### 1NC---DA

#### ACA passed the House, but PC is key to get bipartisan support through the Senate.

Gump 2-15 [Akin; 2-15-22; Strauss Hauer & Feld LLP; “America COMPETES Act v. US Innovation and Competition Act—Summary of Key Differences and Takeaways,” <https://www.jdsupra.com/legalnews/america-competes-act-v-us-innovation-8714158/>] brett

On Friday, February 4, 2022, the House passed the America COMPETES Act on nearly a straight party line vote to, among many other priorities, fund domestic semiconductor chip manufacturing, dramatically increase scientific research and development funding, revive lapsed trade programs and re-orient the United States’ international posture towards competition with China. In taking this step, the House is catching up to the Senate, which passed the United States Innovation and Competition Act (USICA) last July on a bipartisan vote of 68-32. This alert includes side-by-side summaries comparing the two bills in each of those areas, which can be found in the previous links. Over the coming weeks and months, leaders from the House and Senate will seek to negotiate a final bill that can meet approval of 60 Senators and a majority in the House. The bill likely represents one of the last opportunities for significant bipartisan legislative achievement this Congress. While the Biden-Harris administration and Democratic congressional leaders have a publicly stated goal of completing negotiations ahead of the State of the Union on March 1, it is far more likely that a final agreement is not reached until weeks or months after that speech. This timeline is dictated not just by the political incentives for each party, but also the wide policy gulfs that must be overcome between the two bills. To make clear the differences between these two bills, each totaling nearly 3,000 pages, Akin Gump is creating side-by-side tables comparing the major titles of the House-passed COMPETES Act and the Senate-passed USICA. In this alert, you will find comparison tables for the titles regarding CHIPS Act funding, funding for scientific research and development, trade policy, and foreign policy. Readers can use the table of contents to jump to different subject matters to see what the bills have in common and how they differ. A future Akin Gump policy alert will deliver the side-by-sides for the remaining titles. In addition, we are planning a series of webinars to discuss the various subject matters. The first one is scheduled for Wednesday, February 23 at 3 p.m. ET and will discuss a proposed outbound investment screen and export controls. A formal invite will be circulated shortly. The battle between the House and Senate on visions for improving America’s competitiveness is now joined, but whether a final bill will reach the President’s desk remains to be seen.

#### Plan trades off.

Carstensen ’21 [Peter; February 2021; Fred W. & Vi Miller Chair in Law Emeritus at the University of Wisconsin Law School; Concurrences, “The ‘Ought’ and ‘Is Likely’ of Biden Antitrust,” <https://www.concurrences.com/en/review/issues/no-1-2021/on-topic/the-new-us-antitrust-administration-en#carstensen>]

14. Similarly, despite bipartisan murmurs about competitive issues, the potential in a closely divided Congress that any major initiatives will survive is limited at best. In part the challenge here is how the Biden administration will rank its commitments. If it were to make reform of competition law a major and primary commitment, it would have to trade off other goals, which might include health care reform or increases in the minimum wage. It is likely in this circumstance the new administration, like the Obama administration’s abandonment of the pro-competitive rules proposed under the PSA, would elect to give up stricter competition rules in order to achieve other legislative priorities.

15. Another key to a robust commitment to workable competition is the choice of cabinet and other key administrative positions. Here as well, the early signs are not entirely encouraging. In selecting Tom Vilsack to return as secretary of agriculture, the president has embraced a friend of the large corporate interests dominating agriculture who has spent the last four years in a highly lucrative position advancing their interests. Given the desperate need for pro-competitive rules to implement the PSA and control exploitation of dairy farmers through milk-market orders, the return of Vilsack is not good news. Who will head the FTC and who will be the attorney general and assistant attorney general for antitrust is still unknown, but if those picks are also centrists with strong links to corporate America the hope for robust enforcement of competition law will further attenuate!

16. In sum, this is a pessimistic prognostication for the likely Biden antitrust enforcement agenda. There is much that ought to be done. But this requires a willingness to take major enforcement risks, to invest significant political capital in the legislative process, and to select leaders who are committed to advancing the public interest in fair, efficient and dynamically competitive markets. The early signs are that the new administration will be no more committed to robust competition policy than the Obama administration. Events may force a more vigorous policy—I will cling to that hope as the Biden administration takes shape.

#### Key to tech leadership.

DelBene 2-2 Suzan DelBene, American politician and businesswoman, 2-2-2022, "American competitiveness legislation is the key to tackling today's economic challenges, creating tomorrow's opportunities," TheHill, [https://thehill.com/blogs/congress-blog/technology/592447-american-competitiveness-legislation-is-the-key-to-tackling //](https://thehill.com/blogs/congress-blog/technology/592447-american-competitiveness-legislation-is-the-key-to-tackling%20//) ella

The ongoing COVID-19 pandemic, supply chain disruptions, and decades of underinvestment in U.S. infrastructure and manufacturing have resulted in higher prices for Americans at the grocery store and gas pump. The Biden administration and Congress have already acted to ease inflation and clear bottlenecks by extending operations at major ports, releasing oil from the Strategic Petroleum Reserve, and enacting the bipartisan infrastructure law. But this can’t be the end of our work. Right now, Congress can address the challenges facing families and keep the Biden Boom going by taking bipartisan action on American competitiveness legislation to secure our supply chains, cut costs, strengthen American leadership, spur innovation and create good-paying jobs that will set the U.S. up for long-term economic success. In December, the New Democrat Coalition announced our top priorities for this legislation and worked to ensure they were included in the House’s America COMPETES Act. Doing so will address many of the problems we face today, create opportunities for tomorrow, and help America succeed in the 21st century. First and foremost, this legislation must address the global microchip shortage. From cars and clean energy technologies to cell phones and dishwashers, semiconductors and microchips are critical to the products Americans rely on every day. But the current global chip shortage is driving prices up for American consumers in many sectors. For example, new car prices rose by as much as 14% over the last year and used car prices rose 37%. Passing legislation that strengthens global supply chains and supports domestic manufacturing will not only bolster our supply of microchips, but also lower costs, create good American jobs, and help the U.S. lead in the global economy. That’s a win, top to bottom. To compete globally, we also need to leverage the talent of hard-working Americans in diverse communities across this country. Right now, jobs in the technology and innovation sectors are concentrated in just a handful of cities on the coasts. Just five U.S. cities account for 90% of the recent growth in innovation jobs. That’s a lot of untapped potential and communities being left behind. By investing in new innovation centers in regions outside of existing technology hubs like Silicon Valley, we can unlock the potential of communities like Madison, Wis., and Allentown, Pa., to attract new industries, tackle break-through challenges, and create the jobs of the future. If we’re going to fill those jobs, we also need to support the next generation of high-tech and highly skilled American workers. I understand personally how important well-funded educational and research opportunities are to STEM jobs. Before I came to Congress, I was lucky to receive a quality education that prepared me for a job in science and technology. By expanding research fellowships and undergraduate research opportunities, specifically at historically Black colleges and universities, Hispanic-serving institutions, and tribal colleges and universities, American workers will gain the skills to thrive in the global economy. Increasing educational opportunities and funding will also ensure America leads the world as innovators and creators. None of these investments happen in a bubble. America is made stronger through the support of our allies and close trading partners. That’s why we must leave behind the isolationist policies of the last administration and reclaim the mantle of being rule makers, not rule takers. We are in a global race for the future and if we don’t make these key investments, we put our national security, our allies, and our values at risk. As countries around the world ramp up their investments in science and technology, we must make sure we aren’t just keeping pace, but are staying one step ahead. This legislation levels the playing field so that the U.S. can fairly compete on the global stage.

#### Goes nuclear.

Kroenig 18 [Matthew, Deputy Director for Strategy, Scowcroft Center for Strategy and Security; Associate Professor of Government and Foreign Service, Georgetown University, “Will disruptive technology cause nuclear war?” The Bulletin, 11/12/2018, https://thebulletin.org/2018/11/will-disruptive-technology-cause-nuclear-war/]

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.

When it comes to new technology, this means that the United States should seek to maintain an innovation edge. Washington should also work with other states, including its nuclear-armed rivals, to develop a new set of arms control and nonproliferation agreements and export controls to deny these newer and potentially destabilizing technologies to potentially hostile states.

These are no easy tasks, but the consequences of Washington losing the race for technological superiority to its autocratic challengers just might mean nuclear Armageddon.

### 1NC – DA

#### China and Russia are pursuing hypersonics now.

Loiaconi 2-4 [Stephen Loiaconi, The National Desk, 2-4-22, "China, Russia advancing hypersonic weapons raises concerns at Pentagon," KVII, <https://abc7amarillo.com/news/nation-world/china-russia-advancing-hypersonic-weapons-raises-concerns-at-pentagon> [accessed 2-6-22] Lydia

WASHINGTON (TND) — Amid mounting anxiety over Russian and Chinese hypersonic weapons development, the Pentagon is pressing American defense contractors to catch up, but some arms control experts are uncertain how urgently the U.S. military needs such weapons. Defense Secretary Lloyd Austin and Deputy Defense Secretary Kathleen Hicks met with top executives from more than two dozen companies Thursday to urge them to accelerate hypersonic weapons research. The roundtable identified several obstacles hindering U.S. development, including supply chain constraints and logistical challenges. “Participants identified a need to expand access to modeling capabilities and testing facilities in order to adopt a ‘test often, fail fast, and learn’ approach which will accelerate the fielding of hypersonic and counter-hypersonic systems,” Pentagon spokesperson Eric Pahon said in a statement. [Hypersonic weapons](https://www.atlanticcouncil.org/in-depth-research-reports/report/primer-on-hypersonic-weapons-in-the-indo-pacific-region/) travel at five times the speed of sound or faster, making them difficult for conventional missile defense systems to detect and intercept. Russia and China are believed to be making advances toward launching hypersonic devices that would be capable of carrying a nuclear warhead, including recent tests of missiles and glide vehicles. [North Korea claimed](https://abc7amarillo.com/news/nation-world/north-korea-claims-successful-test-of-hypersonic-missile) to have tested hypersonic weapons in September and January, as well. Although the U.S. pioneered hypersonic technology decades ago, the Pentagon eased off research after failed tests in the early 2000s. In recent years, China has conducted hundreds of tests of hypersonic devices, while the U.S. has conducted only a handful. “We’ve got to invest more in defenses, but we’re not without capabilities, and our adversaries should know that,” former national security adviser Robert O’Brien said at a Richard Nixon Foundation event [earlier this week](https://www.nationalreview.com/corner/pompeo-chinese-hypersonic-threat-a-very-difficult-problem/). The Pentagon has [several projects underway](https://www.defense.gov/News/News-Stories/Article/Article/2518370/defense-officials-outline-hypersonics-development-strategy/) aimed at developing operational prototypes for a weapon. A senior Air Force official indicated in an interview [with Breaking Defense](https://breakingdefense.com/2022/01/air-forces-first-hypersonic-missile-could-still-start-production-this-year/) last month that tests of hypersonic missiles are scheduled throughout the coming year. Three hypersonic tests conducted by the U.S. military in 2021 failed, and one of the CEOs who attended Thursday’s meeting [told CNN](https://www.cnn.com/2022/02/03/politics/pentagon-hypersonic-weapons-defense-companies-meeting/index.html) an industry-wide “fear of failure” has undermined progress. However, experts say failing and figuring out what went wrong is an important part of the weapons development process. “As I understand the technologies involved, you have to fail a lot of times before you get it right,” said John Erath, senior policy director at the Center for Arms Control and Non-Proliferation. The White House’s 2022 budget sought $3.8 billion for hypersonic weapons research, as well as nearly $250 million for hypersonic defense. Congress approved most of the requested spending in the 2022 National Defense Authorization Act, which was signed by President Joe Biden in December. “[Russia and China] now have the lead, but they are rushing Fords into the field as the United States moves slowly to perfect its Ferrari,” said Matthew Kroenig, deputy director of the Scowcroft Center for Strategy and Security at the Atlantic Council. “So, I am confident we will have superior technology eventually, but we are currently behind.” The U.S. and Japan also announced an agreement last month to increase collaboration on hypersonic missile defense, citing aggressive actions [by China and North Korea](https://abc7amarillo.com/news/nation-world/nkorea-says-hypersonic-missile-tested-to-modernize-weaponry). It is unclear how that partnership will impact the development of new technologies. “When Japanese and American researchers bring their complementary strengths to bear, we can outcompete and out-innovate anyone,” Secretary of State Antony Blinken said at the time. According to a recent [Congressional Research Service report](https://sgp.fas.org/crs/weapons/R45811.pdf), most U.S. hypersonic programs are not geared toward carrying nuclear warheads, which means they will require greater accuracy. Getting something that moves that fast to hit a target with precision will not be easy, though. “It’s a very difficult technology to master, and it’s not one that fits all that well with the way the U.S. military does things,” Erath said. In a report published in [Science & Global Security](https://www.nytimes.com/2021/01/15/science/hypersonic-missile-weapons.html) last year, independent experts questioned the value of hypersonic technology, with one author calling claims made by defense officials “nonsense.” The Defense Department pushed back, insisting the report was based on outdated information, but even some within the military have voiced skepticism about dedicating more resources to hypersonic weapons research. “It isn’t obvious that the right response to someone else doing hypersonics is that we should be doing hypersonics,” Air Force Secretary Frank Kendall[said last month](https://www.washingtonpost.com/opinions/2022/02/03/america-led-hypersonic-technology-then-other-countries-sped-past/), according to The Washington Post. Still, other experts say China’s investment in hypersonics and other military technologies presents a serious threat to the U.S. and its allies if it proceeds unchecked. According to Kroenig, maintaining military superiority over Beijing and Moscow could be essential to preserving global peace in the years ahead. “International peace and stability have been undergirded by U.S. military primacy for decades,” he said. “If Russia and China gain a military advantage, they will use it to revise the international order and aggress against their neighbors.”

#### The plan gets rid of critical mega constellations that detect hypersonics – this link turns their sats deterrence scenario.

Trevithick 20 [Joseph Trevithick, 10-5-2020, "Work Begins On Starlink-Like Constellation Of Small Hypersonic Missile-Tracking Satellites," Drive, <https://www.thedrive.com/the-war-zone/36909/work-begins-on-starlink-like-constellation-of-small-hypersonic-missile-tracking-satellites> [accessed 2-5-22] lydia

The U.S. military has hired L3Harris and [SpaceX](https://www.thedrive.com/the-war-zone/32346/the-air-force-and-spacex-are-teaming-up-for-a-massive-live-fire-exercise) to build small satellites with powerful infrared sensors [capable of spotting and tracking](https://www.thedrive.com/the-war-zone/18882/stratcom-boss-makes-case-for-satellites-capable-of-tracking-hypersonic-weapons) ballistic [missiles](https://www.thedrive.com/the-war-zone/36149/how-chinas-ballistic-missile-and-nuclear-arsenal-is-ballooning-according-to-the-pentagon) and [hypersonic weapons](https://www.thedrive.com/the-war-zone/31215/u-s-inspectors-have-examined-russias-imminently-operational-hypersonic-missile). These satellites could become part of a large and broader [early warning](https://www.thedrive.com/the-war-zone/22907/usaf-hands-lockheed-billions-for-new-warning-satellites-amid-rush-for-more-space-sensors) constellation with hundreds of space-based sensors and communications nodes watching for incoming threats, monitoring their flight, and potentially providing targeting data to [missile defense assets](https://www.thedrive.com/the-war-zone/32492/the-navys-arleigh-burke-class-destroyers-to-be-armed-with-hypersonic-weapon-interceptors).

The Pentagon [announced](https://www.defense.gov/Explore/News/Article/Article/2372647/agency-awards-contracts-to-build-out-tracking-layer-of-national-defense-space-a/) that the Space Development Agency (SDA) [had awarded](https://www.defense.gov/Newsroom/Contracts/Contract/Article/2372482/) the contracts to L3Harris and SpaceX, worth around $193.5 million and just over $149 million, respectively, on Oct. 5, 2020. Each company will be responsible for building four satellites, each with a wide field of view (WFOV) overhead persistent infrared (OPIR) sensor, in support of work on what SDA calls Tranche 0 of the Tracking Layer of the planned overarching early warning constellation. "SDA is developing the low-cost proliferated WFOV space vehicles that provide the missile warning and the tracking information for national defense authorities, as well as tracking and cueing data for missile defense elements," Mark Lewis, the Acting Deputy Undersecretary of Defense for Research and Engineering, said in a [statement to C4ISRNET](https://www.c4isrnet.com/battlefield-tech/space/2020/10/05/space-development-agency-orders-8-hypersonic-weapon-tracking-satellites/).

"This capability [the Tracking Layer] encompasses space-based sensing, as well as algorithms, novel processing schemes, data fusion across sensors and orbital regimes, and tactical data products able to be delivered to the appropriate user," according to SDA's website. This Layer's Tranche 0 could eventually grow to 20 satellites and this portion of the larger constellation may eventually have as many as 200 space-based sensors. SpaceX's satellite will be derived from that company's [Starlink design](https://www.thedrive.com/the-war-zone/32346/the-air-force-and-spacex-are-teaming-up-for-a-massive-live-fire-exercise" \t "_blank), which was originally designed as part of an effort to provide increased access to broadband internet for commercial and military purposes. An as-yet-unknown subcontractor will be providing the OPIR sensor.

L3Harris is developing both its satellite and sensor in-house. The company has not yet released details about the design of either one. SDA's goal is to launch the first Tranche 0 satellites into Low Earth Orbit (LEO) in 2022 and then have moved on to the Tranche 1 stage by 2024, where the Tracking Layer will be able to provide persistent monitoring for missile and hypersonic threats over specific regions of interest. The hope is that there will be enough satellites in orbit by 2026 to provide global early warning coverage. The idea is that the Tracking Layer will also be more responsive, flexible, and resilient to the [ever-more real prospect](https://www.thedrive.com/the-war-zone/35057/space-force-boss-says-russia-has-been-testing-its-killer-satellites-in-orbit) of an enemy anti-satellite attack by using this large, distributed constellation of small satellites. At present, the U.S. military's space-based early warning capability comes from a relatively limited number of larger satellites, such as the Space-Based Infrared System (SBIRS) constellation, which you can read about in more detail [here](https://foxtrotalpha.jalopnik.com/these-are-the-doomsday-satellites-that-detected-the-exp-1737434876). SBIRS notably provided an advance alert that Iranian ballistic missiles [were headed toward bases](https://www.thedrive.com/the-war-zone/31769/satellite-images-show-the-aftermath-of-irans-missile-strikes-on-al-assad-air-base-in-iraq) hosting U.S. troops in Iraq in January, giving those individuals time to seek cover. SBIRS' sensors are also known to be powerful enough to spot infrared events [that are much smaller](https://www.thedrive.com/the-war-zone/27364/u-s-infrared-warning-satellite-data-could-settle-debate-over-pakistan-india-dogfight) than a ballistic missile blasting off, such as the launch of smaller missiles, large explosions, and even artillery fire.

The Tracking Layer isn't the only planned distributed space-based sensor program in the works, either. It's "going to combine with activities in the Missile Defense Agency as they build toward their [Hypersonic and Ballistic Tracking Space Sensor](https://missiledefenseadvocacy.org/defense-systems/hypersonic-and-ballistic-tracking-space-sensor-hbtss/) (HBTSS) medium field of view (MFOV) space vehicles," Acting Deputy Undersecretary of Defense Lewis added in his statement to C4ISRNET.

#### Absent early detection we lose deterrence – that emboldens rivals

**Beu 21** [Sammantha Beu, 4-2-21, Sensor Tech Key to Effective Missile Defense, <https://www.nationaldefensemagazine.org/articles/2021/4/2/sensor-tech-key-to-effective-missile-defense> [accessed 2-5-22] Lydia

“If you can’t see it, you can’t shoot it. And if you can’t see it, you can’t deter it either,” said Air Force Gen. John Hyten, vice chairman of the Joint Chiefs of Staff. In a recent interview, Hyten discussed the way forward for integrated air-and-missile defense, saying the key to missile defeat and defense is “the sensory capability that can track that missile.” This sentiment has been echoed by other leaders. During her Senate confirmation, Deputy Secretary of Defense Kathleen Hicks was asked about her priorities, replying: “I would assess ongoing efforts to improve national missile defense, with a particular focus on improving discrimination capabilities and sensors for detection of both ballistic and hypersonic missiles.” The Defense Department has already worked to upgrade interceptor capabilities. After scrapping the Redesigned Kill Vehicle program, the Missile Defense Agency began pursuing the Next-Generation Interceptor, expected to roll out within the next decade. The interceptor will enhance the Ground-based Midcourse Defense system based in California and Alaska, but a 10-year gap in capability presents a risk. With growing concerns about potential threats, lawmakers are pushing for an additional layer of defense. Per the fiscal year 2021 National Defense Authorization Act, Congress has tasked the Pentagon to deliver 20 new interim ground-based interceptors capable of protecting the homeland. According to the bill, the interim interceptors should “address the majority of current and near- to mid-term projected ballistic missile threats to the United States homeland from rogue nations.” North Korea and Iran remain a threat to America and its allies, so the United States must be well-equipped to defend against long-range weapons. But what about efforts to advance sensor technologies? Also noted in the NDAA were lawmakers’ concerns regarding the lack of budgeting for key programs to improve overall sensor architecture, including the Homeland Defense Radar-Hawaii and AN/TPY-2, as well as the development and deployment of the hypersonic and ballistic tracking space sensor. Senior “military and civilian officials have stated repeatedly that space-based sensors are the most effective path to improving both homeland and theater missile defenses against a wide range of missile threats,” states the NDAA. Those agreeing include Indo-Pacific Command, which just laid out its investment priorities for the new Pacific Deterrence Initiative. Included in the report — written by PACOM Commander Adm. Philip Davidson — was a request of $2.3 billion for “a constellation of space-based radars.” Sensors are the eyes and ears of missile defense and are critical for detecting and tracking missiles through all phases of their trajectory, either by space-based satellites or by land- and sea-based radars. Some sensors, such as early warning radar and X-band radar, have discrimination capabilities to distinguish whether an incoming object actually poses a threat, is simply debris, or perhaps is a deliberate countermeasure. As it faces the evolving threat of hypersonic missiles and maneuvering reentry vehicles, the U.S. defense industry is working to meet the challenge, with Northrop Grumman and L3Harris selected in January to build prototypes for the HBTSS space-based sensor. Lockheed Martin, Boeing and Raytheon have also won past contracts with the Missile Defense Agency to develop hypersonic missile defense systems. Dr. Mark Lewis, executive director of NDIA’s new Emerging Technologies Institute, and the immediate past director of defense research and engineering and acting deputy undersecretary in charge of technology modernization, said hypersonic weapons will add a new level of complexity to missile defense. “Hypersonic systems don’t just introduce speed; they bring a combination of speed, maneuverability, range and altitude that makes timely detecting, tracking and defeating particularly difficult. That’s why the United States is pursuing such weapons; it’s also why our peer competitors are doing the same,” he said. Lewis has observed that success requires more than just spotting and identifying a hypersonic weapon, but also retaining custody until it can be rendered ineffective. “These systems can be stopped but doing so will require leveraging state-of-the-art space sensors, rapid processing and decision-making, and an assortment of available intercept techniques.” The question is whether the Pentagon considers sensor innovation a priority, as the allocation of funding per the fiscal year 2021 budget request has fallen short. Hypersonic defense is clearly lagging when compared with hypersonic strike capabilities. If the United States wants to outpace competitors like Russia and China, an enhanced and integrated sensor architecture for ballistic and hypersonic defense is a necessary investment. Improving sensors can also enable other technologies. Laser weapon systems use directed energy to deter and even neutralize their targets, and they heavily rely on robust sensor technology for tracking and beam control. Working as a complement to more conventional systems, high-energy lasers can serve as an additional line of defense against missile threats. The bottom line is, the earlier an incoming missile can be detected, the more time there is to react. Sensors are the first line of defense in the kill chain, and without them, the rest of the system cannot operate. The Defense Department should partner with industry and lawmakers to prioritize and bolster sensor capabilities and ensure the effectiveness of missile defense systems against emerging threats.

#### No link turns -- Lack of defense causes regional instability and triggers first strikes – Nuke war.

Reny 20 [Stephen Reny, Former Airforce Fellow, 2020, "Nuclear-Armed Hypersonic Weapons and Nuclear Deterrence on JSTOR," No Publication, <https://www.jstor.org/stable/26956152> [accessed 2-5-22] Lydia

A period of increased instability will occur during the phase in which nuclear hypersonics become operational. This turbulence will peak as one nuclear country deploys hypersonic weapons while others are still in developmental stages. Once this occurs, nuclear powers without hypersonic capability will perceive a disadvantage and be more vulnerable to a strike from the nation with the defense-penetrating capability. During this time, the disadvantaged power will contemplate and recalculate its options, deciding whether a first strike is warranted because of its perceived vulnerability. As Thomas Schelling stated, “Vulnerable strategic weapons not only invite attack but in a crisis could coerce the . . . government into attacking when it might prefer to wait.”73 Therefore, until opposing powers share the same vulnerabilities and/or comply with Wohlstetter’s stability criteria, the mismatch in nuclear attributes will promote instability. Additionally, when competing countries possess ballistic missile defenses and no defensepenetrating capabilities (table 4, situation B), instability will rumble through the nuclear deterrent paradigm: assured vulnerability is completely undermined with neither country convinced it could launch a credible counterstrike. Therefore, as a counter to ballistic missile defenses, hypersonic weapons are a natural evolution in nuclear deterrent systems; they should be anticipated and expected to bring back true assured vulnerability. The danger lies during the transition to assured vulnerability and should be managed in a manner that minimizes risk from the absence of BMD and hypersonics.

### 1NC -- DA

#### Mining is now – multiple companies are competing in mineral exploitation to obtain rare earth metals.

Gilbert 21 [Alex Gilbert is a complex systems researcher and a PhD student in space resources at the Colorado School of Mines. Milken Institute, “Mining in Space Is Coming”; <https://www.milkenreview.org/articles/mining-in-space-is-coming>] kelvin

Space exploration is back. after decades of disappointment, a combination of better technology, falling costs and a rush of competitive energy from the private sector has put space travel front and center. indeed, many analysts (even some with their feet on the ground) believe that commercial developments in the space industry may be on the cusp of starting the largest resource rush in history: mining on the Moon, Mars and asteroids.

While this may sound fantastical, some baby steps toward the goal have already been taken. Last year, NASA awarded contracts to four companies to extract small amounts of lunar regolith by 2024, effectively beginning the era of commercial space mining. Whether this proves to be the dawn of a gigantic adjunct to mining on earth — and more immediately, a key to unlocking cost-effective space travel — will turn on the answers to a host of questions ranging from what resources can be efficiently.

As every fan of science fiction knows, the resources of the solar system appear virtually unlimited compared to those on Earth. There are whole other planets, dozens of moons, thousands of massive asteroids and millions of small ones that doubtless contain humungous quantities of materials that are scarce and very valuable (back on Earth). Visionaries including Jeff Bezos imagine heavy industry moving to space and Earth becoming a residential area. However, as entrepreneurs look to harness the riches beyond the atmosphere, access to space resources remains tangled in the realities of economics and governance.

Start with the fact that space belongs to no country, complicating traditional methods of resource allocation, property rights and trade. With limited demand for materials in space itself and the need for huge amounts of energy to return materials to Earth, creating a viable industry will turn on major advances in technology, finance and business models.

That said, there’s no grass growing under potential pioneers’ feet. Potential economic, scientific and even security benefits underlie an emerging geopolitical competition to pursue space mining. The United States is rapidly emerging as a front-runner, in part due to its ambitious Artemis Program to lead a multinational consortium back to the Moon. But it is also a leader in creating a legal infrastructure for mineral exploitation. The United States has adopted the world’s first space resources law, recognizing the property rights of private companies and individuals to materials gathered in space.

However, the United States is hardly alone. Luxembourg and the United Arab Emirates (you read those right) are racing to codify space-resources laws of their own, hoping to attract investment to their entrepot nations with business-friendly legal frameworks. China reportedly views space-resource development as a national priority, part of a strategy to challenge U.S. economic and security primacy in space. Meanwhile, Russia, Japan, India and the European Space Agency all harbor space-mining ambitions of their own. Governing these emerging interests is an outdated treaty framework from the Cold War. Sooner rather than later, we’ll need new agreements to facilitate private investment and ensure international cooperation.

What’s Out There

Back up for a moment. For the record, space is already being heavily exploited, because space resources include non-material assets such as orbital locations and abundant sunlight that enable satellites to provide services to Earth. Indeed, satellite-based telecommunications and global positioning systems have become indispensable infrastructure underpinning the modern economy. Mining space for materials, of course, is another matter.

In the past several decades, planetary science has confirmed what has long been suspected: celestial bodies are potential sources for dozens of natural materials that, in the right time and place, are incredibly valuable. Of these, water may be the most attractive in the near-term, because — with assistance from solar energy or nuclear fission — H2O can be split into hydrogen and oxygen to make rocket propellant, facilitating in-space refueling. So-called “rare earth” metals are also potential targets of asteroid miners intending to service Earth markets. Consisting of 17 elements, including lanthanum, neodymium, and yttrium, these critical materials (most of which are today mined in China at great environmental cost) are required for electronics. And they loom as bottlenecks in making the transition from fossil fuels to renewables backed up by battery storage.

The Moon is a prime space mining target. Boosted by NASA’s mining solicitation, it is likely the first location for commercial mining. The Moon has several advantages. It is relatively close, requiring a journey of only several days by rocket and creating communication lags of only a couple seconds — a delay small enough to allow remote operation of robots from Earth. Its low gravity implies that relatively little energy expenditure will be needed to deliver mined resources to Earth orbit.

The Moon may look parched — and by comparison to Earth, it is. But recent probes have confirmed substantial amounts of water ice lurking in permanently shadowed craters at the lunar poles. Further, it seems that solar winds have implanted significant deposits of helium-3 (a light stable isotope of helium) across the equatorial regions of the Moon. Helium-3 is a potential fuel source for second and third-generation fusion reactors that one hopes will be in service later in the century. The isotope is packed with energy (admittedly hard to unleash in a controlled manner) that might augment sunlight as a source of clean, safe energy on Earth or to power fast spaceships in this century. Between its water and helium-3 deposits, the Moon could be the resource stepping-stone for further solar system exploration.

Asteroids are another near-term mining target. There are all sorts of space rocks hurtling through the solar system, with varying amounts of water, rare earth metals and other materials on board. The asteroid belt between the orbits of Mars and Jupiter contains most of them, many of which are greater than a kilometer in diameter. Although the potential water and mineral wealth of the asteroid belt is vast, the long distance from Earth and requisite travel times and energy consumption rule them out as targets in the near term.

Even the surface of celestial bodies pose a challenge to mining machinery since they consist of unconsolidated rocky materials called regolith instead of more familiar soil.

Wannabe asteroid miners will thus be looking at smaller near-Earth asteroids. While they are much further away than the Moon, many of them could be reached using less energy — and some are even small enough to make it technically possible to tow them to Earth orbit for mining.

Space mining may be essential to crewed exploration missions to Mars. Given the distance and relatively high gravity of Mars (twice that of the Moon), extraction and export of minerals to Earth seems highly unlikely. Rather, most resource extraction on Mars will focus on providing materials to supply exploration missions, refuel spacecraft and enable settlement.

Technology Is the Difference

The prospects for space mining are being driven by technological advances across the space industry. The rise of reusable rocket components and the now-widespread use of off-the-shelf parts are lowering both launch and operations costs. Once limited to government contract missions and the delivery of telecom satellites to orbit, private firms are now emerging as leaders in developing “NewSpace” activities — a catch-all term for endeavors including orbital tourism, orbital manufacturing and mini-satellites providing specialized services. The space sector, with a market capitalization of $400 billion, could grow to as much as $1 trillion by 2040 as private investment soars.

But despite the high-profile commercial advances, governments still call the shots on the leading edge of space resource technologies. The United States extracted the first extraterrestrial materials in space from the Moon during the Apollo missions, followed by the Soviet Union’s recoveries from crewless Luna missions. President Biden recently borrowed one of the Apollo lunar rocks for display in the Oval Office, highlighting the awe that deep space can still summon.

For the time being, scientific samples remain the goal of mining. Last October, NASA’s OSIRIS-REx mission — due to return to Earth in 2023 — collected a small amount of material from the asteroid Bennu. In December, Japan returned a sample of the asteroid Ryugu with the Hayabusa2 spacecraft. And several weeks later, China’s Chang’e 5 mission returned the first lunar samples since the 1970s.

Sample collection is accelerating, with recent missions targeting Mars. Japan is planning to visit the two moons of Mars and extract a sample from one. NASA’s robotic Perseverance rover will collect and cache drilled samples on Mars that could later be returned to Earth. Perseverance also carries gear for the unique MOXIE experiment on Mars — an attempt to produce oxygen on the planet with technologies that could eventually extract oxygen for astronauts to breath and refuel spacecraft.It’s about as wide as the Eiffel Tower is tall and it could be where we obtain the elements needed to power bases on the moon, Mars or in orbit one day.

#### Private companies are key to a growing space mining sector – investors, profitability, and market demand.

Krishnan 20 [C A Krishnan, 8-6-2020, "Space mining: Just around the corner?," Week, <https://www.theweek.in/news/sci-tech/2020/08/06/Space-mining-Just-around-the-corner.html> [accessed 12-6-21] lydia

A Mars mission carrying 100 metric tons cargo in 2022 followed by a manned mission by 2024 are the immediate milestones of Elon Musk’s SpaceX plan which aims to create a self sustaining Mars city by 2050. Just a few decades back this would have sounded as fantasy, but today it looks as if this time frame may actually be bettered. Space missions are set to undergo revolutionary changes and Elon Musk’s vision and timelines are indicators of this. Space is increasingly being seen as a treasure trove of precious minerals and also a place for future human habitation beyond the earth. Global private space industry investors believe that space mining has the potential to shape and define the 21st Century. NASA estimates that the 'Asteroid belt’ holds minerals worth quintillion of dollars. American astrophysicist Neil Degrasse Tyson believes, “The first trillioners will be those who mine asteroids”. The “Main Asteroid Belt” is located between the orbits of Mars and Jupiter, about 450 to 650 million Kilometers from earth, with million asteroids in it. Over the decades, apart from Moon and Mars, governments and private agencies have been carrying out extensive research and studying asteroids for their composition, possibility of mining them and their mining value —Asteriod ‘Bennu’ has been assessed at $670 million and asteroid ‘2011 UW158’ at $ 5.7 trillion. Transportation of the mined resources for utilisation, however, poses major hurdles. A ‘BBC Future’ report by Sarah Cruddas puts the cost of shipping a ton of water into space at about $ 50 million. As per Chris Lewicki, president of Planetary Resources, an asteroid mining company, it takes more energy to escape the first 300 kilometers from the Earth than the next 300 million kilometers. Similarly, bringing back anything more than a few kilograms of samples from space to the Earth would be even more complex in terms of logistics. To start with, therefore, global space industry investors are focusing on keeping mined space resources in space itself for ‘in situ resource utilisation’. Availability of water on the Moon, Mars and asteroids offer very attractive prospects; apart from being crucial for supporting life and growing food, it also opens the possibility of using its constituents, hydrogen and oxygen, for making rocket fuel. Today, the possibility of manufacturing tools and even building habitats on Moon or Mars with the help of 3D printers using iron, nickel, cobalt, gold, platinum, and iridium etc which are available on the Moon, Mars and asteroids seem within reach. Researchers are working on using regolith, the weathered rock particles found on lunar surface for making moon bricks using 3D printers. These bricks will form the basic construction material for the first moon station and even the first moon hotel. Space industry players believe that an investment of $ 4 billion in water mining in space can generate annual revenue worth about $2.4 billion. Similarly, there is a new community of customers who are already looking for buying propellant in space. American space launch provider, United Launch Alliance (ULA), a Lockheed Martin and Boeing joint venture that provides launch rockets, has made it known that, ULA is willing to pay about $ 3000 a Kg for propellant in low earth orbit. Fast paced developments are taking place in the field of space mining technology with private players in the lead. Optical mining using concentrated sunlight, robotics, automated mining applications, advanced drilling machines etc are just a few examples. Participation of private players has reduced the investment burden and greatly enhanced the width and pace of innovation. It is believed that launch of the first asteroid mining vehicle as well as setting up of the first fuelling stations on the Moon and in low earth orbit could become a reality within a decade. Japanese mission ‘Hayabusa’ was the first to bring samples from an asteroid to earth in 2010. ‘Hayabusa - 2’ made its rendezvous with the near earth asteroid ‘162173 RYUGU’ in June 2018, left the asteroid after collecting samples in November 2019 and will be back on earth on December 6, 2020. Similarly the NASA mission OSIRIS-REx, costing about $ 1 billion, launched in 2016 is due to return to earth with samples of asteroid ‘101955 Bennu’ on September 24, 2023. The latest US space mission, ‘Perseverance’ launched on July 30, 2020 will land on Mars on February 18, 2021. It will be using a helicopter on Mars, set to be the first use of a helicopter outside the earth. Apart from collecting samples from Mars and search for signs of habitable conditions on Mars, it will also test the possibility of manufacturing molecular oxygen from the carbon dioxide-rich Mars atmosphere. Beyond the technological capability, there are, however, complex legal issues. While making fuel and water in space and its ‘in situ resource utilisation’ may pass the scrutiny, commercial exploitation of space through minerals mining, tourism, real estate etc may prove hugely contentious in terms of international legal framework for space. The current legal frameworks were adopted when space activities were entirely within the domain of national governments and were confined to research alone. But with the nature of space activities moving from purely research activities to military applications to commercial activities and with the entry of private players and a new community of consumers in space, the vintage outer space treaty has been rendered grossly inadequate; vagueness of the treaty does not cater for the ‘new types of uses’ or the ‘new users’ of space. Louis de Gouyon Matignon, in a thesis on the subject observed that “some states have already taken the absence of express prohibition as a sign that the utilisation of space resources is permissible, and both the USA and Luxembourg recently adopted national legislations expressly allowing it”. This has, however, triggered a response from the international community denouncing such unilateral initiatives and recommending a collective approach on the lines of the laws for high seas and deep sea bed. Whether a widely acceptable new space treaty comes through or not, Space mining is a reality and the early entrants are likely to retain monopoly and huge economic advantages for a very long time.

#### Space mining is key to sustain global resources -- otherwise, resource wars.

MacWhorter 16 [Kevin; J.D. Candidate, William & Mary Law School, "Sustainable Mining: Incentivizing Asteroid Mining in the Name of Environmentalism", William & Mary Environmental Law and Policy Review, Vol 40, Issue 2, Article 11, <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1653&context=wmelpr>] brett

A. Rare Element Mining on Earth

In the next sixty years, scientists predict that certain elements crucial to modern industry such as platinum, zinc, copper, phosphorous, lead, gold, and indium could be exhausted on Earth. 12 Many of these have no synthetic alternative, unlike chemical elements such as oil or diamonds.13 Liquid-crystal display (LCD) televisions, cellphones, and laptops are among the various consumer technologies that use precious metals.14Further, green technologies including wind turbines, solar panels, and catalytic converters require these rare elements. 15 As demand rises for both types of technologies, and as reserves of rare metals fall, prices skyrocket.16 Demand for nonrenewable resources creates conflict, and consumerism in rich countries results in harsh labor treatment for poorer countries.17

In general, the mining industry is extremely destructive to Earth’s environment.18 In fact, depending on the method employed, mining can destroy entire ecosystems by polluting water sources and contributing to deforestation.19 It is by its nature an unsustainable practice, because it involves the extraction of a finite and non-renewable resource.20 Moreover, by extracting tiny amounts of metals from relatively large quantities of ore, the mining industry contributes the largest portion of solid wastes in the world.21 The Environmental Protection Agency (EPA) describes the industry as the source of more toxic and hazardous waste than any other industrial sector [in the United States], costing billions of dollars to address the public health and environmental threats to communities. 22 Poor regulations and oxymoronic corporate definitions of sustainability, however, make it unclear as to just how much waste the industry actually produces.23

Platinum provides an excellent case study of the issue, because it is an extremely rare and expensive metal—an ore expected to exist in vast quantities in asteroids.24 Further, production of platinum has increased sharply in the past sixty years in order to keep up with growing demand for use in new technologies.25 In fact, despite their high costs, platinum group metals are so useful that [one] of [four] industrial goods on Earth require them in production. 26 Scholars do not expect demand to slow any time soon.27 Among other technologies, industries use platinum in products such as catalytic converters, jewelry production, various catalysts for chemical processing, and hydrogen fuel cells.28 While there is no consensus on how far the Earth’s reserves of platinum will take humanity, many scientists agree that platinum ore reserves will deplete in a relatively short amount of time.29

With the rate of mining at an all-time high,30 it is increasingly clear that historical patterns of mineral resources and development cannot simply be assumed to continue unaltered into the future. 31 The platinum mining industry, however, has a strong incentive to increase its rate of extraction as profits grow with the rate of demand. Without any alternative, this destructive practice will continue into the future.32

So-called platinum-group metal (PGM) ores are mined through underground or open cut techniques.33 Due to these practices, all but a very small fraction of the mined platinum ore is disposed of as solid waste.34 The environmental consequences of platinum production are thus quite significant, but like the mining industry in general, the amount of waste is typically under-reported.35

While this is due to high production levels at the moment, those levels will only increase given the estimated future demand of platinum.36 In spite of the negative consequences, mining continues unabated because it is economically important to many areas.37 The future environmental costs provide a major challenge in creating a sustainable system. Relegating at least some mining companies to near-Earth asteroids would reduce the negative effects of future mining levels on Earth. The economic benefits of mining need not be sacrificed for the sake of the environment.38

#### Terrestrial resource scarcity goes nuclear---we outweigh on timeframe, just the prospect of shortages triggers escalation.

Klare 13 [Michael T., The Nation’s defense correspondent, is professor emeritus of peace and world-security studies at Hampshire College and senior visiting fellow at the Arms Control Association in Washington, D.C. His newest book, All Hell Breaking Loose: The Pentagon’s Perspective on Climate Change, will be published this fall. 2013. “How Resource Scarcity and Climate Change Could Produce a Global Explosion,” <https://www.thenation.com/article/archive/how-resource-scarcity-and-climate-change-could-produce-global-explosion/>] brett

Brace yourself. You may not be able to tell yet, but according to global experts and the US intelligence community, the earth is already shifting under you. Whether you know it or not, you’re on a new planet, a resource-shock world of a sort humanity has never before experienced.

Two nightmare scenarios—a global scarcity of vital resources and the onset of extreme climate change—are already beginning to converge and in the coming decades are likely to produce a tidal wave of unrest, rebellion, competition and conflict. Just what this tsunami of disaster will look like may, as yet, be hard to discern, but experts warn of “water wars” over contested river systems, global food riots sparked by soaring prices for life’s basics, mass migrations of climate refugees (with resulting anti-migrant violence) and the breakdown of social order or the collapse of states. At first, such mayhem is likely to arise largely in Africa, Central Asia and other areas of the underdeveloped South, but in time, all regions of the planet will be affected.

To appreciate the power of this encroaching catastrophe, it’s necessary to examine each of the forces that are combining to produce this future cataclysm.

Resource Shortages and Resource Wars

Start with one simple given: the prospect of future scarcities of vital natural resources, including energy, water, land, food and critical minerals. This in itself would guarantee social unrest, geopolitical friction and war.

It is important to note that absolute scarcity doesn’t have to be on the horizon in any given resource category for this scenario to kick in. A lack of adequate supplies to meet the needs of a growing, ever more urbanized and industrialized global population is enough. Given the wave of extinctions that scientists are recording, some resources—particular species of fish, animals and trees, for example—will become less abundant in the decades to come, and may even disappear altogether. But key materials for modern civilization like oil, uranium and copper will simply prove harder and more costly to acquire, leading to supply bottlenecks and periodic shortages.

Oil—the single most important commodity in the international economy—provides an apt example. Although global oil supplies may actually grow in the coming decades, many experts doubt that they can be expanded sufficiently to meet the needs of a rising global middle class that is, for instance, expected to buy millions of new cars in the near future. In its 2011 World Energy Outlook, the International Energy Agency claimed that an anticipated global oil demand of 104 million barrels per day in 2035 will be satisfied. This, the report suggested, would be thanks in large part to additional supplies of “unconventional oil” (Canadian tar sands, shale oil and so on), as well as 55 million barrels of new oil from fields “yet to be found” and “yet to be developed.”

However, many analysts scoff at this optimistic assessment, arguing that rising production costs (for energy that will be ever more difficult and costly to extract), environmental opposition, warfare, corruption and other impediments will make it extremely difficult to achieve increases of this magnitude. In other words, even if production manages for a time to top the 2010 level of 87 million barrels per day, the goal of 104 million barrels will never be reached and the world’s major consumers will face virtual, if not absolute, scarcity.

Water provides another potent example. On an annual basis, the supply of drinking water provided by natural precipitation remains more or less constant: about 40,000 cubic kilometers. But much of this precipitation lands on Greenland, Antarctica, Siberia and inner Amazonia where there are very few people, so the supply available to major concentrations of humanity is often surprisingly limited. In many regions with high population levels, water supplies are already relatively sparse. This is especially true of North Africa, Central Asia and the Middle East, where the demand for water continues to grow as a result of rising populations, urbanization and the emergence of new water-intensive industries. The result, even when the supply remains constant, is an environment of increasing scarcity.

Wherever you look, the picture is roughly the same: supplies of critical resources may be rising or falling, but rarely do they appear to be outpacing demand, producing a sense of widespread and systemic scarcity. However generated, a perception of scarcity—or imminent scarcity—regularly leads to anxiety, resentment, hostility and contentiousness. This pattern is very well understood, and has been evident throughout human history.

In his book Constant Battles, for example, Steven LeBlanc, director of collections for Harvard’s Peabody Museum of Archaeology and Ethnology, notes that many ancient civilizations experienced higher levels of warfare when faced with resource shortages brought about by population growth, crop failures or persistent drought. Jared Diamond, author of the bestseller Collapse, has detected a similar pattern in Mayan civilization and the Anasazi culture of New Mexico’s Chaco Canyon. More recently, concern over adequate food for the home population was a significant factor in Japan’s invasion of Manchuria in 1931 and Germany’s invasions of Poland in 1939 and the Soviet Union in 1941, according to Lizzie Collingham, author of The Taste of War.

Although the global supply of most basic commodities has grown enormously since the end of World War II, analysts see the persistence of resource-related conflict in areas where materials remain scarce or there is anxiety about the future reliability of supplies. Many experts believe, for example, that the fighting in Darfur and other war-ravaged areas of North Africa has been driven, at least in part, by competition among desert tribes for access to scarce water supplies, exacerbated in some cases by rising population levels.

“In Darfur,” says a 2009 report from the UN Environment Programme on the role of natural resources in the conflict, “recurrent drought, increasing demographic pressures, and political marginalization are among the forces that have pushed the region into a spiral of lawlessness and violence that has led to 300,000 deaths and the displacement of more than two million people since 2003.”

Anxiety over future supplies is often also a factor in conflicts that break out over access to oil or control of contested undersea reserves of oil and natural gas. In 1979, for instance, when the Islamic revolution in Iran overthrew the Shah and the Soviets invaded Afghanistan, Washington began to fear that someday it might be denied access to Persian Gulf oil. At that point, President Jimmy Carter promptly announced what came to be called the Carter Doctrine. In his 1980 State of the Union Address, Carter affirmed that any move to impede the flow of oil from the Gulf would be viewed as a threat to America’s “vital interests” and would be repelled by “any means necessary, including military force.”

In 1990, this principle was invoked by President George H.W. Bush to justify intervention in the first Persian Gulf War, just as his son would use it, in part, to justify the 2003 invasion of Iraq. Today, it remains the basis for US plans to employ force to stop the Iranians from closing the Strait of Hormuz, the strategic waterway connecting the Persian Gulf to the Indian Ocean through which about 35 percent of the world’s seaborne oil commerce passes.

Recently, a set of resource conflicts have been rising toward the boiling point between China and its neighbors in Southeast Asia when it comes to control of offshore oil and gas reserves in the South China Sea. Although the resulting naval clashes have yet to result in a loss of life, a strong possibility of military escalation exists. A similar situation has also arisen in the East China Sea, where China and Japan are jousting for control over similarly valuable undersea reserves. Meanwhile, in the South Atlantic Ocean, Argentina and Britain are once again squabbling over the Falkland Islands (called Las Malvinas by the Argentinians) because oil has been discovered in surrounding waters.

By all accounts, resource-driven potential conflicts like these will only multiply in the years ahead as demand rises, supplies dwindle and more of what remains will be found in disputed areas. In a 2012 study titled Resources Futures, the respected British think-tank Chatham House expressed particular concern about possible resource wars over water, especially in areas like the Nile and Jordan River basins where several groups or countries must share the same river for the majority of their water supplies and few possess the wherewithal to develop alternatives. “Against this backdrop of tight supplies and competition, issues related to water rights, prices, and pollution are becoming contentious,” the report noted. “In areas with limited capacity to govern shared resources, balance competing demands, and mobilize new investments, tensions over water may erupt into more open confrontations.”

### Case

#### Capitalism solves war.

Mina E. Tanious 18, General Authority for Investment and Free Zones (GAFI), Giza, Egypt and Faculty of Economics and Political Science, Cairo University, Giza, Egypt. REPS 4,1, July 7, 2018. “The impact of economic interdependence on the probability of conflict between states” <https://www.emerald.com/insight/content/doi/10.1108/REPS-10-2018-010/full/pdf> brett

Liberals view that increasing ties between countries in some fields encourages them to achieve greater cooperation in other fields. These linkages are supposed to strengthen communication and reduce misunderstandings which may cause tension and creates cultural and institutional mechanisms capable of mediating conflicts that may arise between them. At the same time, mutual recognition of mutual benefits enhances peace.

Liberals believe that economic relations between nations lead to peace, with liberals pointing to three important points (Korbel and Chen, 2009, p. 15):

(1) The costs of waging a war against state’s economic partner are very high because fighting against a partner with which the state trade and invest, the state actually fights against itself because a war between the state and its partner must have a negative effect on the state’s economy.

(2) Economic ties change states’ preferences when economic ties between two states become stronger and these two states become more economically interdependent or even integrated, economic interests – compared with other national interests such as military buildup – become the most important.

(3) Strong economic ties make non-military threats such as economic sanctions credible. Therefore, when there is a conflict between two states that have strong economic ties, a non-military threat is more likely to be the choice.

Liberals, assuming that states seek to maximize absolute welfare, maintain that situations of high trade should continue into the foreseeable future as long as states are rational; such actors have no reason to forsake the benefits from trade, especially defection from the trading arrangement will only lead to retaliation. Liberals can argue that interdependence as reflected in high trade at any particular moment in time-will foster peace, given the benefits of trade over war (Copeland, 1996, p. 16).

The core liberal position is straightforward trade provides valuable benefits, or “gains from trade,” to any particular state. A dependent state should therefore seek to avoid war, as peaceful trading gives it all the benefits of close ties without any of the costs and risks of war. Trade pays more than war, so dependent states should prefer to trade not invade (Copeland, 1996, p. 8).

#### Studies prove.

Dafoe 14, Political Science and International Economics (Allan & Nina Kelsey; assistant professor in political science at Yale & research associate in international economics at Berkeley; Journal of Peace Research, “Observing the capitalist peace: Examining market-mediated signaling and other mechanisms,” http://jpr.sagepub.com.proxy.lib.umich.edu/content/51/5/619.full)

Countries with liberal political and economic systems rarely use military force against each other. This anomalous peace has been most prominently attributed to the ‘democratic peace’ – the apparent tendency for democratic countries to avoid militarized conflict with each other (Maoz & Russett, 1993; Ray, 1995; Dafoe, Oneal & Russett, 2013).More recently, however, scholars have proposed that the liberal peace could be partly (Russett & Oneal, 2001) or primarily (Gartzke, 2007; but see Dafoe, 2011) attributed to liberal economic factors, such as commercial and financial interdependence. In particular, Erik Gartzke, Quan Li & Charles Boehmer (2001), henceforth referred to as GLB, have demonstrated that measures of capital openness have a substantial and statistically significant association with peaceful dyadic relations. Gartzke (2007) confirms that this association is robust to a large variety of model specifications. To explain this correlation, GLB propose that countries with open capital markets are more able to credibly signal their resolve through the bearing of greater economic costs prior to the outbreak of militarized conflict. This explanation is novel and plausible, and resonates with the rationalist view of asymmetric information as a cause of conflict (Fearon, 1995). Moreover, it implies clear testable predictions on evidential domains different from those examined by GLB. In this article we exploit this opportunity by constructing a confirmatory test of GLB’s theory of market-mediated signaling. We first develop an innovative quantitative case selection technique to identify crucial cases where the mechanism of market-mediated signaling should be most easily observed. Specifically, we employ quantitative data and the statistical models used to support the theory we are probing to create an impartial and transparentmeans of selecting cases in which the theory – as specified by the theory’s creators –makes its most confident predictions.We implement three different case selection rules to select cases that optimize on two criteria: (1) maximizing the inferential leverage of our cases, and (2) minimizing selection bias. We examine these cases for a necessary implication of market-mediated signaling: that key participants drew a connection between conflictual events and adverse market movements. Such an inference is a necessary step in the process by which market-mediated costs can signal resolve. For evidence of this we examine news media, government documents, memoirs, historical works, and other sources. We additionally examine other sources, such as market data, for evidence that economic costs were caused by escalatory events. Based on this analysis, we assess the evidence for GLB’s theory of market mediated costly signaling. Our article then considers a more complex heterogeneous effects version of market-mediated signaling in which unspecified scope conditions are required for the mechanism to operate. Our design has the feature of selecting cases in which scope conditions are most likely to be absent. This allows us to perform an exploratory analysis of these cases, looking for possible scope conditions. We also consider alternative potential mechanisms. Our cases are reviewed in more detail in the online appendix.1 To summarize our results, our confirmatory test finds that while market-mediated signaling may be operative in the most serious disputes, it was largely absent in the less serious disputes that characterize most of the sample of militarized interstate disputes (MIDs). This suggests either that other mechanisms account for the correlation between capital openness and peace, or that the scope conditions for market-mediated signaling are restrictive. Of the signals that we observed, strategic market-mediated signals were relatively more important than automatic market-mediated signals in the most serious conflicts. We identify a number of potential scope conditions, such as that (1) the conflict must be driven by bargaining failure arising from uncertainty and (2) the economic costs need to escalate gradually and need to be substantial, but less than the expected military costs of conflict. Finally, there were a number of other explanations that seemed present in the cases we examined and could account for the capitalist peace: capital openness is associated with greater anticipated economic costs of conflict; capital openness leads third parties to have a greater stake in the conflict and therefore be more willing to intervene; a dyadic acceptance of the status quo could promote both peace and capital openness; and countries seeking to institutionalize a regional peace might instrumentally harness the pacifying effects of liberal markets. The correlation: Open capital markets and peace The empirical puzzle at the core of this article is the significant and robust correlation noted by GLB between high levels of capital openness in both members of a dyad and the infrequent incidence of militarized interstate disputes (MIDs) and wars between the members of this dyad (Gartzke, Li & Boehmer, 2001). The index of capital openness (CAPOPEN) is intended to capture the ‘difficulty states face in seeking to impose restrictions on capital flows (the degree of lost policy autonomy due to globalization)’ (Gartzke & Li, 2003: 575). CAPOPEN is constructed from data drawn from the widely used IMF’s Annual Reports on Exchange Arrangements and Exchange Controls; it is a combination of eight binary variables that measure different types of government restrictions on capital and currency flow (Gartzke, Li & Boehmer, 2001: 407). The measure of CAPOPEN starts in 1966 and is defined for many countries (increasingly more over time). Most of the countries that do not have a measure of CAPOPEN are communist.2 GLB implement this variable in a dyadic framework by creating a new variable, CAPOPENL, which is the smaller of the two dyadic values of CAPOPEN. This operationalization is sometimes referred to as the ‘weak-link’ specification since the functional form is consonant with a model of war in which the ‘weakest link’ in a dyad determines the probability of war. CAPOPENL has a negative monotonic association with the incidence of MIDs, fatal MIDs, and wars (see Figure 1).3 The strength of the estimated empirical association between peace and CAPOPENL, using a modified version of the dataset and model from Gartzke (2007), is comparable to that between peace and, respectively, joint democracy, log of distance, or the GDP of a contiguous dyad (Gartzke, 2007: 179; Gartzke, Li & Boehmer, 2001: 412). In summary, CAPOPENL seems to be an important and robust correlate of peace. The question of why specifically this correlation exists, however, remains to be answered. The mechanism: Market-mediated signaling? Gartzke, Li & Boehmer (2001) argue that the classic liberal account for the pacific effect of economic interdependence – that interdependence increases the expected costs of war – is not consistent with the bargaining theory of war (see also Morrow, 1999). GLB argue that ‘conventional descriptions of interdependence see war as less likely because states face additional opportunity costs for fighting. The problem with such an account is that it ignores incentives to capitalize on an opponent’s reticence to fight’ (Gartzke, Li & Boehmer, 2001: 400.)4 Instead, GLB (see also Gartzke, 2003; Gartzke & Li, 2003) argue that financial interdependence could promote peace by facilitating the sending of costly signals. As the probability of militarized conflict increases, states incur a variety of automatic and strategically imposed economic costs as a consequence of escalation toward conflict. Those states that persist in a dispute despite these costs will reveal their willingness to tolerate them, and hence signal resolve. The greater the degree of economic interdependence, the more a resolved country could demonstrate its willingness to suffer costs ex ante to militarized conflict. Gartzke, Li & Boehmer’s mechanism implies a commonly perceived costly signal before militarized conflict breaks out or escalates: if market-mediated signaling is to account for the correlation between CAPOPENL and the absence of MIDs, then visible market-mediated costs should occur prior to or during periods of real or potential conflict (Gartzke, Li & Boehmer, 2001). Thus, the proposed mechanism should leave many visible footprints in the historical record. This theory predicts that these visible signals must arise in any escalating conflict, involving countries with high capital openness, in which this mechanism is operative Clarifying the signaling mechanism Gartzke, Li & Boehmer’s signaling mechanism is mostly conceptualized on an abstract, game-theoretic level (Gartzke, Li & Boehmer, 2001). In order to elucidate the types of observations that could inform this theory’s validity, we discuss with greater specificity the possible ways in which such signaling might occur. A conceptual classification of costly signals The term signaling connotes an intentional communicative act by one party directed towards another. Because the term signaling thus suggests a willful act, and a signal of resolve is only credible if it is costly, scholars have sometimes concluded that states involved in bargaining under incomplete information could advance their interests by imposing costs on themselves and thereby signaling their resolve (e.g. Lektzian & Sprecher, 2007). However, the game-theoretic concept of signaling refers more generally to any situation in which an actor’s behavior reveals information about her private information. In fact, states frequently adopt sanctions with low costs to themselves and high costs to their rivals because doing so is often a rational bargaining tactic on other grounds: they are trying to coerce their rival to concede the issue. Bargaining encounters of this type can be conceptualized as a type of war-of-attrition game in which each actor attempts to coerce the other through the imposition of escalating costs. Such encounters also provide the opportunity for signaling: when states resist the costs imposed by their rivals, they ‘signal’ their resolve. If at some point one party perceives the conflict to have become too costly and steps back, that party ‘signals’ a lack of resolve. Thus, this kind of signaling arises as a by-product of another’s coercive attempts. In other words, costly signals come in two forms: self-inflicted (information about a leader arising from a leader’s intentional or incidental infliction of costs on himself) or imposed (information about a leader that arises from a leader’s response to a rival’s imposition of costs). Additionally, costs may arise as an automatic byproduct of escalation towards military conflict or may be a tool of statecraft that is strategically employed during a conflict. The automatic mechanism stipulates that as the probability of conflict increases, various economic assets will lose value due to the risk of conflict and investor flight. However, the occurrence of these costs may also be intentional outcomes of specific escalatory decisions of the states, as in the case of deliberate sanctions; in this case they are strategic. Finally, at a practical level, we identify three different potential kinds of economic costs of militarized conflict that may be mediated by open capital markets: capital costs from political risk, monetary coercion, and business sanctions.

#### Capitalism is sustainable

Bailey ’18 [Ronald; March 12; B.A. in 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, “Climate Change Problems Will Be Solved Through Economic Growth,” <https://reason.com/2018/03/12/climate-change-problems-will-be-solved-t>; RP]

"It is, I promise, worse than you think," David Wallace-Wells wrote in an infamously apocalyptic 2017 New York Magazine article. "Indeed, absent a significant adjustment to how billions of humans conduct their lives, parts of the Earth will likely become close to uninhabitable, and other parts horrifically inhospitable, as soon as the end of this century." The "it" is man-made climate change. Temperatures will become scalding, crops will wither, and rising seas will inundate coastal cities, Wallace-Wells warns. But toward the end of his screed, he somewhat dismissively observes that "by and large, the scientists have an enormous confidence in the ingenuity of humans….Now we've found a way to engineer our own doomsday, and surely we will find a way to engineer our way out of it, one way or another." Over at Scientific American, John Horgan considers some eco-modernist views on how humanity will indeed go about engineering our way out of the problems that climate change may pose. In an essay called "Should We Chill Out About Global Warming?," Horgan reports the more dynamic and positive analyses of two eco-modernist thinkers, Harvard psychologist Steven Pinker and science journalist Will Boisvert. In an essay for The Breakthrough Journal, Pinker notes that such optimism "is commonly dismissed as the 'faith that technology will save us.' In fact, it is a skepticism that the status quo will doom us—that knowledge and behavior will remain frozen in their current state for perpetuity. Indeed, a naive faith in stasis has repeatedly led to prophecies of environmental doomsdays that never happened." In his new book, Enlightenment Now, Pinker points out that "as the world gets richer and more tech-savvy, it dematerializes, decarbonizes, and densifies, sparing land and species." Economic growth and technological progress are the solutions not only to climate change but to most of the problems that bedevil humanity. Boisvert, meanwhile, tackles and rebuts the apocalyptic prophecies made by eco-pessimists like Wallace-Wells, specifically with regard to food production and availabilty, water supplies, heat waves, and rising seas. "No, this isn't a denialist screed," Boisvert writes. "Human greenhouse emissions will warm the planet, raise the seas and derange the weather, and the resulting heat, flood and drought will be cataclysmic. Cataclysmic—but not apocalyptic. While the climate upheaval will be large, the consequences for human well-being will be small. Looked at in the broader context of economic development, climate change will barely slow our progress in the effort to raise living standards." Boisvert proceeds to show how a series of technologies—drought-resistant crops, cheap desalination, widespread adoption of air-conditioning, modern construction techniques—will ameliorate and overcome the problems caused by rising temperatures. He is entirely correct when he notes, "The most inexorable feature of climate-change modeling isn't the advance of the sea but the steady economic growth that will make life better despite global warming." Horgan, Pinker, and Boisvert are all essentially endorsing what I have called "the progress solution" to climate change. As I wrote in 2009, "It is surely not unreasonable to argue that if one wants to help future generations deal with climate change, the best policies would be those that encourage rapid economic growth. This would endow future generations with the wealth and superior technologies that could be used to handle whatever comes at them including climate change." Six years later I added that that "richer is more climate-friendly, especially for developing countries. Why? Because faster growth means higher incomes, which correlate with lower population growth. Greater wealth also means higher agricultural productivity, freeing up land for forests to grow as well as speedier progress toward developing and deploying cheaper non–fossil fuel energy technologies. These trends can act synergistically to ameliorate man-made climate change." Horgan concludes, "Greens fear that optimism will foster complacency and hence undermine activism. But I find the essays of Pinker and Boisvert inspiring, not enervating….These days, despair is a bigger problem than optimism." Counseling despair has always been wrong when human ingenuity is left free to solve problems, and that will prove to be the case with climate change as well.

#### Growth and innovation solves warming.

Ogutonye, 21—Policy Lead, Science & Innovation Unit, Tony Blair Institute for Global Change (Olamide, “Should Tech Make Us Optimistic About Climate Change?,” <https://institute.global/policy/should-tech-make-us-optimistic-about-climate-change>, dml)

In the middle of a climate emergency, it is challenging to stay upbeat. Yet the good news is that investment in climate technology has continued to grow since the early 2010s. US-listed companies involved with providing technology solutions that support global decarbonisation have consistently outperformed the average since 2019 (Figure 7). Venture capital (VC) investment in the sector grew tenfold between 2013 and 2018, representing five times the growth rate of the overall VC market. By comparison, the growth rate of VC investment in Artificial Intelligence was a third of climate tech between 2013 and 2018 although AI is renowned for its uptick within the same timeframe. Beyond VC, public investment in climate technology research has continued to grow too. In 2019, government research and development funding for energy technologies alone stood at $30 billion, with around 80 per cent of it aimed at low-carbon solutions.

In addition to the positive role of technology, political leaders are increasingly showing a willingness to make ambitious commitments on climate. The Paris Agreement is a case in point. The international treaty was adopted in 2015 and ratified internationally within a year – a much quicker pace than its predecessor, the Kyoto Protocol, which took eight years. The Paris deal grew into a political snowball, galvanising further commitment from most of the world’s leading emitters and arguably becoming the most symbolic climate event of the 21st century. The US withdrawal from the Paris Agreement in 2019 dealt a political blow to the global pact although the decision, since reversed by President Biden, did not resonate or last long enough to have any major impact.

The Biden-Harris administration has already indicated that it will not sit on the fence but will instead revive the country’s leadership on climate action. In the UK and elsewhere, similar efforts can be observed as more countries commit to some form of net zero target. More than 100 countries have pledged a commitment towards net zero, with estimates suggesting that over 70 per cent of global GDP and 55 per cent of CO2 emissions are now covered by a similar target. A Climate Action Tracker Report indicates that the cumulative effect of countries’ pledges to the Paris Agreement – if kept and fully achieved – could keep global temperature rise below 2.1°C by 2100, putting the stated goal of 1.5°C within striking distance.

As explored in our recent Institute paper, there are also important insights for politicians in terms of applying lessons from the Covid-19 pandemic to the climate emergency. Although the pandemic is different in scale, complexity and timeline, it offers an immediate window into how policy leaders can adapt and make decisions in order to better support climate innovation. Countries can also apply the “recovering better together” principles outlined by the UN, which calls for a commitment to climate-related actions as economies recover from the Covid-19 slowdown. More than 60 countries, including high emitters, are already making an explicit promise to link their nationally determined contributions (NDC) to Covid-19 recovery, supported by the United Nations Development Programme’s Climate Promise programme. Countries in the Global South are equally aligning their climate mission with international support for various NDC support programmes. A green recovery can cut the level of 2030 emissions to 25 per cent lower than projections based on pre-Covid commitments and put the world close to a 2°C pathway. The pandemic has also highlighted the significance of tech innovation, not least in record-breaking vaccine delivery but also in the suite of digital solutions developed for contact tracing, compliance monitoring and management of health-care records.

The global financial landscape is evolving to become more responsive to climate innovation. Since they were first issued in 2007, green bonds have grown into what is now estimated to become a $1 trillion market. Analysts expect as much as $500 billion of green bonds this year as the EU raises capital for its Covid recovery fund. From target-linked to transition bonds, innovations in this green market are being used to bring projects in energy, transport, buildings and other economic sectors to life. Investor-led initiatives such as Climate Action 100+, whose members control over $50 trillion of assets, are actively using funds to ensure the world’s largest corporate greenhouse gas emitters commit to climate action. Other investor networks are pursuing a similar agenda, including Europe’s Institutional Investors Group on Climate Change (IIGCC) and Australia and New Zealand’s Investor Group on Climate Change (IGCC). Humanity’s competence in technology and innovation will be central to the race in mitigating and tackling climate change.

#### Warming isn’t existential—updated studies prove

Nordhaus 20 - (Ted Nordhaus is the founder and executive director of the Breakthrough Institute and a co-author of “An Ecomodernist Manifesto.”; 1-23-2020, WSJ, "Ignore the Fake Climate Debate," doa: 12-27-2020) url: <https://www.wsj.com/articles/ignore-the-fake-climate-debate-11579795816>

Beyond the headlines and social media, where Greta Thunberg, Donald Trump and the online armies of climate “alarmists” and “deniers” do battle, there is a real climate debate bubbling along in scientific journals, conferences and, occasionally, even in the halls of Congress. It gets a lot less attention than the boisterous and fake debate that dominates our public discourse, but it is much more relevant to how the world might actually address the problem. In the real climate debate, no one denies the relationship between human emissions of greenhouse gases and a warming climate. Instead, the disagreement comes down to different views of climate risk in the face of multiple, cascading uncertainties. On one side of the debate are optimists, who believe that, with improving technology and greater affluence, our societies will prove quite adaptable to a changing climate. On the other side are pessimists, who are more concerned about the risks associated with rapid, large-scale and poorly understood transformations of the climate system. But most pessimists do not believe that runaway climate change or a hothouse earth are plausible scenarios, much less that human extinction is imminent. And most optimists recognize a need for policies to address climate change, even if they don’t support the radical measures that Ms. Thunberg and others have demanded. In the fake climate debate, both sides agree that economic growth and reduced emissions vary inversely; it’s a zero-sum game. In the real debate, the relationship is much more complicated. Long-term economic growth is associated with both rising per capita energy consumption and slower population growth. For this reason, as the world continues to get richer, higher per capita energy consumption is likely to be offset by a lower population. A richer world will also likely be more technologically advanced, which means that energy consumption should be less carbon-intensive than it would be in a poorer, less technologically advanced future. In fact, a number of the high-emissions scenarios produced by the United Nations Intergovernmental Panel on Climate Change involve futures in which the world is relatively poor and populous and less technologically advanced. Affluent, developed societies are also much better equipped to respond to climate extremes and natural disasters. That’s why natural disasters kill and displace many more people in poor societies than in rich ones. It’s not just seawalls and flood channels that make us resilient; it’s air conditioning and refrigeration, modern transportation and communications networks, early warning systems, first responders and public health bureaucracies. New research published in the journal Global Environmental Change finds that global economic growth over the last decade has reduced climate mortality by a factor of five, with the greatest benefits documented in the poorest nations. In low-lying Bangladesh, 300,000 people died in Cyclone Bhola in 1970, when 80% of the population lived in extreme poverty. In 2019, with less than 20% of the population living in extreme poverty, Cyclone Fani killed just five people. “Poor nations are most vulnerable to a changing climate. The fastest way to reduce that vulnerability is through economic development.” So while it is true that poor nations are most vulnerable to a changing climate, it is also true that the fastest way to reduce that vulnerability is through economic development, which requires infrastructure and industrialization. Those activities, in turn, require cement, steel, process heat and chemical inputs, all of which are impossible to produce today without fossil fuels. For this and other reasons, the world is unlikely to cut emissions fast enough to stabilize global temperatures at less than 2 degrees above pre-industrial levels, the long-standing international target, much less 1.5 degrees, as many activists now demand. But recent forecasts also suggest that many of the worst-case climate scenarios produced in the last decade, which assumed unbounded economic growth and fossil-fuel development, are also very unlikely. There is still substantial uncertainty about how sensitive global temperatures will be to higher emissions over the long-term. But the best estimates now suggest that the world is on track for 3 degrees of warming by the end of this century, not 4 or 5 degrees as was once feared. That is due in part to slower economic growth in the wake of the global financial crisis, but also to decades of technology policy and energy-modernization efforts. “We have better and cleaner technologies available today because policy-makers in the U.S. and elsewhere set out to develop those technologies.” The energy intensity of the global economy continues to fall. Lower-carbon natural gas has displaced coal as the primary source of new fossil energy. The falling cost of wind and solar energy has begun to have an effect on the growth of fossil fuels. Even nuclear energy has made a modest comeback in Asia.

#### [Optional] Caps key to space col---extinction.

Everett 16 (Sean, CEO of Prome Biological Intelligence, a global biotechnology company, editor of Medium’s news outlet dedicated to space colonialization titled “The Mission”, BS Mathematics & Actuarial Science, MBA from UChicago,“Humanity’s Extinction Event Is Coming” https://medium.com/the-mission/humanitys-extinction-event-is-coming-c0f84f1803f)

But the reality is that an asteroid impact, a change in our magnetic field, or the rising temperature of Earth’s climate are all events that we currently cannot escape. There is no back-up plan. We are, for better or worse, tied to the fate of this planet. As history has shown, that’s not a good fate to be tied to. In fact on September 7, 2016 a 30-foot asteroid flew between the Earth and the Moon. Our most powerful instruments only detected it with two days notice. Two days. If the asteroid was only 1000-foot wide, it would destroy all human life and we’d have no back-up to get out of it. Even the White House is worried about it. Five, yes five, major extinction events have occurred on our planet that we know about. We’re due for another. And when that happens, what’s our alternative? You can’t move to another house. You can’t buy survival, even with a billion dollars in the bank. The only way out, is up. We must find a way to become multi-planetary if we want to save humanity, your family, and yes, even yourself. Only this can restore the honor we seemed to have lost from the brave days of the 60s, while also ensuring our survival. It’s for the species, folks. And as a species, we have not allowed ourselves the opportunity to blast off for the stars. Only the space race in the 60s when we were afraid enough of a self-inflicted global extinction event (read: nuclear) that we put forth the funding required to launch into orbit and onto our moon. We didn’t have calculators back then, and now we have supercomputers in our pocket, but no one is allowed out of our atmosphere, save for a few communication and spy satellites. Doesn’t that make you mad? It’s not some oppressive government that tells us no. It’s us. We pay our taxes. We elect leaders. Those leaders choose Defense as the primary budget line item, but forget about defending against the forthcoming apocalypse. Funding for NASA in the United States has decreased from 4% of the national budget in the 60s to about 0.5% from 2010 onwards. That’s just the money side. But in order to move past this threshold from our home planet to space and then onto other planets, we need to do two things: Travel there. Survive. Luckily, we can simplify the problem of passing this barrier by sending machines in our place. Like TARS from Interstellar, they can go places humans cannot and explore the environment for habitability and resources, even in particularly hostile conditions. Maybe not black hole hostile, but definitely Mars hostile, as the Curiosity Rover has shown. Only now, with a few bold, private startups are we beginning to see a re-emergence of the space industry. We are about to pass a few very important tests that allow us to explore and visit the cosmos. The first is launching physical things into space. This is the catalyst that will jump start a new space race. Prices of sending cargo are falling dramatically, down to nearly $500 per pound of payload with SpaceX’s Falcon 9 heavy re-usable rocket. Note that the re-usable part is key. We can’t throw away our “space car” every time we Uber it. And once that becomes standard and cost-optimized we might be able to get that down to $10 per pound. Imagine what could happen when it costs the same amount to ship something across town as it does into space. The second, and this is just as important, is the wave of autonomous machines. Tesla has popularized the notion of self-driving cars. SpaceX lands their rocket onto a small barge in the ocean autonomously. Companies are buying startups in the space. Self-driving will be our gift, our talisman, on the quest to save the species by becoming multi-planetary. II. Shipping Ourselves to Space The graph below is from the Founders Fund manifesto, showing the decreasing cost of launching something into space. It begins with the 1960s US-versus-Russia space race and extends to the present day SpaceX-versus-Blue Origin reusable rocket race. The cheapest method we have today is SpaceX’s Falcon series rockets. With the Falcon 9 Heavy, it’s predicted launching cargo into space will be cheaper than ever before, at $750 per pound of payload delivered to low earth orbit (LOE)on an expendable rocket. You have to note here, however, that these statistics are as cheap as possible. It costs more to deliver payload on a non-reusable rocket, and on something that’s further out than LEO, like geosynchronous orbit, or to Mars. For example, based on SpaceX’s published pricing, it would be at least 4x more expensive to deliver far less cargo to Mars. So what happens when we reduce that cost to $10 per pound? Namely, an explosion of startups, much like iOS. Instead of pushing to production for your continuously deployed web and mobile app, we will see future developers push to production by deploying physical things into space. “STAGE” takes on an entirely new meaning for software developers when it means your automated regression tests fail, it could blow up a rocket and hurt people on board. That’s why SpaceX and Blue Origins exist. To make this continuous-deployment-to-space process as cheap and fast as possible. By Elon’s calculations, every 15 minutes. III. Self-Driving Space Explorers The most successful products for space, at least in the beginning, will make money by pushing this stuff into orbit. Things like science experiments and new 3D printers. A company called Made in Space creates a number of these products, including the empty box you see below used for sending things up with Blue Origin. The box shown in gray is a specialized 3D printer that works in zero gravity. Remember how most 3D printers work. It squeezes out a single layer of liquid ooze, and then another, over and over again until it builds up enough vertically that it creates an object. This can be simple plastic or more esoteroic metals. But when you’re “dripping” something, held down in place by gravity, the entire process has to be re-imagined for space. Things in zero-G would just float away. Enter these chaps. There’s also the very real need for oxygen, food, water, and shelter from the harsh elements. Funny how we will end up recreating Maslow’s Heirarchy in every new voyage or planetoid we want to colonize. And space mining is off to the races with the recent announcement of Deep Space Industry’s Prospector-1: Their vision is to extract water from asteroids and use the chemical components to hydrate us, but also as oxygen (breathing) and hydrogen (fuel). To do that, you have to identify candidate asteroids, physically get to them, land and attach, and then do surveying, prospecting, and extraction. In short, you’re going to need some level of self-driving capabilities to make this happen. And wouldn’t it be nice if it “just worked” right out of the box. Unfortunately, in space you don’t have fleets of these space craft, millions of miles of training data, maps, or an internet connection to the cloud so how the heck are deep learning algorithms going to work? I don’t think they will. And that’s what I believe we need a better approach.

#### Transition goes nuclear from cap

#### 1---Security threats.

Mann 14 [Eric Mann is a special agent with a United States federal agency, with significant domestic and international counterintelligence and counter-terrorism experience. Worked as a special assistant for a U.S. Senator and served as a presidential appointee for the U.S. Congress. He is currently responsible for an internal security and vulnerability assessment program. Bachelors @ University of South Carolina, Graduate degree in Homeland Security @ Georgetown. “AUSTERITY, ECONOMIC DECLINE, AND FINANCIAL WEAPONS OF WAR: A NEW PARADIGM FOR GLOBAL SECURITY,” May 2014, <https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/37262/MANN-THESIS-2014.pdf>]

The conclusions reached in this thesis demonstrate how economic considerations within states can figure prominently into the calculus for future conflicts. The findings also suggest that security issues with economic or financial underpinnings will transcend classical determinants of war and conflict, and change the manner by which rival states engage in hostile acts toward one another. The research shows that security concerns emanating from economic uncertainty and the inherent vulnerabilities within global financial markets will present new challenges for national security, and provide developing states new asymmetric options for balancing against stronger states.¶ The security areas, identified in the proceeding chapters, are likely to mature into global security threats in the immediate future. As the case study on South Korea suggest, the overlapping security issues associated with economic decline and reduced military spending by the United States will affect allied confidence in America’s security guarantees. The study shows that this outcome could cause regional instability or realignments of strategic partnerships in the Asia-pacific region with ramifications for U.S. national security. Rival states and non-state groups may also become emboldened to challenge America’s status in the unipolar international system.¶ The potential risks associated with stolen or loose WMD, resulting from poor security, can also pose a threat to U.S. national security. The case study on Pakistan, Syria and North Korea show how financial constraints affect weapons security making weapons vulnerable to theft, and how financial factors can influence WMD proliferation by contributing to the motivating factors behind a trusted insider’s decision to sell weapons technology. The inherent vulnerabilities within the global financial markets will provide terrorists’ organizations and other non-state groups, who object to the current international system or distribution of power, with opportunities to disrupt global finance and perhaps weaken America’s status. A more ominous threat originates from states intent on increasing diversification of foreign currency holdings, establishing alternatives to the dollar for international trade, or engaging financial warfare against the United States.

#### 2---Violent collapse.

Milne and Kinsella, 17—Faculty of English, University of Cambridge AND School of Media, Culture and Creative Arts, Faculty of Humanities, Curtin University (Drew and John, “NUCLEAR THEORY DEGREE ZERO, WITH TWO CHEERS FOR DERRIDA,” Angelaki, 22:3, 1-16,) brett

Another version of the “accelerationist” argument captures some of the ideological workings of the term. In Marxist circles, an “accelerationist” is someone who thinks that the collapse of capitalism will be hastened by allowing reactionary forces to speed up capitalism’s self-destruction. There are occasions when such an argument has validity: nothing about the form of the argument makes it inherently or structurally wrong. There are revolutionary moments when allowing capitalism to collapse in order to rebuild a socialist society is a better path than propping up a failing capitalist regime. The judgement is political rather than philosophical. In most contexts, however, the accelerationist argument, especially as a political principle, is deeply dangerous. It would be better, for example, to preserve a failing US capitalist regime while building social forces to take it over, than to allow the nuclear weapons of the United States to fall into the hands of a suicidal military rearguard or some counter-revolutionary terrorist organisation. Preserving the possibility of human life might involve propping up collapsing capitalist institutions, not least the nuclear safety inspectorate, rather than allowing humanity to be swallowed up by some death spiral of presidential dictators in fear of being toppled. These are critical judgements that could arise at any moment, with real risks that poor judgements will hasten a nuclear confrontation that leads to mutually assured annihilation. The formal shape of an accelerationist argument needs to be understood strategically and politically if it is to address nuclear questions.

#### No climate wars.

Adams et al. 18, Courtland Adams – School of Geography, The University of Melbourne, Carlton Victoria, Australia., Tobias Ide – School of Geography, The University of Melbourne, Carlton Victoria, Australia. Georg Eckert Institute, Braunschweig, Germany, Jon Barnett – School of Geography, The University of Melbourne, Carlton Victoria, Australia., and Adrien Detges – Department of Political and Social Sciences, Freie Universität Berlin, Berlin, Germany. Nature Climate Change | VOL 8 | MARCH 2018 | 200–203 | “Sampling bias in climate–conflict research” <https://www.nature.com/articles/s41558-018-0068-2> brett

A growing number of policymakers, journalists and scholars are linking climate change to violent conflict9. Nevertheless, scientific evidence of this relationship remains elusive due to heterogeneous research designs, variables, data sets and scales of analysis10,11. Amid the array of disparate findings is a core of meta-analyses that are based on statistical methods12,13 as well as several in-depth studies linking climate change to highly prominent conflicts such as those in Darfur or Syria14,15.Critics of this research point to an array of methodological problems, and to a lesser extent a deeper underlying problem with a study design that selects only cases where conflict is present or where data are readily available1–4,10. Researchers have, for instance, intensively studied the impact of a multi-year drought on the onset of the Syrian civil war in 2011, while there is little analysis of responses to the same drought in Jordan or Lebanon, where no large-scale violence erupted16. So, if the evidence of a causal associa-tion between climate and violent conflict is informed only by excep-tional instances where violent conflict arises and climate also varies in some way, it is unable to explain the vastly more ubiquitous and continuing condition of peace under a changing climate.Other critics of the research claiming a link between climate change and violent conflict have pointed to the way it stigmatizes some places—most often ‘Africa’ or a few African countries—as being more naturally violent than others. It does this ignoring the many similar and/or proximate places where peaceful responses are the norm, and the complex political, economic and institutional factors that cause violence and peace4,6,8,17. Such ‘mappings of dan-ger’ can undermine the confidence of investors, local people and international donors and hence undermine sustainable develop-ment. They change the climate policy challenge from being one of adaptation with and in the interests of local people, to one of inter-ventions to secure peace in the interests of those who fear the risk of contagious conflict and instability6,18.So, it is important to understand whether the research claim-ing a link between climate change and violent conflict is based on a biased sampling strategy. Yet the extent to which this is the case remains untested. We therefore survey the relevant academic lit-erature for the period 1990–2017 using the Scopus database and a systematic review—a method often used to analyse large bod-ies of literature with a high degree of rigour and replicability, and which is described in the Methods section with data provided in Supplementary Datasets 1 and 219,20.The analysis of the relevant literature shows that Africa is by far the most frequently mentioned continent (77 mentions), followed by Asia (45) (see Table 1). The dominant focus on Africa in the literature is largely stable over time (see Fig. 1). This is surprising given that Asia is also home to places that are politically fragile and highly vulnerable to climate change21,22, but much more populous. Other continents with significant vulnerabilities to climate change (and that are at least in some places also prone to violent conflict), such as South America or Oceania, are hardly considered at all21.With respect to world regions, Sub-Saharan Africa was by far most frequently mentioned in the literature analysed (44 times), although the Middle East (22) and the Sahel (22) were also dis-cussed often (see Table 1). At the country level, Kenya and Sudan were most frequently analysed by climate–conflict researchers (11 mentions), followed by Egypt (8) as well as India, Nigeria and Syria (7). Complete lists of the continents, world regions and countries discussed in climate–conflict research can be found in Supplementary Dataset 1.To check whether the selection of cases is biased towards the dependent variable, we run a number of Poisson regressions (see Supplementary Tables 1–3 for the full results) using data on, among others, the number of times a country is mentioned in the literature and on battle-related deaths between 1989 and 201522. Although the battle-related deaths data set is far from perfect and tends to under-estimate small-scale violence (which many scholars believe is likely to be the most affected by climate change), it is currently the best global data set on violent conflict prevalence available.The correlation between the number of mentions and a high death toll is positive and significant in all models (Fig. 2). This sug-gests that studies on climate–conflict links that research one or a few individual countries are disproportionally focusing on cases that are already experiencing violent conflict. Holding other factors constant, we estimate that countries with more than 1,000 battle-related deaths are mentioned almost three times as often as countries with a lower death toll. This is further supported by a comparison of the top ten countries of each list (Table 2). Six of the ten most-often-mentioned countries are also among the ten countries with the most battlerelated deaths. The four remaining countries are also characterized by significant numbers of battle-related deaths, ranging from 2,775 (Egypt) to 8,644 (South Sudan). In contrast, the sampling of countries to be studied seems to be barely informed by the independent variable. A high exposure and a high vulnerability to climate change according to the ND-GAIN index23 are negatively, but not significantly, correlated with the number of times a country is mentioned (Fig. 2). The same holds true for the correlation with our climate risk measure based on the Global Climate Risk Index (CRI)24, although correlations are mostly significant here (Fig. 2), indicating that countries less at risk from climate change are more often discussed in the climate–conflict literature. Table 3 adds further evidence to this claim. None of the ten most climate change-affected countries according to the ND-GAIN exposure score or the CRI are among the top ten countries considered in the climate–conflict literature. Further, the literature on climate change and conflict does not discuss 11 of these 20 high-climate risk-countries at all (Guatemala, Haiti, Honduras, Kiribati, Marshall Islands, Micronesia, Nicaragua, Philippines, Seychelles, Tuvalu and Yemen), despite many of them being characterized by significant political instability. There may be several reasons for these disparities, which include a greater interest in conflict-prone countries, issues of accessibility (discussed in the next paragraph) and a preference for studying countries with a higher global political relevance. The literature largely agrees that climate change is a ‘threat multiplier’ that aggravates existing tensions. It would hence make little sense to focus predominantly on countries that are politically very stable. Also, several analyses explicitly select their cases based on a number of scope conditions that are hypothesized to make climate–conflict links more likely16,25. But if studies (especially when analysing a small number of cases) focus on places that are already suffering from intense violent conflict, while highly vulnerable countries receive little attention, results may be distorted and significant knowledge gaps left unaddressed. In line with this, we find that further climate sensitivity measures such as the contribution of the agricultural sector to employment (negative, insignificant effect) and to gross domestic product (GDP; slightly positive and significant, but not robust effect) are weak predictors for the num-ber of mentions (Fig. 2).Our results further indicate a streetlight effect in climate–con-flict research, that is, researchers tend to focus on particular places for reasons of convenience5. On the continent level, the availability of conflict data might have played an important role, especially as statistical analyses are very widespread in climate–conflict research10. Large geo-referenced conflict data sets spanning sev-eral countries and longer time periods were until very recently only available for Africa26. Indeed, when just considering statistical studies (n = 35 in our sample), the focus on Africa as a continent (65%) and Sub-Saharan Africa as a region (57%) is even stronger than in the full sample.On the country level, all models reveal a positive and significant correlation between the numbers of mentions in the literature and countries that are former British colonies (Fig. 2). A likely explana-tion for this finding is that countries formerly colonized by Great Britain have better data (for example, historic weather records), which makes research more convenient5. Further, in four of the six most-mentioned countries (Sudan, Kenya, India and Nigeria). English is an official language (which makes research more practi-cable for many Western scholars). However, the positive correlation between these two factors indicated by model 2 (Fig. 2) is not significant. The presence of a streetlight effect in climate–conflict research is a reason for concern as it suggests that case selection (and hence knowledge production) is driven by accessibility rather than concerns for the explanation or practical relevance27.One should note that the database we used for the literature search (Scopus) mainly captures journal articles that are written in English. Including French and Spanish language journals would probably yield a different picture of countries and regions most fre-quently mentioned.The statistical findings provided by this study are robust to the use of different model specifications, the inclusion of further con-trol variables, and the removal of the two most frequently men-tioned countries (Kenya and Sudan) from the analysis (see Fig. 2 and the Supplementary Information for further information). Results also hold when analysing Africa only, hence suggesting that the detected sampling biases occur not only on a global scale, but are also valid for the continent most intensively discussed in climate–conflict research.To conclude, critics have warned for some time that environ-mental security and climate–conflict research tend to choose cases on the dependent variable2,3,28. Our study provides the first system-atic, empirical evidence that such claims are warranted. Studies focusing on one or a few cases tend to study places where the depen-dent variable (violent conflict) is present and hardly relate to the independent variable (vulnerability to climate change). In addition, climate–conflict research strongly focuses on cases that are most convenient in terms of field access or data availability.To be clear, we do not intent to criticize individual studies, which often have good reasons to focus on specific regions, coun-tries and phenomena. However, the sampling biases of the climate–conflict research field as a whole are deeply problematic for at least four reasons.First, they convey the impression that climate–conflict links are stronger or more prevalent than they actually are3. This is especially the case for studies using few cases. Large-N studies usually contain a large number of non-conflict cases in their sample, although they draw all of these cases from a few regions or countries (see below).Second, focusing strongly on cases of violent conflict limits the ability of (qualitative) researchers to study how people adapt peace-fully to the impacts of climate change or carry out the associated conflicts non-violently4,29. Such knowledge, however, would be par-ticularly valuable from a policy-making perspective.Third, evidence of climate–conflict links comes primarily from few regions and countries that are convenient to access, such as (Sub-Saharan) Africa. This is even more of an issue in large-N, statistical analyses. While such a bias is not problematic per se as considerable parts of (Sub-Saharan) Africa are vulnerable to both climate change and conflict, this also implies that other very vulnerable regions, for instance in Asia and especially in South America and Oceania, receive little scholarly attention. Finally, over-representing certain places leads to them being stigmatized as inherently violent and unable to cope with climate change peacefully4,6. This is particularly the case for Africa as a continent, the world regions Sub-Saharan Africa and the Middle East, and countries such as Kenya, Sudan or Egypt. Such stigmatization might contribute to the re-production of colonial stereotypes, especially as 81% of the first authors in our sample were affiliated with institutions in countries that are members of the Organisation for Economic Co-operation and Development (OECD). And it can also provide legitimation for the imposed security responses in certain places at the expense of co-produced adaptation responses in all places at risk from climate change17,18,30.

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