity? The result would be some tangible advantage for warfighting, such as tactical warning or control paralysis, but one that cannot be exercised in bargaining. Second, is the target able to “detect” the compromise of its NC3? The more complicated and sensitive the target, the more likely cyber attackers are to make a mistake that undermines the intrusion. Attribution is not likely to be difficult given the constricted pool of potential attackers, but at the same time the consequences of misattributing “false flag” operations could be severe [95]. At a minimum, detection is assumed to provide information to the target that the balance of power is perhaps not as favorable as imagined previously. We assume that detection without an actual compromise is possible because of false positives or deceptive information operations designed to create pessimism or paranoia. Third, is the target able to “mitigate” the compromise it detects? Revelation can prompt patching or network reconfiguration to block an attack, but this assumption is not always realistic. The attacker may have multiple pathways open or may have implanted malware that is difficult to remove in tactically meaningful timelines. In such cases the cyber commitment problem is not absolute, since the discovery of the power to hurt does not automatically disarm it. Successful mitigation here is assumed to restore mutual assessments of the balance of power to what they would be absent the cyber attack. Table 1 shows how these factors combine to produce different deterrence outcomes in a brinksmanship (chicken) crisis. If there is no cyber compromise and the target detects nothing (no false positives) then we have the optimistic ideal case where nuclear transparency affords stable “deterrence.” Transparency about the nuclear balance, including the viability of secure second strike forces, provides strategic stability. We also expect this box to describe situations where the target has excellent network defense capabilities and thus the prospect of defense, denial or deception successfully deters any attempts to penetrate NC3. This may resemble the Cold War situation (with electronic warfare in lieu of cyber), or even the present day US–Russia dyad, where the odds of either side pulling off a successful compromise against a highly capable defender are not favorable. Alternately the attack may be deemed risky enough to encourage serious circumspection. However, the existence of Canopy Wing does not encourage optimism in this regard. [[TABLE 1 OMITTED]] Conversely, if there is a compromise that goes undetected, then there is a heightened risk of “war” because of the cyber commitment problem. This box may be particularly relevant for asymmetric dyads such as the United States and North Korea, where one side has real cyber power but the other side is willing to go to the brink where it believes, falsely, that it has the capability to compel its counterpart to back down. Cyber disruption of NC3 is attractive for damage limitation should deterrence fail, given that the weaker state’s diminutive arsenal makes damage limitation by the stronger state more likely to succeed. The dilemma for the stronger state is that the clandestine counterforce hedge, which makes warfighting success more likely, is precisely what makes deterrence more likely to fail. The United States would face similar counterforce dilemmas with other dyads like China or even Russia, although even a strong cyber power should be more circumspect when confronted with an adversary with a larger/more capable nuclear and conventional arsenal. More complex and cyber savvy targets, moreover, are more likely to detect a breach in NC3, leading to more ambiguous outcomes depending on how actors cope with risk and uncertainty. Paradoxically, confidence in cyber security may be a major contributor to failure; believing one is safe from attack increases the chance that an attack is successful. If the successful compromise is detected but not mitigated, then the target learns that the balance of power is not as favorable as thought. This possibility suggests fleeting opportunities for “coercion” by revealing the cyber coup to the target in the midst of a crisis while the cyber attacker maintains or develops a favorable military advantage before the target has the opportunity to reverse or compensate the NC3 disruption. Recognizing the newly transparent costs of war, a risk neutral or risk averse target should prefer compromise. The coercive advantages (deterrence or compellence) of a detected but unmitigated NC3 compromise will likely be fleeting. This suggests a logical possibility for creating a window of opportunity for using particular cyber operations that are more robust to revelation as a credible signal of superior capability in the midst of a crisis. It would be important to exploit this fleeting advantage via other credible military threats (e.g. forces mobilized on visible alert or deployed into the crisis area) before the window closes. One side may be able gain an unearned advantage, an opportunity for coercion via a “bluff,” by the same window-of-opportunity logic. A target concerned about NC3 compromise will probably have some network monitoring system and other protections in place. Defensive systems can produce false positives as a result of internal errors or a deception operation by the attacker to encourage paranoia. It is logically possible that some false positives would appear to the target to be difficult to mitigate. In this situation, the target could believe it is at a disadvantage, even though this is not in fact the case. This gambit would be operationally very difficult to pull off with any reliability in a real nuclear crisis. Cyber–nuclear coercion and bluffing strategies are fraught with danger. Detection without mitigation might put a risk-acceptant or loss-averse target into a “use-lose” situation, creating pressures to preempt or escalate. The muddling of decision-making heightens the risk of accidents or irrational choices in a crisis scenario. Worry about preemption or accident then heightens the likelihood that the initiator will exercise counterforce options while they remain available. These pressures can be expected to be particularly intense if the target’s detection is only partial or has not revealed the true extent of damage to its NC3 (i.e. the target does not realize it has already lost some or all of what it hopes to use). These types of scenarios are most usually invoked in analyses of inadvertent escalation [23–27]. The essential distinction between “use-lose” risks and “war” in this typology is the target’s knowledge of some degree of NC3 compromise. Use-lose and other cognitive pressures can certainly result in nuclear war, since the breakdown of deterrence leads to the release of nuclear weapons, but we distinguish these outcomes to highlight the different decision making processes or rational incentives at work. A “spiral” of mistrust may emerge if one side attempts a compromise but the defender detects and mitigates it. Both sides again have common mutual estimates of the relative balance of power, which superficially resembles the “deterrence” case because the NC3 compromise is negated. Unfortunately, the detection of the compromise will provide the target with information about the hostile intentions of the cyber attacker. This in turn is likely to exacerbate other political or psychological factors in the crisis itself or in the crisis-proneness of the broader relationship. The strange logical case where there is no compromise but one is detected and mitigated could result from a false positive misperception (including a third-party false flag operation) that could conflict spiraling [96, 97]. The bluff and coercion outcomes are also likely to encourage spiraling behavior once the fleeting bargaining advantage dissipates or is dispelled (provided anyone survives the interaction). The risk of crisis instability is not the same for all dyads. It is harder to compromise the NC3 of strong states because of the redundancy and active defenses in their arsenal. Likewise, strong states are better able to compromise the NC3 of any states but especially of weaker states, because of strong states’ greater organizational capacity and expertise in cyber operations. Stable deterrence or MAD is most likely to hold in mutually strong dyads (e.g. the United States and the Soviet Union in the Cold War or Russia today to a lesser extent). Deterrence is slightly less likely in other equally matched dyads (India–Pakistan) where defensive vulnerabilities create temptations but offensive capabilities may not be sufficient to exploit them. Most states can be expected to refrain from targeting American NC3 given a US reputation for cyber power (a general deterrence benefit enhanced by Stuxnet and Snowden). The situation is less stable if the United States is the attacker. The most dangerous dyad is a stronger and a weaker state (United States and North Korea or Israel and Iran). Dyads involving strong and middle powers are also dangerous (United States and China**).** The stronger side is tempted to disrupt NC3 as a warfighting hedge in case deterrence breaks down, while the weaker but still formidable side has a reasonable chance at detection. The marginally weaker may also be tempted to subvert NC3, particularly for reconnaissance; the stronger side is more likely to detect and correct the intrusion but will be alarmed by the ambiguity in distinguishing intelligence collection from attack planning [98]. In a brinksmanship crisis between them, windows for coercion may be available yet fleeting, with real risks of spiral and war**.**

#### IoT innovation will be gutted by patent holdup – antitrust solves

Morton 16 [Fiona Scott Morton, Theodore Nierenberg Professor at Yale School of Management. Carl Shapiro, Former Director of the Institute of Business and Economic Research at UC Berkeley, Professor of the Graduate School at the Haas School of Business and the Department of Economics at the University of California at Berkeley. “Patent Assertions: Are We Any Closer to Aligning Reward to Contribution?”. 2016. https://www.journals.uchicago.edu/doi/full/10.1086/684987#\_i22]

However, our overall conclusions regarding SEPs are more mixed. Policy and legal changes that have reduced the ability of SEP owners to engage in patent holdup appear to have stalled out, especially as regards reform of the IPR rules at SSOs other than the IEEE. If so, this could have important effects on innovation and efficiency. For example, the “Internet of Things” is a new and growing area where royalty stacking and patent holdup appear to be very real dangers. Devices of all sorts, from thermostats to railroad cars to refrigerators, are being given connectivity using standards developed by SSOs. The price of those chips, and whether the IP contained in them costs $5 or $0.50 or $0.005, will determine the nature of new applications and the rate of adoption.

Failure to prevent patent holdup relating to tomorrow’s information technology and communications standards is likely to cause significant social welfare loss in the years ahead. If new and more effective private solutions relating to standard setting do not emerge to promote innovation and protect consumers, antitrust enforcement is one of the only remaining remedies that seems feasible.

V. Conclusions

Over the past five years, the rewards provided to patent owners in the United States have become more closely matched with the value of the technology they contribute. When rewards and contributions are aligned, economic efficiency is promoted because investments into developing new technologies are commensurate with benefits. These changes have come from legislation, the federal courts, and policy statements and enforcement actions by regulators of various types. However, at this juncture, we see a substantial gap persisting between the ability of some patent owners to monetize their patents and the contributions provided by the technology underlying those patents. With the “Internet of Things” poised to create economic growth, this is a problem worthy of further research and policy attention.

#### Solves extinction through resource efficiency

Maheswaran 20 [Mohan, Forbes Council Member on Forbes Technology Council. “Why The IoT Will Save Our Natural Resources”. https://www.forbes.com/sites/forbestechcouncil/2020/02/21/why-the-iot-will-save-our-natural-resources/?sh=49a24ad51be5]

Since the 18th century, industrialization and overconsumption have contributed to the rapid depletion of nature's raw materials. Smart connectivity carves a path for us to be more efficient in our use of these materials, effectively reducing the rate at which we are consuming and wasting natural resources.

According to the United Nations' Global Resources Outlook 2019 report, the worldwide use of natural resources has more than tripled in almost 50 years, with nonmetallic minerals witnessing a fivefold increase and fossil fuel use increasing over 45% over the same time frame.

To ensure that future generations have access to these resources and for the long-term survival of our planet, we must focus our efforts on managing the use of resources like water, gas and coal.

The emerging role of the IoT.

There are many IoT options for preserving natural resources, from tracking the bee population to reducing global carbon remissions, but implementing solutions into existing infrastructure can require a high investment in terms of resources like time and money.

IoT solutions with key capabilities such as long range and low power are more reliable and effective in enabling smart cities, smart enterprises and smart homes to manage resources more efficiently. Their emergence is enabling villages, cities and countries to rapidly and cost-effectively plan and transform themselves into smart communities that prepare a long-term vision for their people and their associated resources.

Long-range, low-power devices also remove the obstacle of capturing incorrect data and/or inaccurate analytics, as these devices provide data in real time that can assist with decision-making processes that help to conserve both exhaustible and inexhaustible resources. Such decisions might include the shutting down of pipelines due to leaks, the monitoring of excess resource use or simply the alert of a potential loss of valuable resources due to imperfect environmental conditions.

For example, according to a survey conducted by the Energy Information Administration, a large commercial building in the U.S. uses an average of at least 20,000 gallons of water per day, while statistics published by the Environmental Protection Agency show that each American uses approximately 88 gallons of water per day. The concern of water shortage is rising so much that in 2014, the Government Accountability Office noted that 40 out of 50 U.S. states expected water shortages over the next 10 years.

Smart water management systems can provide commercial buildings with status updates on how much water is used by the minute and can help predict where water issues could occur while providing valuable, timely information. For corporations with multiple locations, this approach to managing water can help save millions of gallons of water annually, as well as millions of dollars in overhead operation costs.

Embedding the IoT into the land, sea and sky.

Companies like Costco as well as cities across the world are deploying LoRa-enabled sensors to help preserve raw materials and natural resources. High water usage is a common concern among farmers. To maximize the growth of crop yields and to reduce water usage, some farmers are installing LoRa-based sensors to monitor water in real time.

Sensoterra, a technology company offering low-cost wireless solutions for real-time soil moisture measurement for commercial farms, partnered with my company to integrate LoRa-based sensors in its agriculture systems to reduce up to 30% of water usage in commercial farms, including potato and almond orchards. Reducing water usage on commercial farms helps conserve limited water supplies while allowing the farmers to focus more on their businesses.

Additionally, city and park authorities use movement sensors on bridges, roads and buildings to get real-time alerts in case of an impending natural disaster such as an earthquake. Another of our customers, handheld device company Beartooth, uses IoT sensors and enables users to talk, text and locate friends in a cellular network outage without the need for Wi-Fi, and the LoRa-based device has low power consumption.

Air pollution also poses a major risk to our environment and health. According to the World Health Organization, exposure to outdoor air pollution causes 4.2 million deaths per year. IoT sensors are able to collect air quality data to determine the areas causing dangerous air pollution in cities and facilitate the analytical management of suitable air quality control programs. Consumers and businesses have already realized the significance of collecting data and synthesizing it into meaningful patterns of information.

I believe the transition to intelligent information systems will be crucial as global environmental challenges accelerate. Deploying IoT solutions with LoRa-based sensors, together with edge network analytics, makes it possible to install intelligent sensor systems without requiring labor-intensive sensor battery replacements.

In general, deploying an IoT solution is usually complex. Currently, there are limited end-to-end solutions that are available as "out-of-the-box" solutions. Systems integrators are the proper companies to turn to for providing such end-to-end solutions and making sure the relevant back-end IT systems are integrated such that existing processes will benefit from the new IoT data captured from sensors.

One challenge for companies who would like to implement LoRaWAN is that not all countries have public LoRaWAN network providers with nationwide coverage. Some companies prefer to deploy applications that can connect to a broad public, nationwide coverage. However, users are also able to use a private LoRaWAN network, and some customers actually prefer to use a private network. Customers are able to manage the private network by themselves or have third parties like systems integrators manage the network. Such private networks even have benefits compared to public networks when it comes to flexibly deploying LoRa gateways wherever coverage is needed, whether it's indoors or outdoors.

The proliferation of long-range, ultra-low-power IoT sensors and networks is potentially the most important technology innovation in generations that will play a huge role in the buildout of smart cities that will help preserve our future natural resources.

#### Resource wars are the most likely cause of global conflict – scarcity is a conflict multiplier

Lehane 17 [Sinéad Lehane is research manager for Future Directions International’s Global Food and Water Crises Research program. Her current research projects include Australia’s food system and water security in the Tibetan Plateau region. Shaping Conflict in the 21st Century—The Future of Food and Water Security. February 2, 2017. www.hidropolitikakademi.org/shaping-conflict-in-the-21st-century-the-future-of-food-and-water-security.html]

In his book, The Coming Famine, Julian Cribb writes that the wars of the 21st century will involve failed states, rebellions, civil conflict, insurgencies and terrorism. All of these elements will be triggered by competition over dwindling resources, rather than global conflicts with clearly defined sides. More than 40 countries experienced civil unrest following the food price crisis in 2008. The rapid increase in grain prices and prevailing food insecurity in many states is linked to the outbreak of protests, food riots and the breakdown of governance. Widespread food insecurity is a driving factor in creating a disaffected population ripe for rebellion. Given the interconnectivity of food security and political stability, it is likely food will continue to act as a political stressor on regimes in the Middle East and elsewhere. Addressing Insecurity Improving food and water security and encouraging resource sharing is critical to creating a stable and secure global environment. While food and water shortages contribute to a rising cycle of violence, improving food and water security outcomes can trigger the opposite and reduce the potential for conflict. With the global population expected to reach 9 billion by 2040, the likelihood of conflict exacerbated by scarcity over the next century is growing. Conflict is likely to be driven by a number of factors and difficult to address through diplomacy or military force. Population pressures, changing weather, urbanization, migration, a loss of arable land and freshwater resources are just some of the multi-layered stressors present in many states. Future inter-state conflict will move further away from the traditional, clear lines of military conflict and more towards economic control and influence.

### 2

#### The United States federal government should substantially increase antitrust prohibitions on standard essential patent holders that engage in anticompetitive licensing practices.

#### Applying antitrust to FRAND violations including refusals to deal solves collapsed innovation and market competition

Greene 19 [Kyle, J.D. Candidate Columbia Law. Columbia Business Law Review Writer and Honors intern @SEC. “Standard Essential Patents and Antitrust Law”. November 2019. https://journals.library.columbia.edu/index.php/CBLR/article/view/5120/2370]

III.ANTITRUST LIABILITY: WHEN SEP HOLDERS REFUSE TO DEAL

A.Reasons for a Presumption of Antitrust Liability

The affirmative case for a presumption of antitrust liability when a SEP holder refuses to deal with a prospective standard implementer in violation of its FRAND commitments proceeds, from the above discussion, as follows: (1) the standard setting process is of vital importance for many industries and technologies, but confers incredible and abusable power to SEP holders,141(2) despite Trinko, the Supreme Court has not ruled out either the essential facilities doctrine or an intent-based inquiry for a Sherman Act Section 2 refusal to deal case,142and (3) the leading circuit court decisions that consider refusals to deal by patent holders in general do not offer policy or legal objections which support an argument against presuming antitrust liability when the patent holder owns a standard essential patent.143As a result, a refusal to deal by an SEP holder is dangerously anticompetitive conduct that is—on its face—exactly the sort of conduct which has been, and should be, condemned by the antitrust laws.

Standards are crucial to the modern economy. But the factors that make standards valuable, even necessary, in so many industries are the same factors that lead to SEP holders occupying a dangerous position from the perspective of the antitrust laws: standards help coordinate disparate technologies and products from many firms into a consolidated, cohesive set. This enables interoperability, access, and the accumulation of massive network effects.144Given those valuable network effects, SEP holders who engage with the process of standards development and make FRAND commitments become ex post gatekeepers—regardless of their ex ante position in the market—to the implementation of standards and thereby control access to the entire market. If an SEP holder then violates its FRAND commitments by refusing to deal, the SEP holder has exhibited all of the markers of a Section 2 case that results in liability.

First, the SEP holder has acquired control over access to an essential facility (the relevant standard) and then denied competitors access to that facility (by refusing to license a patent necessary to fulfill the standard).145Although the same refusal to license its patent might have been acceptable if the SEP holder was not part of the SSO and the patent was not part of the standard, the market power and bargaining position of the patent holder is fundamentally altered when a patent becomes standard essential. This is reminiscent of Associated Press, except here the coordinating organization attempted to prevent the abuse of the SEP holder’s position by securing FRAND commitments from them.146It is therefore the deviant behavior of the SEP holder, not the SSO itself, that is to blame for the anticompetitive harm.

Second, the salient facts of a refusal to deal by an SEP holder are closely analogous to those of Aspen Skiing. The defendant monopolist was found liable in Aspen Skiing for two primary reasons: it had terminated a prior course of voluntary dealing and it had sacrificed short-run profits in order to harm a competitor.148Although an SEP holder may not have previously dealt with any given prospective standard implementer, the SEP holder’s participation in the SSO and its FRAND commitments constitute a prior course of dealing with allfellow participants and implementers of the standard. The subsequent violation of contractual FRAND commitments is a clear termination of that course of dealing. Additionally, licensing an SEP at a reasonable rate is, in isolation,obviously profitable for an SEP holder in the short-run (compared to an alternative world where the SEP holder earns no licensing revenue). The failure to profitably license at a reasonable rate raises, as it did in Aspen Skiing, a strong inference that the goal of the refusal to deal is anticompetitive.149Even if the conduct in Aspen Skiingis at the outer edge of Section 2 liability, it still falls within the boundaries of Section 2 liability. A FRAND-violating refusal to deal by an SEP holder, resembling the important features of Aspen Skiingas closely as it does, must also fall within that boundary.150

Finally, the burden of an inquiry into the intent of the SEP holder should be exactly reversed from what it was when the circuit courts considered refusals to license intellectual property more broadly. In those circuit court cases, the business justifications of the rights holders were treated as presumptively valid and defensible in light of the point of the intellectual property laws. Rather than appearing to be anticompetitive on its face, a refusal to deal seemed well within the ambit of reasonable, legislatively-permitted behavior by a firm holding valuable patents or copyrights. But the inclusion of a patent in a standard is transformative for a firm, and the firm becomes something much more than just another intellectual property rights holder. At that point, the subsequent violation of FRAND commitments is actually anticompetitive on its face: it loudly proclaims that the SEP holder has recognized its power in the market and decided to turn that power toward damaging the competitive process that it had previously contracted to protect and promote. PATENTS1119The presumption of antitrust liability for a SEP holder suggests that it should be presumed to not have a valid business justification when refusing to deal. The SEP holder would have the burden of rebutting this presumption before the court and substantiating a legitimate, procompetitive business justification for the refusal to deal.

B.Contrary Considerations

The strongest counterargument against presumptive antitrust liability for SEP holders who violate their FRAND commitments with a refusal to deal—and against any version of the essential facilities doctrine—is based in the fear that this approach to competition policy would lead to reduced investment and innovation.152The general form of the argument is that forcing firms to deal with competitors might increase competition in the short-run, but in the long-run it will reduce the incentive to innovate153because innovative firms will know that they will not be able to fully capitalize on a successful investment.154This concern is particularly strong in the realm of intellectual property. After all, these rights were specifically developed to give innovators and creators the ability to exclude others from copying and devaluing their work.155This increases the value of intellectual property to the owner and, in turn, encourages the creation of more intellectual property. Without the power to exclude competitors, a patent holder would have very little reason to take the risks and make the investments needed in order to develop a new idea or technology.

However, arguments of this form are often true at the extreme but not necessarily correct at the margin.156The complete lack of protection for intellectual property rights would be devastating for creators and inventors and would drastically reduce the incentives to innovate. But this does not mean that reducing the protections for intellectual property will always reduce the incentives for innovation to a greater degree than it will have positive, structural effects on the market.157To the contrary, this Note argues that antitrust liability will have positive, structural effects on the market which benefit competition and innovation more than the reduced incentives will harm competition and innovation. Still, this debate is fertile ground for further discussion, inquiry, and empirical research. Another possible objection to antitrust liability—this time on statutory rather than policy grounds—is that the Patent Act158created immunity for unilateral refusals to license patents.159The Federal Circuit adopted a version of this approach in CSU v. Xerox. The court based its decision, in part, on an inference that, “[t]he patentee’s right to exclude is further supported by [S]ection 271(d) of the Patent Act.”160But this view is not widely held by academics,161other courts,162or the DOJ or FTC.163A full examination of the Patent Act is outside the scope of this Note, but the idea that § 271(d) created broad antitrust immunity for intellectual property owners is a relatively fringe view.

Finally, it could be argued that the Supreme Court has recently expressed a reluctance to endorse either the essential facilities doctrine or the logic of Aspen Skiing. So, a new presumption of antitrust liability grounded in their fruitful combination is extremely unlikely in the near term. This argument is probably correct. But the question of what the law affords and what should be done with that affordance is separate from the question of what a particular court is likely to do. Presumptive antitrust liability for SEP holders may be wise today, unlikely tomorrow, and a reality the day after.

IV.CONCLUSION

This Note does not argue that an SEP holder should be prevented from benefiting when its patents lend value to a standard; this Note argues that an SEP holder should be prevented from benefiting when it attempts to abuse its position as a gatekeeper to a vital, collaborative standard. A presumption of antitrust liability for an SEP holder who refuses to deal in violation of its FRAND commitments accomplishes this balance. In some dynamic markets, the returns to innovation and the cycle of creative destruction are enough to ensure competition and progress.164But in standards-driven markets that derive their value from the coordinated creation of networks, the antitrust laws are an important bulwark of continued competition and growth.165They should be used accordingly. 164See Katz & Shelanski, supra note 156,at 5 (“Creative destruction means that a firm’s acquisition of possession of market power may be fleeting and that firms must protect such power through ongoing innovation efforts. Under constant pressure from actual and potential innovators, the incumbent firm itself produces better products on better terms for consumers....”). 165See Lao, supra note 22,at 562 (“Combined with a closed network system, network effects can, therefore, effectively create or reinforce existing entry barriers, insulate the monopolist from competition, and lock consumers into the existing technology.”).

### 3

#### Advantage Two is China

#### Influence in standard setting organizations (SSOs) determines future competitiveness, national security, and global tech norms. China understands their importance and is establish themselves as a standards power.

Hormats 21 [Robert D. Hormats, Former undersecretary of State for economic growth, energy and the environment, 2009-13, managing director of Tiedemann Advisors, a New York-headquartered financial firm “Who will set standards for 21st century technologies — the US or China?” 6/3/21. https://thehill.com/opinion/technology/556047-who-will-set-standards-for-21st-century-technologies-the-us-or-china]

The standards that are set will, in some cases, have a major impact in determining which nation’s products will enjoy growing opportunities in international markets. In others, they will regulate how well various countries’ products and services work or interact with those of other countries. In a number they will determine whether certain American products or services have an advantage or disadvantage in the global markets. And they have the potential to set broadly accepted international ethical and normative codes and conventions for growing industries, rather than letting these standards evolve in a nationalistic and fragmented way.

Such standards can affect the ways in which new technologies affect our societies, our security, our economies and our lives for decades to come. They can determine whether these technologies are used in constructive or destructive ways by countries and non-state actors.

Many of the global standards currently in place were set over the years by international “standards-setting” bodies. Many currently existing fora likely will seek to take on the task of determining standards for future technologies, although for certain rapidly emerging and dramatically new technologies no agreed standard-setting institutions yet exist. Where there are groups constituted or charged to take on these tasks, countries that are most effective at negotiating within them or developing coalitions of other members that support their objectives will have an outsized impact on the final rules or norms.

The Chinese understand this very well. They have proven to be effective negotiators in such meetings over the years, and are adept at mobilizing support from many parts of the world; the Belt and Road Initiative and China’s close political and commercial ties in large numbers of countries in the developing world have helped support its objectives. Beijing also has put together a long-term standardization reform plan and a five-year plan for standardization. As the draft Endless Frontier Act points out, China wants to establish itself as a “standards power” and dramatically strengthen its participation in international standards-setting organizations. The U.S. needs to have bold, long-term objectives as well — and a portion of this act is aimed at that. We need also to be a “standards power” in order to serve our global economic and trade interests and ensure that new technologies are ethically and safely utilized.

The legislation emphasizes how critical it is for the U.S. and its allies to participate vigorously in the development of standards that underpin fair international competition and constructive use of advanced technologies. U.S. leadership in standards development is particularly crucial for emerging technologies where there currently are no, or few, agreed international rules and little consensus on what constitutes ethical or safe practices or norms. A strong U.S. role in standards-setting will improve prospects for American competitiveness, the constructive use of certain advanced technologies that could be mobilized for a multitude of purposes, and national security.

#### US ability to influence SSOs is rapidly declining because of FRAND collapse

Hovenkamp 20 [Herbert, James B. Dinan University Professor, University of Pennsylvania Law School and The Wharton School. ‘’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.

#### Only reversing royalty hikes maintains US SSO leadership

Sokol 16 [Daniel, full-time law professor at the USC Gould School of Law with a secondary appointment at the USC Marshall School of Business, who serves part-time as Senior Advisor at White & Case, top 10 most cited antitrust law professor in the world. Wentong Zheng, University of Florida Research Foundation Professor & University Term Professor. “FRAND (And Industrial Policy) in China”. 5/5/16. https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2776235]

FRAND related issues are challenging in practice because there have been few cases around the globe that interpret and apply FRAND. Though some cases in dicta may identify patent hold up, no fully litigated case on the merits in the United States or Europe has yet found such hold up to exist in the case of licensing between two operating companies. We further note that the overwhelming majority of license agreements are determined through bilateral contractual negotiations between the parties without the need for any dispute resolution process. Issues of institutional design also contribute to the challenge. Different institutional choices on issues such as injunctions, patent scope, and the determination of fair and reasonable royalties across multiple jurisdictions (sometimes with different outcomes) complicate the FRAND 3 analyses. On the academic side, there is much theorizing about FRAND (Layne-Farrar 2016; Lim 2016) but very little empirical work (Galetovic, Haber and Levine 2015). Much of the academic work to date has been sponsored research or research that is based on consulting from one or more companies in the FRAND debate.

FRAND is an issue that has received an extraordinary amount of attention worldwide, including from antitrust authorities. FRAND issues in both mergers and conduct cases have been explored in: the United States, European Union, China, Korea, Taiwan, and India among others (Blair and Sokol 2016). Different proposals for defining or implementing FRAND (some of them divorced from the facts and circumstances of a particular transaction) abound.

It is in this context of complexity in both the substantive law and the institutional design on FRAND that a relatively new antitrust regime, the Anti-Monopoly Law (AML) of China, 1 has now come on the scene (Sokol 2013; Zheng 2010). Because of the size of China’s economy, developments on FRAND in China potentially have global impact on FRAND rates and even the business models of innovative firms. The operation of market forces will result in globalization of the lowest rate set by a court or agency for a particular patent or patent portfolio in a major jurisdiction. China is such a jurisdiction. Consequently, if China is more influential, it will be because China will be inclined to set rates lower than other jurisdictions. In essence, what happens in China on FRAND now impacts decision-making in the boardrooms of Silicon Valley.

#### US standards leadership prevents extinction from automation, strategic stability, genetic engineering

Jain 19 [Ash Jain is a senior fellow with the Scowcroft Center for Strategy and Security, where he oversees the Atlantic Council’s Democratic Order Initiative and D-10 Strategy Forum, Matthew Kroenig, "Present at the Re-Creation: A Global Strategy for Revitalizing, Adapting, and Defending a Rules-Based International System", 2019, https://www.atlanticcouncil.org/wp-content/uploads/2019/10/Present-at-the-Recreation.pdf]

The system must also be adapted to deal with new issues that were not envisioned when the existing order was designed. Foremost among these issues is emerging and disruptive technology, including AI, additive manufacturing (or 3D printing), quantum computing, genetic engineering, robotics, directed energy, the Internet of things (IOT), 5G, space, cyber, and many others. Like other disruptive technologies before them, these innovations promise great benefits, but also carry serious downside risks. For example, AI is already resulting in massive efficiencies and cost savings in the private sector. Routine tasks and other more complicated jobs, such as radiology, are already being automated. In the future, autonomous weapons systems may go to war against each other as human soldiers remain out of harm’s way.

Yet, AI is also transforming economies and societies, and generating new security challenges. Automation will lead to widespread unemployment. The final realization of driverless cars, for example, will put out of work millions of taxi, Uber, and long-haul truck drivers. Populist movements in the West have been driven by those disaffected by globalization and technology, and mass unemployment caused by automation will further grow those ranks and provide new fuel to grievance politics. Moreover, some fear that autonomous weapons systems will become “killer robots” that select and engage targets without human input, and could eventually turn on their creators, resulting in human extinction. The other technologies on this lisgt similarly balance great potential upside with great downside risk. 3D printing, for example, can be used to “make anything anywhere,” reducing costs for a wide range of manufactured goods and encouraging a return of local manufacturing industries.61 At the same time, advanced 3D printers can also be used by revisionist and rogue states to print component parts for advanced weapons systems or even WMD programs, spurring arms races and weapons proliferation.62 Genetic engineering can wipe out entire classes of disease through improved medicine, or wipe out entire classes of people through genetically engineered superbugs. Directed-energy missile defenses may defend against incoming missile attacks, while also undermining global strategic stability.

Perhaps the greatest risk to global strategic stability from new technology, however, comes from the risk that revisionist autocracies may win the new tech arms race. Throughout history, states that have dominated the commanding heights of technological progress have also dominated international relations. The United States has been the world’s innovation leader from Edison’s light bulb to nuclear weapons and the Internet. Accordingly, stability has been maintained in Europe and Asia for decades because the United States and its democratic allies possessed a favorable economic and military balance of power in those key regions. Many believe, however, that China may now have the lead in the new technologies of the twenty-first century, including AI, quantum, 5G, hypersonic missiles, and others. If China succeeds in mastering the technologies of the future before the democratic core, then this could lead to a drastic and rapid shift in the balance of power, upsetting global strategic stability, and the call for a democratic- led, rules-based system outlined in these pages.63

#### Authoritarian tech lead is an S-Risk of irreversible, constant suffering. That outweighs extinction

Minardi 20 [Di Minardi, "The grim fate that could be ‘worse than extinction’", 10/15/20, https://www.bbc.com/future/article/20201014-totalitarian-world-in-chains-artificial-intelligence]

What would totalitarian governments of the past have looked like if they were never defeated? The Nazis operated with 20th Century technology and it still took a world war to stop them. How much more powerful – and permanent – could the Nazis have been if they had beat the US to the atomic bomb? Controlling the most advanced technology of the time could have solidified Nazi power and changed the course of history.

When we think of existential risks, events like nuclear war or asteroid impacts often come to mind. Yet there’s one future threat that is less well known – and while it doesn’t involve the extinction of our species, it could be just as bad.

It’s called the “world in chains” scenario, where, like the preceding thought experiment, a global totalitarian government uses a novel technology to lock a majority of the world into perpetual suffering. If it sounds grim, you’d be right. But is it likely? Researchers and philosophers are beginning to ponder how it might come about – and, more importantly, what we can do to avoid it.

Existential risks (x-risks) are disastrous because they lock humanity into a single fate, like the permanent collapse of civilisation or the extinction of our species. These catastrophes can have natural causes, like an asteroid impact or a supervolcano, or be human-made from sources like nuclear war or climate change. Allowing one to happen would be “an abject end to the human story" and would let down the hundreds of generations that came before us, says Haydn Belfield, academic project manager at the Centre for the Study of Existential Risk at the University of Cambridge.

Toby Ord, a senior research fellow at the Future of Humanity Institute (FHI) at Oxford University, believes that the odds of an existential catastrophe happening this century from natural causes are less than one in 2,000, because humans have survived for 2,000 centuries without one. However, when he adds the probability of human-made disasters, Ord believes the chances increase to a startling one in six. He refers to this century as “the precipice” because the risk of losing our future has never been so high.

Researchers at the Center on Long-Term Risk, a non-profit research institute in London, have expanded upon x-risks with the even-more-chilling prospect of suffering risks. These “s-risks” are defined as “suffering on an astronomical scale, vastly exceeding all suffering that has existed on Earth so far.” In these scenarios, life continues for billions of people, but the quality is so low and the outlook so bleak that dying out would be preferable. In short: a future with negative value is worse than one with no value at all.

This is where the “world in chains” scenario comes in. If a malevolent group or government suddenly gained world-dominating power through technology, and there was nothing to stand in its way, it could lead to an extended period of abject suffering and subjugation. A 2017 report on existential risks from the Global Priorities Project, in conjunction with FHI and the Ministry for Foreign Affairs of Finland, warned that “a long future under a particularly brutal global totalitarian state could arguably be worse than complete extinction”.

Singleton hypothesis

Though global totalitarianism is still a niche topic of study, researchers in the field of existential risk are increasingly turning their attention to its most likely cause: artificial intelligence.

In his “singleton hypothesis”, Nick Bostrom, director at Oxford’s FHI, has explained how a global government could form with AI or other powerful technologies – and why it might be impossible to overthrow. He writes that a world with “a single decision-making agency at the highest level” could occur if that agency “obtains a decisive lead through a technological breakthrough in artificial intelligence or molecular nanotechnology”. Once in charge, it would control advances in technology that prevent internal challenges, like surveillance or autonomous weapons, and, with this monopoly, remain perpetually stable.

If the singleton is totalitarian, life would be bleak. Even in the countries with the strictest regimes, news leaks in and out from other countries and people can escape. A global totalitarian rule would eliminate even these small seeds of hope. To be worse than extinction, “that would mean we feel absolutely no freedom, no privacy, no hope of escaping, no agency to control our lives at all", says Tucker Davey, a writer at the Future of Life Institute in Massachusetts, which focuses on existential risk research.

“In totalitarian regimes of the past, [there was] so much paranoia and psychological suffering because you just have no idea if you're going to get killed for saying the wrong thing,” he continues. “And now imagine that there's not even a question, every single thing you say is being reported and being analysed.”

“We may not yet have the technologies to do this,” Ord said in a recent interview, “but it looks like the kinds of technologies we’re developing make that easier and easier. And it seems plausible that this may become possible at some time in the next 100 years.”

AI and authoritarianism

Though life under a global totalitarian government is still an unlikely and far-future scenario, AI is already enabling authoritarianism in some countries and strengthening infrastructure that could be seized by an opportunistic despot in others.

“We've seen sort of a reckoning with the shift from very utopian visions of what technology might bring to much more sobering realities that are, in some respects, already quite dystopian,” says Elsa Kania, an adjunct senior fellow at the Center for New American Security, a bipartisan non-profit that develops national security and defence policies.

In the past, surveillance required hundreds of thousands of people – one in every 100 citizens in East Germany was an informant – but now it can be done by technology. In the United States, the National Security Agency (NSA) collected hundreds of millions of American call and text records before they stopped domestic surveillance in 2019, and there are an estimated four to six million CCTV cameras across the United Kingdom. Eighteen of the 20 most surveilled cities in the world are in China, but London is the third. The difference between them lies less in the tech that the countries employ and more in how they use it.

What if the definition of what is illegal in the US and the UK expanded to include criticising the government or practising certain religions? The infrastructure is already in place to enforce it, and AI – which the NSA has already begun experimenting with – would enable agencies to search through our data faster than ever before.

In addition to enhancing surveillance, AI also underpins the growth of online misinformation, which is another tool of the authoritarian. AI-powered deep fakes, which can spread fabricated political messages, and algorithmic micro-targeting on social media are making propaganda more persuasive. This undermines our epistemic security – the ability to determine what is true and act on it – that democracies depend on.

“Over the last few years, we've seen the rise of filter bubbles and people getting shunted by various algorithms into believing various conspiracy theories, or even if they’re not conspiracy theories, into believing only parts of the truth,” says Belfield. “You can imagine things getting much worse, especially with deep fakes and things like that, until it's increasingly harder for us to, as a society, decide these are the facts of the matter, this is what we have to do about it, and then take collective action.”

Preemptive measures

The Malicious Use of Artificial Intelligence report, written by Belfield and 25 authors from 14 institutions, forecasts that trends like these will expand existing threats to our political security and introduce new ones in the coming years. Still, Belfield says his work makes him hopeful and that positive trends, like more democratic discussions around AI and actions by policy-makers (for example, the EU considering pausing facial recognition in public places), keep him optimistic that we can avoid catastrophic fates.

We need to decide now what are acceptable and unacceptable uses of AI

Davey agrees. “We need to decide now what are acceptable and unacceptable uses of AI,” he says. “And we need to be careful about letting it control so much of our infrastructure. If we're arming police with facial recognition and the federal government is collecting all of our data, that's a bad start.”

If you remain sceptical that AI could offer such power, consider the world before nuclear weapons. Three years before the first nuclear chain reaction, even scientists trying to achieve it believed it was unlikely. Humanity, too, was unprepared for the nuclear breakthrough and teetered on the brink of “mutually assured destruction” before treaties and agreements guided the global proliferation of the deadly weapons without an existential catastrophe.

We can do the same with AI, but only if we combine the lessons of history with the foresight to prepare for this powerful technology. The world may not be able to stop totalitarian regimes like the Nazis rising again in the future – but we can avoid handing them the tools to extend their power indefinitely.

# 2AC

## T-Prohibition

### 2AC – Prohibition

#### Prohibitions can have exemptions – prefer contextual evidence

DOJ and FTC 17 [US Department of Justice and Federal Trade Commission, “ANTITRUST GUIDELINES FOR INTERNATIONAL ENFORCEMENT AND COOPERATION”. https://www.ftc.gov/system/files/documents/public\_statements/1049863/international\_guidelines\_2017.pdf]

The Sherman Antitrust Act (“Sherman Act”) sets forth general antitrust prohibitions.11 Section 1 of the Sherman Act outlaws contracts, combinations, and conspiracies that unreasonably restrain “trade or commerce among the several States, or with foreign nations.”12 Section 2 outlaws monopolization, attempts to monopolize, and conspiracies to monopolize “any part of the trade or commerce among the several States, or with foreign nations.”13 Section 6a, added by the Foreign Trade Antitrust Improvements Act of 1982 (“FTAIA”), clarifies the Sherman Act’s application to conduct involving only non-import foreign commerce.1

#### Prohibitions include restraints, not just bans

Merriam Webster ND [“prohibition”. https://www.merriam-webster.com/dictionary/prohibition]

Definition of prohibition

1: the act of prohibiting by authority

2: an order to restrain or stop

#### Changing liability expands the scope of antitrust law – means we meet the floor

Richman 84 [DC, Yale Law School J.D. 1984. “Antitrust Standing, Antitrust Injury, and the Per Se Standard”. https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=6883&context=ylj]

Some courts and commentators treated Brunswick as irrelevant to standing doctrine. Because the standing of the Brunswick plaintiffs had never been challenged, these readers concluded that only a trial on the merits could determine whether a plaintiff has suffered an "antitrust injury."69 They failed to realize that the Brunswick plaintiffs' allegations of predatory pricing had made a grant of standing quite proper. If the plaintiffs had, at the outset, attributed their losses solely to the continued existence of their competitors instead of alleging a disruption of the market, their lack of "antitrust injury" and of standing would have been clear from the start. Whether a plaintiff's claim is defeated at the standing stage or the damages stage may thus be merely a matter of when his theory of causation becomes clear.7 Some lower courts used Brunswick solely to reinforce their own diverse approaches to standing.71 Indeed, the Second and Seventh Circuits were quite correct in using Brunswick to confirm their tests' results. As the Second circuit's decision in Fields Productions illustrates, 7 the only difference between the Second Circuit's test and Brunswick's approach lay in their analytical progressions. The circuit's analysis looked to the particular per se rule invoked and then determined whether that rule presumed any disruption of the plaintiff's market. The analysis implicit in Brunswick focuses first on the plaintiff's market and then on whether the plaintiff, through either a per se claim or rule of reason allegations, can indicate some effect upon that market. 7

1

After Brunswick, therefore, the Ninth Circuit's refusal to abandon the doctrine that permitted standing to the kind of plaintiff barred by Fields Productions was unjustified. By continuing to consider intent and foreseeability in its analysis of standing in per se claims, the Ninth Circuit expanded the scope of section 4 beyond that allowed by Brunswick." In Ostrofe v. H.S. Crocker Co.,7 5 for example, a former sales manager alleged that his employer had forced his resignation to prevent him from interfering in a conspiracy to fix prices. Even though the plaintiff clearly had failed to indicate any disruption of competition in his own market-the labor market-the Ninth Circuit found him to have standing under section 4. It reasoned that the "[d]ischarge of those who refuse to participate [in a price fixing conspiracy] is essential to success of the scheme"' and concluded that the plaintiff had suffered a direct injury.

## Adv CP

### 2AC

## States CP

### 2AC – States CP

#### Standard setting is global and SSOs are outside of US jurisdiction

Kasdan 19 [Abraham and Michael. Partners in IP Law @ Wiggins and Dana LLP. “Recent Developments In The Licensing Of Standards Essential Patents”. 8/30/19. https://www.natlawreview.com/article/recent-developments-licensing-standards-essential-patents-0]

Technologies that operate across many different devices and geographical regions are all around us. As one example, today's mobile telephones can connect to 3G/4G/LTE and WiFi networks and communicate with other devices virtually anywhere in the world. This is made possible because all of these devices comply with highly specific technical standards that are promulgated by national and/or international standards setting organizations (SSOs), made up of companies involved in developing and building these global technologies.

When aspects of technical standards are protected by patents, the patent owners are generally obligated by the pertinent SSO to offer licenses to their patented technology under "fair, reasonable and non-discriminatory" (FRAND) terms, as the quid pro quo for having their patented technology included in the standard. The purpose behind the FRAND requirement is to prevent patent owners from gaining an unfair advantage over companies who must make devices that practice the standard in order to participate in the market; and are therefore necessarily “locked in” to standard-compliant designs.

Over the past several years, the licensing and litigation landscape involving standard essential patents (SEPs) and FRAND has become a matter of intense focus. Numerous technology industries, as well as courts around the world have begun to grapple with key issues such as “How do you determine what a FRAND licensing rate should be?” and whether a licensor’s offer is FRAND or not. This article summarizes several recent developments in the transnational licensing of SEP portfolios.

The Overall Landscape

Not surprisingly, most of the recent licensing disputes over SEPs involve the worldwide telecommunications industry. A host of multinational companies have been involved in developing the 2G, 3G, 4G and soon-to-be-commercialized 5G standards (aspects of which are also described by a bewildering array of acronyms, such as "LTE" and "LTE Advanced" ) These standards specify the technical features included in mobile phones and their networks.

The European Telecommunications Standards Institute (ETSI) is an SSO charged with developing worldwide standards for these technologies. Early on, SSOs recognized that the incorporation of patented technology into a standard could give the patent holder significant leverage when negotiating licenses. SSOs therefore required the patent holder to agree to make its SEPs available on FRAND licensing terms. However, ETSI, like other SSOs, does not provide guidance on how to structure licensing terms that meet the FRAND requirement. Indeed, doing so or setting price or royalty rates among entities in a given industry may raise antitrust issues. This leaves it to others to work out the specifics of how SEP owners can comply with the FRAND requirement.

#### State international regulation gets preempted, kills foreign investment and triggers massive economic uncertainty

O’Rourke 10 [Ken, Senior Partner @ O'Melveny & Myers LLP. “United States: The FTAIA In State Court: A Defense Perspective”. 3/3/10. https://www.mondaq.com/unitedstates/trade-regulation-practices/95030/the-ftaia-in-state-court-a-defense-perspective]

A threshold question is whether these limitations similarly restrict the extraterritorial application of state antitrust laws. Defendants will argue that the state antitrust laws cannot permissibly extend to reach conduct or give rise to damages that Congress has placed beyond the reach of federal antitrust law under the FTAIA.

The defendants' argument goes like this. First, under the Supremacy Clause of the U.S. Constitution,4 federal law preempts state law even in the absence of an express preemption provision when, "under the circumstances of [a] particular case, [the challenged state law] stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress."5

Second, the FTAIA's legislative history establishes that Congress had multiple objectives when enacting the statute. One objective was to ensure that the risk of Sherman Act liability did not prevent American exporters and other firms doing business abroad from entering into advantageous "business arrangements (such as joint selling arrangements), however anticompetitive, as long as those arrangements adversely affect only foreign markets."6

Another objective was to eliminate "ambiguity in the precise legal standard to be employed in determining whether American antitrust law is to be applied to a particular transaction."7

Congress sought to adopt a "clear benchmark ... for businessmen, attorneys and judges as well as [U.S.] trading partners"8 with the "ultimate purpose" of "promot[ing] certainty in assessing the applicability of American antitrust law to international business transactions and proposed transactions."9

A third objective was to promote international comity by acknowledging and respecting the prerogatives of other nations to establish and apply their own standards for regulating and remediating alleged restraints of trade in their own markets.10

Congress believed that respecting such foreign sovereign regulatory prerogatives would ultimately best serve U.S. interests by "encourage[ing] our trading partners to take more effective steps to protect competition in their markets."11

Applying state antitrust laws to regulate foreign trade or commerce excluded from federal antitrust jurisdiction by the FTAIA arguably would frustrate every one of these objectives.

American exporters and other businesses engaged in foreign trade or commerce could have no confidence that restraints exempted from federal antitrust attack would not be subject to alternative antitrust attack under the laws of one or more U.S. states. Businesses, therefore, would be deterred from entering into arrangements that Congress intended to enable.

Likewise, ambiguity in the "standard to be employed" for assessing the extraterritorial application of "American antitrust law" would not only persist, but would be multiplied fifty times.

And the imposition of as many as 50 states' antitrust laws on foreign trade or commerce clearly would negate the federal objectives of international comity and respect for foreign regulation of foreign markets.

At every level then, the application of state antitrust laws to foreign trade or commerce exempted by the FTAIA from federal antitrust regulation would "stand[] as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress" in enacting the FTAIA.12

Plaintiffs likely will counter these preemption arguments by pointing out that there is a presumption against preemption and that Congress did not expressly overrule any state antitrust law when enacting the FTAIA.

True, Congress did not address the reach of state antitrust laws, one way or the other, when it enacted the FTAIA. However, the Sherman Act has always extended to "commerce with foreign nations,"13 and was subject to a large body of pre-FTAIA case law addressing the limitations on its extraterritorial reach.14

By contrast, state antitrust laws such as California's Cartwright Act do not expressly reference foreign commerce and have no comparable history of being applied to it.

Congress, therefore, had no cause to be concerned that states would attempt to apply state antitrust laws to foreign trade or commerce exempted from federal regulation by the FTAIA.

Even if there had been such a concern, Congress would have been amply justified in anticipating that the doctrine of implied obstacle preemption — well established when the FTAIA was enacted in 198215 — would resolve any conflict.16

Take California as a specific example. There is a "strong presumption" against preemption, particularly in fields that have been the subject of California's "historic police powers."17 Antitrust plaintiffs would argue that California's "historic police powers" include the authority to regulate competition in California.

On the other hand, the U.S. Supreme Court has consistently held that the power of states to regulate commercial activity outside their borders is necessarily circumscribed.18 That principle applies a fortiori when states attempt to regulate foreign trade or commerce.19

Even in cases involving traditional regulation of conduct within state borders, the California Supreme Court has declined to apply a presumption against preemption where the regulation in question also implicates foreign affairs.20

When the area of regulation encompasses not only foreign trade and commerce but also international relations — that is to say, areas in which federal rather than state interests traditionally predominate — the case for preemption is even stronger.21

Extending the foreign extraterritorial reach of state antitrust laws beyond the limits of the Sherman Act would infringe not only the Supremacy Clause but several additional constitutional provisions establishing federal primacy in the areas of foreign trade, foreign commerce and international relations.22

This allocation of power is intended to ensure that only one entity — the federal government — represents American interests in foreign trade and commerce and foreign affairs.23

In recognition of these principles, courts have repeatedly invalidated state laws that undermine, or threaten to undermine, federal policies and prerogatives in the areas of foreign trade and commerce or foreign affairs.24

These decisions support a conclusion that states cannot constitutionally apply state antitrust laws such as the Cartwright Act to remediate alleged harm from restraints of trade in foreign markets having no direct, substantial and foreseeable anti-competitive effects on trade or commerce in the United States (as would be required for federal antitrust jurisdiction under the FTAIA).

There are policy reasons for this result as well. Claims arising from international cartel conduct or overseas monopolistic behavior arguably seek to apply state antitrust law to decide the legality of foreign conduct (e.g., communications between English and Japanese manufacturers about industry standards, or discussions between Chinese and Korean buyers, or joint ventures in Singapore investing in South America) regardless of whether such conduct was legal when and where it occurred.

Such claims threaten much more than an "incidental or indirect effect" on foreign trade and the internal affairs of foreign countries exercising their sovereign rights to regulate their own markets.25

To assert a state's antitrust law as an all-encompassing international antitrust statute available to police alleged restraints of trade in every country would contravene the federal policy, reflected in the FTAIA, of promoting international comity in this area.26

And allowing one state to apply its antitrust laws to foreign transactions paves the way for every other state to apply its antitrust statutes beyond the limits of the FTAIA.27

Exposure to a thicket of state antitrust regimes would drive foreign companies to avoid doing business that even tangentially affects U.S. commerce.

Finally, such an outcome would conflict with the reported decisions considering this specific issue. One federal court, in In re Intel Corp. Microprocessor Antitrust Litig. ("Intel II"),28 held that California Cartwright Act claims are "limited by the reach of their applicable federal counterparts."29

Intel II analyzed the question as follows:

"Plaintiffs have ... not demonstrated that their state law claims should be applied beyond the boundaries set by the FTAIA ... As the Supreme Court has recognized, '[f]oreign commerce is pre-eminently a matter of national concern,' and therefore, it is important for the Federal Government to speak with a single, unified voice.

"Here, Congress has spoken under the FTAIA with the 'direct, substantial and reasonably foreseeable effects' test, and the Court is persuaded that Congress' intent would be subverted if state antitrust laws were interpreted to reach conduct which the federal law could not."30

The only published California appellate decision on the issue, Amarel v. Connell, similarly holds that the Cartwright Act should not be construed to allow prosecution of extraterritorial antitrust claims that the FTAIA would not.31

The Amarel court observed that "[t]he legislative history of [the FTAIA] discloses it was intended to establish a uniform standard, in the face of conflicting judicial formulations, of the domestic effects necessary to trigger the jurisdiction of American antitrust laws,"32 and that "the proper approach to a preemption analysis is to reconcile 'the operation of both statutory schemes with one another rather than holding one completely ousted.'"33

The court concluded that the plaintiffs' state law antitrust claims were "not preempted" because, as pleaded, the claims did not seek to apply state antitrust laws in a manner inconsistent with the FTAIA.

Rather, they sought damages for anti-competitive practices "alleged to have had an adverse effect on the relevant markets in this state ..."34

According to the court:

"So long as the anticompetitive conduct in question has a direct, substantial and reasonably foreseeable effect within the state, prosecution of the conduct under state law is not precluded."35

In sum, there are strong reasons for a state court evaluating a state law antitrust claim involving foreign trade or commerce to limit the reach of that state law co-extensively with the reach of the Sherman Act as defined by the FTAIA.

To do otherwise contravenes constitutional clauses, rules of statutory construction and federal policies.

#### Refusal to deal is immunized

Greene 19 [Kyle, J.D. Candidate Columbia Law. Columbia Business Law Review Writer and Honors intern @SEC. “Standard Essential Patents and Antitrust Law”. November 2019. https://journals.library.columbia.edu/index.php/CBLR/article/view/5120/2370]

One of the most widely discussed—and criticized—cases affording patent holders near-immunity from antitrust liability is the 2000 Federal Circuit case, Inre Independent Service Organizations Antitrust Litigation (“CSUv.Xerox”).96Xerox manufactured and serviced its own high-volume copying equipment, and eventually took steps to restrict independent service operators’(ISOs) access to replacement parts for Xerox copiers. 97Xerox first refrained from selling replacement parts for one line of copiers to a select group of large ISOs, and then further restricted sales by shutting out more ISOs from more copier lines and forcing other replacement parts retailers to stop selling to ISOs.98 In 1994, CSU opted out of a class action settlement that other ISOs agreed to and then sued Xerox for violating he Sherman Act.99 CSU alleged that Xerox attempted to eliminate CSU and other ISOs from the high-volume copier and printer service market by selling its patented parts to ISOs for higher prices than it did to end-users, making it impossible for ISOs to compete with Xerox on price.100

The court decided in favor of Xerox, holding that intellectual property holders could refuse to deal—and thereby exclude competitors from as many markets as they saw fit101—without the fear of antitrust liability, provided that they were operating “within the scope” of their copyright or patent.102This remained true regardless of the “subjective motivation” for the holders’ refusal to sell or license their intellectual property.103The only exceptions to this antitrust immunity were if a patent holder engaged in illegal tying, fraud in the acquisition of the patent, or sham litigation.104The resulting rule on refusals to deal provided unique privileges to intellectual property holders far greater than those enjoyed by other property holders.105With CSU v. Xerox, the Federal Circuit took a much more confident stand in favor of intellectual property holders over their competitors than other circuits had. Although the decision did not set out to derogate antitrust law to second-class status under patent and copyright law, the effect of the decision was to do just that.

## Econ DA

### 2AC – Top

#### Applying antitrust to FRAND doesn’t deter innovation since investments happen before rate changes

Cary 11 [George Cary, Mark Nelson, Steven Kaiser, Alex Sistla. Cary and Sistla are members of the California and District of Columbia Bars. Mr. Nelson is a member of the New York and District of Columbia Bars. Mr. Kaiser is a member of the New Jersey and District of Columbia Bars. “THE CASE FOR ANTITRUST LAW TO POLICE THE PATENT HOLDUP PROBLEM IN STANDARD SETTING”. Antitrust Law Journal No 3. (2011). https://www.clearygottlieb.com/~/media/organize-archive/cgsh/files/publication-pdfs/the-case-for-antitrust-law-to-police-the-patent-holdup-problem-in-the-standard-setting.pdf]

Finally, measuring FRAND based on the ex ante value of a technology is unlikely to have any negative impact on incentives to innovate. Geradin’s hypothesized discovery of incremental ex post value was unanticipated, by definition, and would generally come to light only after investments in innovation were made. Under these circumstances, we doubt that the inability to capture such windfall gains later would deter a company from investing in innovation. Indeed, the existing practice of many essential patent holders to negotiate royalty rates early on, and in many cases before a standard is adopted, belies the concern about inadequate incentives to innovate. If firms believed it was important to be able to capture unanticipated future benefits of a technology, they would not so readily enter into long-term licensing agreements that locked them into established royalty rates. Indeed, in our experience firms typically consider the trade-off between the FRAND rate at which they license their technology (even assuming this rate is lower than some hypothetical ex post rate) and the additional sales volume they are likely to achieve by having their technology incorporated into a standard. Moreover, our experience with industry practice suggests that royalty rates for a particular technology do not increase, and often decrease, over time, suggesting that the concern that ex ante royalties will be too low is more theoretical than real.

#### Startups are key to the economy - competitiveness and jobs

Brown 20 [William, The Lincy Institute and Brookings Mountain West. Mary Blankenship, Professor @ University of Nevada, Las Vegas, Caitlin Saladino, The Lincy Institute and Brookings Mountain West. “How Technology-Based Start-ups Support U.S. Economic Growth”. 1/27/20. https://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=1011&context=bmw\_lincy\_econdev]

Technology-based start-ups account for 3.8% of the total firms in the United States, employ 3.6% of the workforce, generate 27.2% of U.S. exports, and pay 8.1% of total wages.2 They provide jobs that have higher wages and create jobs in sectors outside of their own. A single technology-based job can create another five jobs in other industries. These start-ups are also crucial to the economy because they drive our competitiveness and are largely export based. However they face unique challenges compared to the other U.S. businesses.

#### Economy is broadly resilient and fears are overblown

* Institutional intervention and complex safety nets prevent full collapse
* Resilience is broadly true – can withstand a lot, and COVID made it stronger
* WW2 and Korea prove

Ranson 20 [R. David, Research Fellow at the Independent Institute and the President and Director of Research at HCWE Inc. He holds an M.A. and B.Sc. degrees from Queen’s College, Oxford, and an M.B.A. in finance and a Ph.D. in business economics from the University of Chicago. “Resilient US Economy Has Overcome the COVID-19 Recession” https://www.independent.org/news/article.asp?id=13290]

Though the president and first lady weren’t able to dodge the COVID-19 bullet, the U.S. economy, we now know, has adapted remarkably well to the pandemic and social distancing. As a result, the worst of the COVID-19 recession is over.

Fear pushed public and even professional opinion to be bearish about the prospects of economic recovery. On both sides of the aisle, it became commonplace to assume that economic vitality depended largely on financial aid from Washington.

Therein lies a Catch-22 that’s keeping us from paying attention to the economy’s rebound. If markets and the economy recover or perform well, the conventional wisdom attributes this to government “stimulus.” If they stagnate or perform poorly, it’s attributed to Washington’s sloth and stinginess. In short, we’ve been too focused on vulnerability—and the perceived need for artificial stimulation—and not focused enough on resilience.

Real GDP dropped like a stone in the second quarter (April-June) of 2020, at a record annual rate of 31.7%. The great majority of forecasters did not anticipate that we could recover from such a blow anytime soon—even taking into account unprecedented government largesse. Their predictions of sustained weakness are being overtaken by events.

Weeks ago the largest component of gross domestic product, consumer spending, already had bounced back to pre-pandemic levels, recovering twice as fast as employment or industrial production. Within just two months, May and June, retail sales had completed a full round trip. In July and August they rose further.

How well does this good news reflect the economy as a whole? That requires an estimate of GDP itself. With forecasters in broad disagreement, it might seem that we’ll have to wait until third quarter results are in.

Happily, thanks to the Center for Quantitative Economic Research at the Federal Reserve Bank of Atlanta, there’s now a more timely source of information, unavailable in past downturns, and derived from real-time hard data: the bank’s GDPNow estimate. As of Sept. 24 the GDPNow team calculated third-quarter annualized growth of 32%.

This figure exceeds all but three of the 62 forecasts in The Wall Street Journal’s September survey of forecasters, and reflects a huge upward revision from GDPNow’s earliest estimate at the end of July.

Such quarter-to-quarter growth would be twice the record set by the Korean War buildup. And it implies that the economy already had recaptured three-fourths of its second-quarter collapse in a single quarter.

The speed and vigor of the U.S. rebound can be interpreted in two contrasting ways. One is that federal intervention has been much more effective than expected. There will be no shortage of politicians waiting to take credit for that. The other is that, collectively, virtually all of the so-called experts underestimated the economy’s intrinsic resilience.

Back in the days when federal “stimulus” was puny by today’s standards, GDP already showed an ability to bounce back from drastic financial shocks, natural disasters, widespread strikes and global crises. To paraphrase Independent Institute senior fellow Richard Vedder, professor emeritus of economics at Ohio University, perhaps the most impressive example is the economic transition following demobilization at the end of World War II. Millions of military personnel became jobless within months and military spending plummeted. But the economy’s resilience came to the rescue and the predicted sharp rise in overall unemployment never occurred.

It’s not clear whether government “stimulus” funds add to or subtract from the economy’s resilience. Relief to those among the newly unemployed who are too pressed to fend for themselves may actually help them become more resilient. On the flip side, moderate deprivation may be a greater spur to self-reliance, encouraging the unemployed to seek work rather than temporary income from government.

Either way, the resilience of the U.S. economy is overpowering the COVID-19 recession, which soon could be history.

## Agency Tradeoff

### Nonuq

#### Funding chalked now and mergers thump

McCabe 18 [David, tech reporter with a focus on Big Tech antitrust enforcement for Axios and The New York Times. “Mergers are Spiking, But Antritrust Cop Funding Isn’t” https://www.axios.com/antitrust-doj-ftc-funding-2f69ed8c-b486-4a08-ab57-d3535ae43b52.html]

Why it matters: A wave of mega-mergers touching many facets of daily life, from T-Mobile’s merger with Sprint to CVS’s purchase of Aetna, will test the Justice Department's and Federal Trade Commission’s ability to examine smaller or more novel cases, antitrust experts say.

What they’re saying: “You have finite resources in terms of people power, so if you are spending all of your time litigating big mergers … there might be some investigations where decisions might have to be made about which investigations you can pursue,” said Caroline Holland, who was a senior staffer in DOJ’s Antitrust Division under President Obama and is now a Mozilla fellow.

What's happening:

More mergers are underway now than at any point since the recession. The total number of transactions reported to the federal government in fiscal year 2017, and not including cases given expedited approval or where the agencies couldn't legally pursue an investigation, is 82% higher than the number reported in 2010 and 55% higher than the number reported in 2012.

Funding for antitrust officials who weigh the deals hasn’t kept pace. The funding for the Department of Justice’s antitrust division has fallen 10% since 2010, when adjusted for inflation. That's in line with the broader picture: not adjusting for inflation, the Department's overall budget increased just slightly in 2016 and 2017.

Funding for the FTC has fallen 5% since 2010 (adjusted for inflation).

### Fill-In

#### Other agencies fill in for essential services

Denson & Morris 17 [Allen, senior attorney at the U.S. Department of the Treasury’s Office of the Comptroller of the Currency, Enforcement & Compliance Division. There he handled all aspects of agency investigations, litigation, and regulatory inquiries, and Lucy, From 2010 to 2011, Lucy served as a founding member of the CFPB Implementation Team that organized the CFPB after passage of the Dodd-Frank Act, previously worked at the Federal Trade Commission for over 20 years, including as Assistant Director for Financial Practices and as Assistant to the Director of the FTC's Bureau of Consumer Protection. “’Stuffed’ By Federal Regulation? 2017 May Not Bring the Relief Imagined” https://www.hudsoncook.com/article/stuffed-by-federal-regulation-2017-may-not-bring-the-relief-imagined/]

Practically, coordination outlined in the MOU has led to a "me-first" approach rather than a "me-too" approach at both agencies. In a competition among regulators with overlapping jurisdiction, it has typically been the CFPB that has led the way in opening investigations, as it has attempted to establish the new agency as a tough regulator.

The recent election results may shift the balance of power between the FTC and the CFPB. We have heard many calls for transitioning the leadership at the CFPB from Director Cordray to a more industry-friendly head, or transitioning to a commission-style structure, as is currently in place at the FTC. If such a change occurs, we expect to see the FTC assert itself in an attempt to recapture some of the regulatory "turf" many perceive it to have lost during recent years, such as in mortgage lending, servicing, fair lending, debt collection, and consumer privacy. The FTC is an experienced and proud agency that has been around for over 100 years. We can expect that it will continue to use its enforcement authority to protect consumers regardless of the political climate.

As a reminder, the FTC has authority to order restitution, disgorgement, or other equitable relief for unfair or deceptive practices-just like the CFPB minus its authority over "abusive" practices-and it may assess penalties for violations of FTC orders and rules. Thus, any FTC investigation can come with substantial consequences for perceived law violators. The FTC also has the same investigative tools as the CFPB, such as Civil Investigative Demands (CIDs).

Although the political climate has changed, now is not the time to stop focusing on compliance. A weakened CFPB could mean an empowered FTC. Ultimately, the enforcement staff at each agency will continue to do their jobs: investigate and bring cases against perceived law violators. So now is the time to remain vigilant and ensure that your compliance management system is in good order. Your primary lines of defense will continue to be: sound policies and procedures that the business actually follows and implements; careful attention to consumer complaints from all sources and providing remediation where necessary, and carefully scrutinized contracts, advertisements, and other points of consumer contact.

### AT: Funding Key

#### Resources don’t change anything

Kades 19 [Michael, attorney at the FTC for 20 years, senior antitrust counselor to Senator Amy Klobuchar, economics at Yale. “The State of US Federal Antitrust Enforcement” p. 16 https://equitablegrowth.org/research-paper/the-state-of-u-s-federal-antitrust-enforcement/]

While enforcement statistics give one view of the federal enforcers’ activity, appropriations measure their resources. The picture here is clear: Appropriations are historically low, an effect of budget austerity and sequestration. When testifying before Congress, agency leadership often claims that they can simply do more with less. But, at some point, they simply do less with less. Merely increasing appropriations, however, does not guarantee either more or more effective enforcement. Former FTC Bureau of Competition Director Debbie Feinstein explained that she would have used additional resources to fund economic studies, not enforcement.19 If enforcers do not see a need for more enforcement (or different enforcement priorities), larger budgets will have little impact. At the same time, those who argue that changing leadership and staff will dramatically alter antitrust enforcement are also wrong. Nor do these statistics prove that resource limitations are the primary hurdle to more active antitrust enforcement. The current judiciary, particularly with the elevation of both Supreme Court Justices Neil Gorsuch and Brett Kavanaugh, is more likely to be worried about overly expansive antitrust enforcement than underenforcement. Over the past 40 years, courts have, with few exceptions, limited the scope of antitrust law, raised evidentiary burdens, and raised the cost and complexity of antitrust enforcement.

### AT: Funding/Tradeoff DA

#### Only effects the margins, and they are used to working with limited funding

McCabe 18 [David, tech reporter with a focus on Big Tech antitrust enforcement for Axios and The New York Times. “Mergers are Spiking, But Antritrust Cop Funding Isn’t” https://www.axios.com/antitrust-doj-ftc-funding-2f69ed8c-b486-4a08-ab57-d3535ae43b52.html]

Yes, but: It’s not the attention-grabbing mega-mergers that advocates worry will get less of a close look thanks to a shortage of funds. Instead, some say budget limitations are likely to matter when officials are deciding which smaller or "borderline" deals to investigate further.

“Sometimes there’s nothing there,” said Holland of the agency's early investigations. “Other times, it might be, ‘This is kind of a close call, and we’ve got three or four close calls and we need to pick one of them.’"

"It could mean settlements get accepted that otherwise wouldn’t, or deals that should be challenged aren’t," said Michael Kades of the Washington Center for Equitable Growth, an antitrust-enforcement-friendly think tank that has done extensive research on the topic, in an email.

Even with mega-deals in the news, they have only accounted for 55% of total global M&A activity this year, per Thomson Reuters.

Democratic lawmakers, whose 2018 platform takes aim at corporate consolidation, worry about the agencies' flat funding. In a statement, Sen. Amy Klobuchar said that enforcing "our antitrust laws is a big job and it’s gotten bigger" and noted she's introduced legislation "to update merger filing fees and increase agencies’ resources, while ensuring that taxpayers foot less of the bill for merger review."

Earlier this year, the Congressional Antitrust Caucus urged appropriators to give the antitrust division more resources to handle higher case-loads.

Former government staffers caution, however, that regulators are used to making do with limited resources.

“I think the commission does make cuts like that but they’re very much focused on whether they’re good uses in pursuit of the commission’s mission, much more so than if there’s some resource constraint,” said a former FTC staffer. “I think if there’s a good case, the commission will find a way to bring it.”

## K

### 2AC – Top

#### Competition is the determinant for innovation – thumps other internals

Slimane 15 [Melouki Slimane, Political sciences Department ,Faculty of Law ,University of M’sila,Algeria. “Relationship between innovation and leadership.” 2015. https://www.sciencedirect.com/science/article/pii/S1877042815031766/pdf?md5=38f8d716e7d805a09d96f0171aa3d033&pid=1-s2.0-S1877042815031766-main.pdf]

Today, we need innovators more than any time before. Every organization and business is feeling the impact of globalization, migration, technological and knowledge revolutions, and climate change issues. Innovation will bring added value and widen the employment base. Innovation is imperative if the quality of life in these trying circumstances is to improve. Innovation will make the world a better place for the younger generation.[1] Ken Michaels Assumes New Leadership Role at Macmillan Science and Education;2005;p 13

Studies have confirmed that all businesses want to be more innovative. One survey identified that almost 90 per cent of businesses believe that innovation is a priority for them. The importance of innovation is increasing, and increasing significantly .[2] Phil Holberton. Speaking of Leadership , Vol. 3, No. 3Taking Charge American journal 2001. In the current day economic scenario, innovativeness has become a major factor in influencing strategic planning. It has been acknowledged that innovation leads to wealth creation. Even though efficiency is essential for business success, in the long run, it cannot sustain business growth.

Experts have identified many types of innovation such as ‘Product Innovation’ that entails the introduction of a new product or a service that is new or considerably improved, ‘Process Innovation’ comprising the implementation of a new or a significantly enhanced production or delivery method, ‘Supply Chain Innovation’ in which innovations transform the sourcing of input products from the market and the delivery of output products to customers and ‘Marketing Innovation’ which results in the evolution of new methods of marketing with enhancements in product design or packaging, its promotion or pricing, among others. [3]-Ogbonna, E. and Harris, L. (2000), Leadership style, organizational culture and performance: Empirical evidence from UK companies, International Journal of Human Resources Management, pp.766-788.

Most often planned and measured combination of ideas, objects and people leads to innovation resulting in new business ideas and technological revolutions. In order to be termed valuable innovations, new products and services need to be strong enough to progress through rigorous commercialization processes and into the marketplace. Many organizations are adopting measures to strengthen their ability to innovate. Such companies are creating a dependable operating system for innovation, an important indicator of corporate sustainability. [4]- Cenzo, D, “Human resources management”, Engel work, New Jersey, 1996.p146.

Research has indicated that competition combined with strong demand is a major driver of innovation. Intensity of competition is the determinant of innovation and productivity. Innovation, besides 220 Melouki Slimane / Procedia - Social and Behavioral Sciences 181 ( 2015 ) 218 – 227 products and services, also includes new processes, new business systems and new methods of management, which have a significant impact on productivity and growth.

#### Growth is sustainable and inevitable – unparalleled data proves tech solves, but transition doesn’t.

Bailey ’16 (Ronald; 12/16/16; B.A. in Philosophy and B.A. Economics from the University of Virginia, member of the Society of Environmental Journalists and the American Society for Bioethics and Humanities, citing a compilation of interdisciplinary research; Reason, “Is Economic Growth Environmentally Sustainable?” <http://reason.com/archives/2016/12/16/is-economic-growth-environmentally-sust1)>

Is economic growth environmentally sustainable? No, say a group of prominent ecological economists led by the Australian hydrologist James Ward. In a new PLoS ONE article—"Is Decoupling GDP Growth from Environmental Impact Possible?"—they offer an analysis inspired by the 1972 neo-Malthusian classic The Limits to Growth. They even suggest that The Limits to Growth's projections with regard to population, food production, pollution, and the depletion of nonrenewable resources are still on track. In other words, they think we're still heading for a collapse. I think **they're wrong**. But they're wrong in an instructive way. The authors describe two types of "decoupling," relative and absolute. Relative decoupling means that economic growth increases faster than rates of growth in material and energy **consumption** and **environmental impact**. Between 1990 and 2012, for example, China's **GDP rose 20-fold** while its energy use increased by a factor of four and its material use by a factor of five. Basically this entails increases in efficiency that result in using fewer resources to produce more value. Absolute decoupling is what happens when continued economic growth actually **lessens resource use** and impacts on the natural environment, that is, creating more value while using less stuff. Essentially humanity becomes richer while withdrawing from nature. To demonstrate that continued economic growth is unsustainable, the authors recycle the hoary I=PAT model devised in 1972 by the Stanford entomologist and population alarmist Paul Ehrlich and the Harvard environmental policy professor (and chief Obama science adviser) John Holdren. Human Impact on the environment is supposed to equal to Population x Affluence/consumption x Technology. All of these are presumed to intensify and worsen humanity's impact on the natural world. In Ward and company's updated version of I=PAT, the sustainability of economic growth largely depends on Technology trends. Absolute decoupling from resource consumption or pollutant emissions requires technological intensity of use and emissions to decrease by at least the same annual percentage as the economy is growing. For example, if the economy is growing at three percent per year, technological intensity must reduce 20-fold over 100 years to maintain steady levels of resource consumption or emissions. If technological intensity is faster then resource use and emissions will decline over time, which would result in greater wealth creation with ever lessening resource consumption and environmental spillovers. Once they've set up their I=PAT analysis, Ward and his colleagues assert that "for non-substitutable resources such as land, water, raw materials and energy, we argue that whilst efficiency gains may be possible, there are minimum requirements for these resources that are ultimately governed by physical realities." Among the "physical realities" they mention are limits on plant photosynthesis, the conversion efficiencies of plants into meat, the amount of water needed to grow crops, that all supposedly determine the amount of agricultural land required to feed humanity. They also cite "the upper limits to energy and material efficiencies govern minimum resource throughput required for economic production." To illustrate the operation of their version of the I=PAT equation, they apply it to a recent study that projected it would be possible for Australia's economy to grow 7-fold while simultaneously reducing resource and energy use and lowering environmental pressures through 2050. They **crank the notion** that there are nonsubstitutable physical limits on material and energy resources through their equations until 2100, and they find that eventually consumption of both rise at the same rate as economic growth. QED: Economic growth is unsustainable. Or as they report, "Permanent decoupling (absolute or relative) is impossible for essential, non-substitutable resources because the efficiency gains are ultimately governed by physical limits." **Malthus wins again!** Or does he? GDP growth—increases in the monetary value of all finished goods and services—is a crude measure for improvements in human well-being. Nevertheless, rising incomes (GDP per capita) correlate with lots of good things that nearly everybody wants, including access to more and better **food**, longer and **healthier lives**, more educational **opportunities**, and greater scope for life choices. Ward and his colleagues are clearly right that there is only so much physical stuff on the Earth, but even they know that wealth is not created simply by using more stuff. Where they go wrong (as so many Malthusians do) is by implicitly assuming that there are limits to human creativity. Interestingly, Ward and his colleagues, like Malthus before them, focus on the supposed limits to **agricultural productivity**. For example, they cite the limits to photosynthesis, which will limit the amount of food that humanity can produce. But as they acknowledge, human population may not continue to increase. In fact, **global fertility rates** have been **decelerating** for many decades now, and demographer Wolfgang Lutz calculates that world population will peak after the middle of this century and begin falling. Since the number of mouths to feed will stabilize and people can eat only so much, it is unlikely that the **biophysical limits** of agriculture on Earth will be exceeded. But it gets even better. Agricultural **productivity is improving**. Consider the biophysical limit on photosynthesis cited by the study. In fact, researchers are already making progress on installing more efficient C-4 photosynthesis into rice and wheat, which would **boost yields by** as much as **50 percent**. British researchers just announced that they had figured out how to boost photosynthetic efficiency to create a super-wheat would increase yields by 20 percent. In a 2015 article for the Breakthrough Journal, "The Return of Nature: How Technology Liberates the Environment," Jesse H. Ausubel of Rockefeller University reviews how humanity is **already decoupling** in many ways from the natural world. "A series of 'decouplings' is occurring, so that our economy no longer advances in tandem with exploitation of land, forests, water, and minerals," he writes. "American use of almost everything except information **seems to be peaking**." He notes that agricultural applications of fertilizer and water in the U.S. peaked in the 1980s while yields continued to increase. Thanks to increasing agricultural productivity, humanity is already at **"peak farmland"**; as a result, "an area the size of India or of the United States east of the Mississippi could be released globally from agriculture over the next 50 years or so." Ward is worried about biophysical limits on water use. But as Ausubel notes, U.S. **water use has peaked** and has declined **below the level of 1970**.

What about meat? Ausubel notes the **greater efficiency** with which chickens and cultivated fish turn grains and plant matter into meat. In any event, the future of farming is not fields but factories. Innovators are already seeking to replace the entire dairy industry with milk, yogurt, and cheeses made by genetically modified bacteria grown in tanks. Others are figuring how to culture meat in vat. Ausubel also notes that many countries have already been through or are about to enter the "forest transition," in which forests begin to expand. Roger Sedjo, a forest economist at Resources of the Future, has projected that by the middle of this century most of world's **industrial wood** will be produced from planted forests covering a remarkably small land area, perhaps **only 5 to 10 percent** of the extent of today's global forest. Shrinking farms and ranches and expanding forests will do a lot toward turning around the alarming global reduction in wildlife. How about unsubstitutable stuff? Are we running out of that? Ausubel notes that the U.S. has apparently already achieved **absolute decoupling**—call it peak stuff—for a lot of materials, including plastics, paper, timber, phosphate, aluminum, steel, and copper. And he reports relative decoupling for **53** other **commodities**, all of which are likely heading toward absolute decoupling. Additive manufacturing is also known as 3-D printing, in which machines build up new items one layer at a time. The Advanced Manufacturing Office suggested that additive manufacturing can reduce material needs and costs by up to **90 percent**. And instead of the replacement of worn-out items, their material can **simply be recycled** through a printer to return it to good-as-new condition using only 2 to 25 percent of the energy required to make new parts. 3-D printing on demand will also eliminate storage and inventory costs, and will significantly cut transportation costs. Nanomanufacturing—building atom-by-atom—will likely engender a **fourth industrial revolution** by spurring exponential economic growth while reducing human demands for material resources. Ward and company project that Australians will be using 250 percent more energy by 2100. Is there an upper limit to energy production that implies unsustainability? In their analysis, the ecological economists apparently assume that energy supplies are limited. Why this is not clear, unless their model **implicitly assumes** a growing **consumption** of fossil fuels (and even then, the world is not close to running out of those). But there is a source of energy that, for all practical purposes, is limitless and has few deleterious environmental effects: **nuclear power**. If demand for primary energy were to double by 2050, a back-of-the-envelope calculation finds that the **entire world's energy needs** could be supplied by 6,000 conventional nuclear power plants. The deployment of fast reactors would supply "renewable" energy for thousands of years. The development of thorium reactors could also supply **thousands of years** of energy. And both could do so without harming the environment. (Waste heat at that scale would not be much of a problem.) Such power sources are in any relevant sense "decoupled" from the natural world, since their fuel cycles produce **little pollution**. Recall that GDP measures the monetary value of all finished goods and services. Finished goods will become a shrinking part of the world's economy as more people gain access to food, clothing, housing, transportation, and so forth. Already, services account for 80 percent of U.S. GDP and 80 percent of civilian employment. Instead of stuff, people will want to spend time creating and enjoying themselves. As technological progress enables economic growth, people will consume more pixels and less petroleum, more massages and less mortar, more handicrafts and less hardwood. Ultimately, Ward and his colleagues make the **same mistake as Malthus** and the Limits to Growth folks: They **extrapolate trends** without taking adequate account of human **ingenuity**. Will it be possible to grow the economy 7-fold over this century while reducing resource consumption and restoring the natural world? Yes.

#### Our ev is just better – prefer data over buzzwords.

Newman ’17 (Peter; 7/27/17; Curtin University Sustainability Policy Institute, conducting a twenty-year statistical analysis based on third-party meta studies; EDP Sciences, “The rise and rise of renewable cities,” <https://www.rees-journal.org/articles/rees/pdf/2017/01/rees170008s.pdf)>

Abstract. The **decoupling of fossil fuels** from growth in economic activity has been **proceeding rapidly** for most of the 21st century and is analyzed globally in terms of structures and technologies for energy efficiency and for switching to renewable energy in the world’s cities. This is leading to the **decline of coal** and oil. The evidence suggests that the changes are **based on demand** for the structures and technologies that are emerging, facilitating a **disruptive process**. The rise of renewable cities can therefore be expected to accelerate. 1 Introduction The rise of renewable cities began in the 1990s but has accelerated in the 21st century [1,2]. As shown below, both coal and oil have begun to fall in the nations of the world driven mostly by their cities as this is where **growth and change** is happening [3]. The question raised by this paper is whether the rise will continue and even accelerate. The theory behind whether the rise in renewable cities is likely to continue or accelerate is partly left to economists who project the future based on the past [4] and more recently by those who see disruptive innovation as causing the future and thus leading to much accelerated change [5,6]. Disruptive innovation is caused by demand rather than supply. The costs of supply need to be competitive but may not be the cheapest option when people discover they want it for many reasons and this changes the whole system that the market is based around. An example often given by Christensen [5] is how small floppy discs outcompeted the larger discs which were cheaper per unit of memory storage but were not as convenient to carry; the system changed in response by developing the portable lap top computer. Disruptive innovations can surprise businesses who focus just on supply costs and they can go bankrupt whilst their product is still the cheapest and the whole structural system around them changes in response to the new demand. This is known as the “Kodak effect” due to the way Kodak chose not to develop their digital cameras as they saw them as too expensive. This paper seeks to find evidence of whether the renewable city is being driven by disruptive innovations based on demand, as well as competitive costs of supply, leading to a whole system change. If it is so, then the rise in renewable cities is likely to continue and even accelerate based on demand for the structures and products of the renewable city at a surprising rate. The decoupling of economic growth and fossil fuels In 2017, the International Energy Agency confirmed that economic growth has been **decoupling from** greenhouse **emissions** and fossil fuels since the start of the 21st century and that this was now leading to the first **drop in fossil fuel consumption**

and subsequent emissions [7]. How this relates to the rise of the renewable city is the focus of this paper. The mechanisms are first understood by looking at a range of national data as set out in Figure 1. Denmark decoupled relatively from the 1990s but absolutely over the last 17 years and is typical of many European nations and cities. The US and Australia have been slower but have now decoupled relatively from the 2000s and absolutely over the past 5–9 years. China decoupled relatively from 2005 and absolutely over the past few years with coal whilst **oil has plateaued**. India has started relative decoupling in the past decade and may change to an absolute decline in fossil fuels as it is investing strongly in renewables and urban electric rail [11]. These trends suggest a global process the rise of the renewable city as outlined by Droege [1,2]; this appears to be occurring much faster than expected and invites the question as to whether it will accelerate [3]. 3 Mechanisms for the rise of the renewable city The mechanisms behind the decoupling of wealth and fossil fuels and the resulting rise of renewable cities are likely to be based around **structural energy** efficiencies and **growth** in renewables. Whether they are disruptive, demand driven changes, will be examined with coal and oil. 3.1 The fall of coal 3.1.1 Structural built environment energy efficiencies In the period from 2000 to 2013 the Organization for Economic Cooperation and Development improved energy efficiency by a steady 0.6% per year but in 2013/14 it improved 1.5% and in 2014/15 it improved 1.8% [12]. This rapid growth seems to be more **structural** in its base as appliances and buildings are becoming **significantly more efficient** as shown by the Intergovernmental Panel on Climate Change [13]. This does appear to be a demand driven process involving digital smart systems in appliances and in construction and management of buildings leading to declines in electricity consumption [14]. 3.1.2 Renewable fuel growth Bloomberg New Energy Finance (BNEF) has made projections of the growth in renewables based on the relative costs of fuels. They suggest that from 2015 to 2040 renewables will become the **dominant power source** in the world; wind and solar will account for **64% of** the **new** generating **capacity**, and globally there will be 60% zerocarbon power, replacing coal and gas, which will decline from 57% to 31% [15]. The predictions are made based on trends and on declining costs for renewables relative to fossil fuels. The **biggest growth** is predicted to be roof top solar which will drop in cost by 60%. However, it may be driven at an **even faster rate** if it has demand driven characteristics. Carbon tracker researchers have suggested that the changes may be even more radical than BNEF are predicting as they appear to be following more rapidly than any previous predictions and are indicating elements of disruptive innovation [16,17]. The question is therefore whether there is any new evidence of the changes being disruptive with adoption of renewables proceeding more rapidly than supply cost projections. There is evidence from Australia of a **remarkably rapid adoption** of roof top solar at a time when little investment in power was happening in the aftermath of abandoning the Australian carbon-pricing scheme [18]. Perth in particular showed this as the city grew rapidly in wealth over the past decade and 25% of households invested in roof-top solar photovoltaics (PV). This happened well beyond what would have been predicted based just on supply costs and household solar is now the largest power station in the grid [18]. Battery storage is now following the same trends [19] and analysis in Perth shows solar-storage systems enable over **90% gridfree** electricity as well as producing more renewable energy to feed into the grid and generate income [18]. The technology of PV and batteries seems to fit into a niche for ordinary single residential householders [20]; recent demonstrations are showing similar heavy demand in medium density shared households that integrate PV and batteries using Citizen Utilities and blockchain software to enable peer to peer trading [21]. The signs are there that demand is driving the electricity system toward a rapid decline in coal even faster than supply costs would indicate. This may involve more gas in some cities like in the US where this is significantly cheaper but the attractions of roof-top solar and batteries are more than likely going to outcompete gas when the **market enables it to work** as it is in Australia with simple financing, permitting and installation [22,23]. 3.2 The fall of oil 3.2.1 Structural transport energy efficiencies Oil is embedded in the structure of cities through 50 years of automobile dependence in the practice of town planning; however this is changing as an unpredicted peak in car use per capita has occurred across the world’s developed cities and even into emerging cities [24]. This is driven by: – increases in density that have led to exponential declines in car use [24]; – rapid growth in transit across all the world’s cities as traffic congestion has led to faster rail options that bypass the traffic [25]; – similar trends in walking and cycling driven by health considerations and the demand for better networks [26,27]. These trends are all demand driven. Vehicle efficiency has also been slowly increasing despite an increase in vehicle size washing out some of this improvement [28]. 3.2.2 Electric mobility Electric vehicles are growing globally at **over 40% per year** and are expected to reach at least 25% of the vehicle fleet by 2040 [29]. Most of this growth is in China which is likely to mean cheaper exports. The demand for electric vehicles is high whether they are personal cars, buses, trains or electric bikes and certainly with cars this is happening well before the **supply cost** is competitive though the daily costs of operation are significantly lower and this is a strong demand factor for most consumers; some are therefore predicting even higher adoption rates [30]. There is another demand-based trend that will impact on the shift to **electric mobility**. The trend in electricity to become more **based on renewables** means that growth in solar-powered EVs are likely to be driven by demand similar to roof top solar. EVs are already being used to fit cleverly into home PV and battery systems with the high potential for “vehicle to grid (V2G)” transfers of power to enable extra storage options in the grid. Electric transit is also beginning to be switched to renewable power as demand for clean transport grows across cities [24] and new ways of financing this demand are being found [31]. 4 Will the demand for renewable cities rise and rise? The rise of the renewable city has been quite dramatic and this paper suggests that it will continue to rise due to demand which **facilitates disruptive innovation** in replacing both coal and oil. Such demand is seen in the improved electricity systems that are emerging as a result of the demand for roof top solar and in the demand for re-urbanized cities where electric mobility can better service the needs of the community. There are two other demand factors that are likely to continue to drive the need for a **renewable city** the knowledge economy and the digital economy The knowledge economy is based around creative interactions where people work together in dense urban centers as these are where the innovative, face-to-face synergies occur between people [32]. Old central business districts and new suburban centers have been transformed back into functional walking cities and those which have done this best have attracted the most capital and young talent to work there [33]. The six most walkable cities in the US have 38% higher GDP. In Boston 70% of the knowledge economy workers live in walkable locations [24]. Transit systems and walking are the most spatially efficient forms of transport as well as being the most free of carbon. If one km of a lane of road was considered as a unit of travel then car traffic can fit about 800 people per hour down that lane in a suburban street, a freeway up to 2500, a busway around 5000, a light rail between 10,000 and 20,000 and a heavy rail up to 50,000 [24]. These striking differences in spatial efficiency are translating into competitive advantage based on the need to bring people together in centers. There is a strong demand for such cities because they represent the places where the new knowledge economy will most likely emerge and provide new opportunities. The data is also strong that there is demand for **low carbon buildings** in these new regenerating urban centers [34]. Indeed, cities are competing for residents and workers through the provision of new sustainability oriented precincts and neighborhoods; the data shows that sustainability features in buildings are a close third behind **affordability and location** [3,32,35]. As with many economic changes, there is another cultural dimension to this change that perhaps explains the rapidity of the changes observed above as well as the demographic complexion of the change. Young people (especially those involved in knowledge economy jobs) are moving to reduce their car use and switch to alternative transport faster than any other group. This has been recognized by a few commentators and has been related to the use of social media devices in the digital economy. On transit or walking (and even to an extent while biking) young people are already connected by their smart technology phones and tablets. They are hardly usable while driving a car. The report by Davis et al. [34] shows that the mobile phone is a far more important device than a car for younger people. This is a cultural revolution that partly underlies the rail revolution as well as the re-urbanization of cities. It is essentially a smart city phenomenon. Thus, the structural expression of this change is that younger people are moving to live in the walking city or transit city as these locations more readily enable them to express the kind of urban experience and culture that they aspire to as well as save precious time. This is the demand that enables peak car, the rail revival and city center renewal to continue. This can explain why cities like Washington, D.C. and Portland are demonstrating the decoupling of GDP from car use per capita (Fig. 2). 5 Conclusion The evidence gathered in this paper has shown that there is a **new trend**: the rise of the renewable city which has emerged this century from the **decoupling of fossil fuels** and economic **growth**. The fall of coal and the fall of oil are both caused by structural **energy efficiency gains** (smart technology and smart buildings for coal; smart, dense transit-oriented cities that reduce car dependence for oil) and by switching to renewable fuels (coal is being replaced by wind and solar especially roof-top PV; oil is being replaced by electric mobility). This appears to be led by demand in cities as well as somewhat competitive supply costs. The rise and rise of the renewable city is thus to be expected as demand is likely to continue to rise for the urban living advantages associated with renewable city technologies and structures.

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#### COVID induced restructuring that prevents catastrophic future fallouts

Sneader & Singhal 20 [Kevin, degree in law with first-class honors from his hometown University of Glasgow. He went on to graduate from Harvard Business School, where he received a master of business administration degree with highest distinction, and Shubham, leads McKinsey’s healthcare, public sector and social sector work globally. He serves leading healthcare and social institutions and governments on all top-management agenda issues. “Beyond Coronavirus: The Path to the Next Normal” https://www.mckinsey.com/~/media/McKinsey/Industries/Healthcare%20Systems%20and%20Services/Our%20Insights/Beyond%20coronavirus%20The%20path%20to%20the%20next%20normal/Beyond-coronavirus-The-path-to-the-next-normal.ashx]

Reimagination A shock of this scale will create a discontinuous shift in the preferences and expectations of individuals as citizens, as employees, and as consumers. These shifts and their impact on how we live, how we work, and how we use technology will emerge more clearly over the coming weeks and months. Institutions that reinvent themselves to make the most of better insight and foresight, as preferences evolve, will disproportionally succeed. Clearly, the online world of contactless commerce could be bolstered in ways that reshape consumer behavior forever. But other effects could prove even more significant as the pursuit of efficiency gives way to the requirement of resilience—the end of supply-chain globalization, for example, if production and sourcing move closer to the end user. The crisis will reveal not just vulnerabilities but opportunities to improve the performance of businesses. Leaders will need to reconsider which costs are truly fixed versus variable, as the shutting down of huge swaths of production sheds light on what is ultimately required versus nice to have. Decisions about how far to flex operations without loss of efficiency will likewise be informed by the experience of closing down much of global production. Opportunities to push the envelope of technology adoption will be accelerated by rapid learning about what it takes to drive productivity when labor is unavailable. The result: a stronger sense of what makes business more resilient to shocks, more productive, and better able to deliver to customers. Reform The world now has a much sharper definition of what constitutes a black-swan event. This shock will likely give way to a desire to restrict some factors that helped make the coronavirus a global challenge, rather than a local issue to be managed. Governments are likely to feel emboldened and supported by their citizens to take a more active role in shaping economic activity. Business leaders need to anticipate popularly supported changes to policies and regulations as society seeks to avoid, mitigate, and preempt a future health crisis of the kind we are experiencing today. In most economies, a healthcare system little changed since its creation post–World War II will need to determine how to meet such a rapid surge in patient volume, managing seamlessly across in-person and virtual care. Public health approaches, in an interconnected and highly mobile world, must rethink the speed and global coordination with which they need to react. Policies on critical healthcare infrastructure, strategic reserves of key supplies, and contingency production facilities for critical medical equipment will all need to be addressed. Managers of the financial system and the economy, having learned from the economically induced failures of the last global financial crisis, must now contend with strengthening the system to withstand acute and global exogenous shocks, such as this pandemic’s impact. Educational institutions will need to consider modernizing to integrate classroom and distance learning. The list goes on. The aftermath of the pandemic will also provide an opportunity to learn from a plethora of social innovations and experiments, ranging from working from home to large-scale surveillance. With this will come an understanding of which innovations, if adopted permanently, might provide substantial uplift to economic and social welfare— and which would ultimately inhibit the broader betterment of society, even if helpful in halting or limiting the spread of the virus.

#### No financial collapse – reforms solve – crises only reinforce resilience of capitalism

Foroohar 16 (Rana, assistant managing editor at TIME and the magazine’s economics columnist, “American Capitalism’s Great Crisis,” May 12, http://time.com/4327419/american-capitalisms-great-crisis/)//cmr

It's a depressing state of affairs, no doubt. Yet America faces an opportunity right now: a rare second chance to do the work of refocusing and right-sizing the financial sector that should have been done in the years immediately following the 2008 crisis. And there are bright spots on the horizon. Despite the lobbying power of the financial industry and the vested interests both in Washington and on Wall Street, there's a growing push to put the financial system back in its rightful place, as a servant of business rather than its master. Surveys show that the majority of Americans would like to see the tax system reformed and the government take more direct action on job creation and poverty reduction, and address inequality in a meaningful way. Each candidate is crafting a message around this, which will keep the issue front and center through November. The American public understands just how deeply and profoundly the economic order isn't working for the majority of people. The key to reforming the U.S. system is comprehending why it isn't working. Remooring finance in the real economy isn't as simple as splitting up the biggest banks (although that would be a good start). It's about dismantling the hold of financial-oriented thinking in every corner of corporate America. It's about reforming business education, which is still permeated with academics who resist challenges to the gospel of efficient markets in the same way that medieval clergy dismissed scientific evidence that might challenge the existence of God. It's about changing a tax system that treats one-year investment gains the same as longer-term ones, and induces financial institutions to push overconsumption and speculation rather than healthy lending to small businesses and job creators. It's about rethinking retirement, crafting smarter housing policy and restraining a money culture filled with lobbyists who violate America's essential economic principles. It's also about starting a bigger conversation about all this, with a broader group of stakeholders. The structure of American capital markets and whether or not they are serving business is a topic that has traditionally been the sole domain of "experts"—the financiers and policymakers who often have a self-interested perspective to push, and who do so in complicated language that keeps outsiders out of the debate. When it comes to finance, as with so many issues in a democratic society, complexity breeds exclusion. Finding solutions won't be easy. There are no silver bullets, and nobody really knows the perfect model for a high-functioning, advanced market system in the 21st century. But capitalism's legacy is too long, and the well-being of too many people is at stake, to do nothing in the face of our broken status quo. Neatly packaged technocratic tweaks cannot fix it. What is required now is lifesaving intervention. Crises of faith like the one American capitalism is currently suffering can be a good thing if they lead to re-examination and reaffirmation of first principles. The right question here is in fact the simplest one: Are financial institutions doing things that provide a clear, measurable benefit to the real economy? Sadly, the answer at the moment is mostly no. But we can change things. Our system of market capitalism wasn't handed down, in perfect form, on stone tablets. We wrote the rules. We broke them. And we can fix them.

#### Warming doesn’t trigger extinction

* peer-reviewed journal shows IPCC exaggeration
* history proves resilience
* no extinction- warming under Paris goals
* rock breaking strategy could offset warming

IBD 18 [Investors Business Daily, Citing Study from Peer reviewed journal by Lewis and Curry, “Here's One Global Warming Study Nobody Wants You To See”, 4/25/18, https://www.investors.com/politics/editorials/global-warming-computer-models-co2-emissions/]

Settled Science: A new study published in a peer-reviewed journal finds that climate models exaggerate the global warming from CO2 emissions by as much as 45%. If these findings hold true, it's huge news. No wonder the mainstream press is ignoring it.

In the study, authors Nic Lewis and Judith Curry looked at actual temperature records and compared them with climate change computer models

. What they found is that the planet has shown itself to be far less sensitive to increases in CO2 than the climate models say. As a result, they say, the planet will warm less than the models predict, even if we continue pumping CO2 into the atmosphere.

As Lewis explains: "Our results imply that, for any future emissions scenario, future warming is likely to be substantially lower than the central computer model-simulated level projected by the (United Nations Intergovernmental Panel on Climate Change), and highly unlikely to exceed that level.

How much lower? Lewis and Curry say that their findings show temperature increases will be 30%-45% lower than the climate models say. If they are right, then there's little to worry about, even if we don't drastically reduce CO2 emissions.

The planet will warm from human activity, but not nearly enough to cause the sort of end-of-the-world calamities we keep hearing about. In fact, the resulting warming would be below the target set at the Paris agreement.

This would be tremendously good news.

The fact that the Lewis and Curry study appears in the peer-reviewed American Meteorological Society's Journal of Climate lends credibility to their findings. This is the same journal, after all, that recently published widely covered studies saying the Sahara has been growing and the climate boundary in central U.S. has shifted 140 miles to the east because of global warming.

The Lewis and Curry findings come after another study, published in the prestigious journal Nature, that found the long-held view that a doubling of CO2 would boost global temperatures as much as 4.5 degrees Celsius was wrong**.** The most temperatures would likely climb is 3.4 degrees.

It also follows a study published in Science, which found that rocks contain vast amounts of nitrogen that plants could use to grow and absorb more CO2, potentially offsetting at least some of the effects of CO2 emissions and reducing future temperature increases.