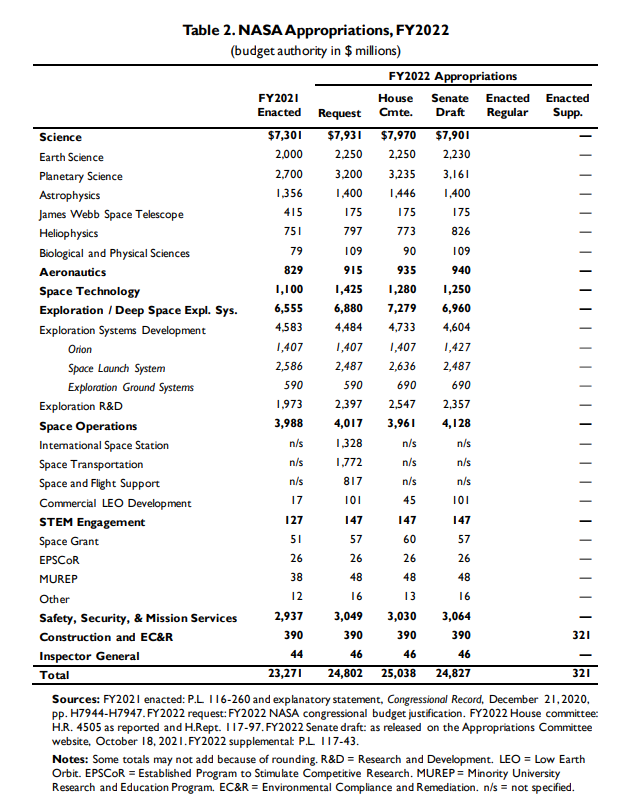
## 1

#### Interpretation: Debaters may not specify the type of private space appropriation that is unjust

#### Violation: [THEY SPECIFIED]

#### Limits – Allowing the aff to specify what kind of appropriation is unjust explodes the caselist and lets them get away with any aff – it allows for affs in entirely different sectors like an energy aff, transportation aff, or research aff and then further specification in those sectors like the Space Elevator aff, Astrophysics research aff, SBSP affs, etc. NASA alone has 10 different sectors – with specifications in those sectors – Cite: Daniel Morgan, Oct. 21, 2021. Congressional Research Service. “NASA Appropriations and Authorizations: A Fact Sheet” https://sgp.fas.org/crs/space/R43419.pdf



#### Ground – All of our ground is tied to generic appropriation like the Innovation DA, Indian Soft Power DA, Heg DA, and even the Global ConCon CP meaning if the aff can specify then we have literally nothing to answer the aff with.

#### Paradigm Issues

#### 1 – Drop the debater – their abusive advocacy skewed the debate from the start and we can’t come back

#### 2 - Comes before 1AR theory — A - If we had to be abusive it’s because it was impossible to engage their aff, B – Neg abuse outweighs aff abuse because we control the depth of the debate if we can’t engage depth is impossible

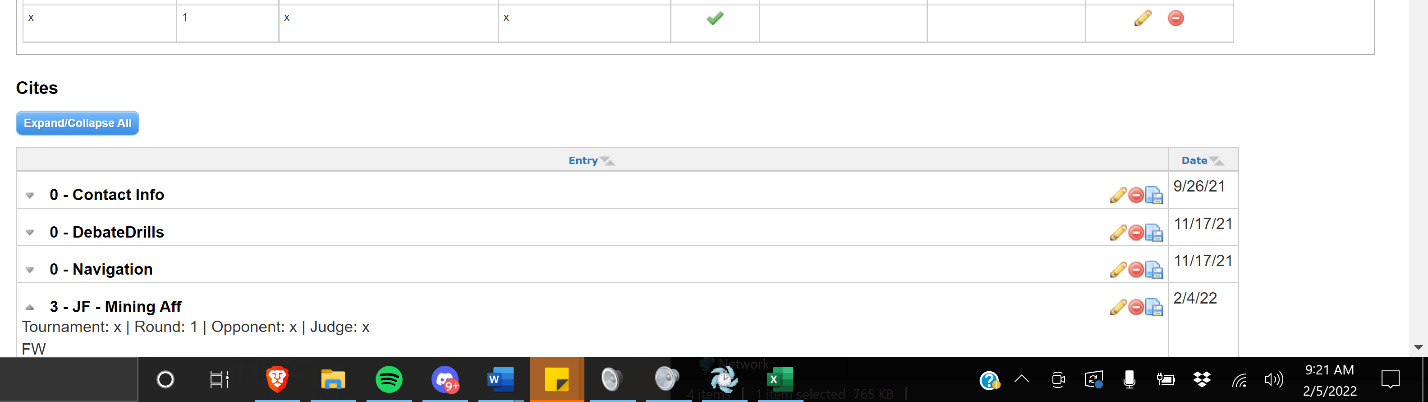
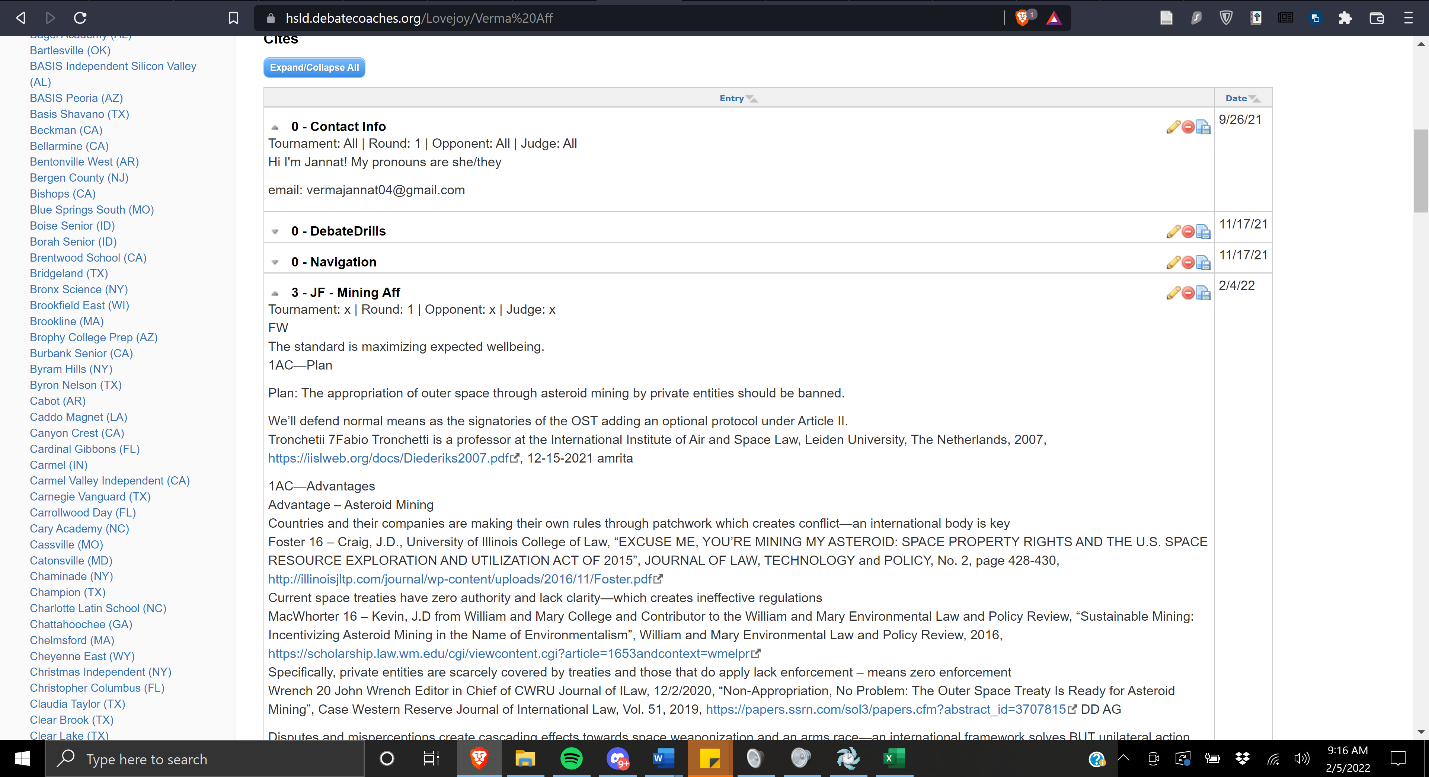
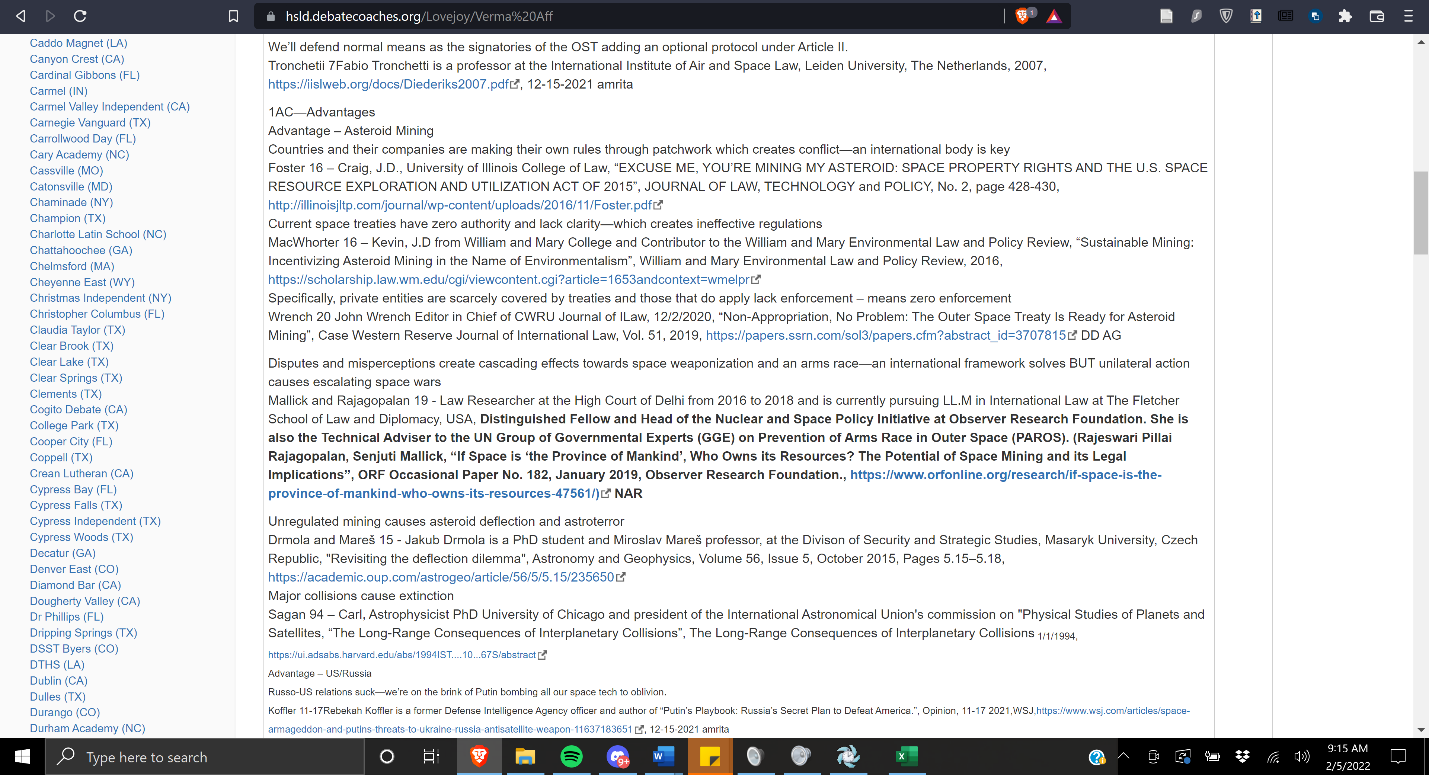
#### 3 - Use competing interps on T – A – T is a yes/no question, you can’t be half topical or mostly topical B - reasonability invites arbitrary judge intervention and a race to the bottom of questionable argumentation

#### 4 - No RVIs – A - Forcing the 1NC to go all in on the shell kills substance education and neg strat, B - discourages checking real abuse C - Encourages baiting – outweighs because if the shell is frivolous, they can beat it quick

## 2

#### Interpretation: Debaters should open source all previously read affirmative cases on the NDCA wiki

#### Violation – you didn’t – the disclosed aff on this topic isn’t – Screenshots



#### 1] Resource disparities – it allows people to steal cards from big schools like Strake or Harvard Westlake so that smaller schools won’t be stomped on by massive prep squads because they can use the prep squads products against them

#### 2] Evidence ethics – open source is the only way to verify before round that cards aren’t miscut – full text doesn’t solve since you could have highlighted unethically or cut wrongly which we can verify in four minutes – it’s impossible to sift through each cards highlighting and compare it with its sources in four minutes much less do so AND create our own strategy

## Case

### Framing

#### Frame case through disclosure – if we concede a hidden impact or a tiny blip it’s not our fault and you shouldn’t hold it against us because their disclosure norms are not clear – and I upheld the honor system bc only till 4 mins before round I received the aff – but no osourced was received before round not even full text, first 3 last 3 which supercharges our violation and offense.

### OST

#### Outer Space Laws are unclear – private corporations are still capable of escaping due to loopholes in the plan.

**Green and Stark 17** [Christopher and Eda, “Outer Space Treaty and Beyond: Do Existing Space Laws Put an Astronomical Barrier to Private IP Rights in Space?”, JDSUPRA. 8 September 2020 https://www.jdsupra.com/legalnews/outer-space-treaty-beyond-do-existing-44028/] //DebateDrills LC

Our **limited body of space law provides little guidance**. The first international treaty, the “Outer Space Treaty,” was signed by the U.S., Russia, and the U.K. in 1967, quickly followed by the Rescue Agreement. Over the next two decades, three other treaties—the Liability Convention, the Registration Convention, and the Moon Agreement—were also signed by these nations, with most countries following in their footsteps.[3] But after that rapid succession of international treaties, there have since been few others. These five documents form the basis of the international space law we have today, but **none address** the issue of [intellectual property rights in space](https://www.fr.com/fish-litigation/ip-rights-outer-space/). Rather, upon inspection, it appears that **the stated purpose of these treaties may be antithetical to intellectual property protection.**

The “Outer Space Treaty” espouses communal themes in characterizing space as the “province of all mankind,” the “common heritage of mankind” and to the “benefit of all countries.”[4] Unsurprisingly, Article II of the Outer Space Treaty prohibits any appropriation of areas in space, keeping in line with its principle of communal property.[5] On the other hand, **patents are fundamentally territorial and grant monopoly rights for a period of time. Applied to space, it is unclear just what is open for patent protections.**

For example, **can private companies patent orbital patterns of satellites**? Currently, companies may patent the technology or design of satellites that stay in a particular orbit, even if not the orbital pattern itself.[6] The practical implications of this are significant, especially with the advent of satellite constellations. If particular satellite technologies, and, indirectly, their orbital patterns, are patentable, then a significant portion of space may be occupied by one satellite constellation, i.e. one company alone.[7] Does this private apportionment of space run counter to our notions of sharing space? Some argue that **the Outer Space Treaty only bans sovereign appropriation and does not limit private entities from exerting claims**. Others counter that private property rights flow from sovereign property claims, so the former is meaningless without the latter.[8] So the question remains, **can the stated goals of sharing outer space be reconciled with the proprietary nature of patents**?

**Our current corpus of space treaties comes from a period of history when space exploration was undertaken primarily by governments** rather than private actors. The cooperative goals were likely a reaction to the time, as the world was coming out of a charged space race. **The silence of these space treaties on intellectual property rights presents an opportunity for modern-day agreements to provide patent protections for private companies**. Without robust international agreement on patents for space, we may even see less international cooperation as companies refuse to divulge their discoveries.[9] Now, as more and more private companies enter space exploration and carry the torch of innovation, **it is more important than ever to strike a balance between sharing our “common heritage” and providing patent protections that incentivize invention.**[10]

### Mining Impact Turn

#### No Space War -

#### 1] Deterrence

Bowen 18

[Bleddyn Bowen, Lecturer in International Relations at the University of Leicester. The Art of Space Deterrence. February 20, 2018. https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/]

Fourth, the ubiquity of space infrastructure and the fragility of the space environment may create a degree of existential deterrence. As space is so useful to modern economies and military forces, a large-scale disruption of space infrastructure may be so intuitively escalatory to decision-makers that there may be a natural caution against a wholesale assault on a state’s entire space capabilities because the consequences of doing so approach the mentalities of total war, or nuclear responses if a society begins tearing itself apart because of the collapse of optimised energy grids and just-in-time supply chains. In addition, the problem of space debris and the political-legal hurdles to conducting debris clean-up operations mean that even a handful of explosive events in space can render a region of Earth orbit unusable for everyone. This could caution a country like China from excessive kinetic intercept missions because its own military and economy is increasingly reliant on outer space, but perhaps not a country like North Korea which does not rely on space. The usefulness, sensitivity, and fragility of space may have some existential deterrent effect. China’s catastrophic anti-satellite weapons test in 2007 is a valuable lesson for all on the potentially devastating effect of kinetic warfare in orbit.

#### 2] Redundancy – their ev is hysteria

Johnson-Freese and Hitchens ‘16

Johnson-Freese and Hitchens 16 [Dr. Joan Johnson-Freese is a member of the Breaking Defense Board of Contributors, a Professor of National Security Affairs at the Naval War College and author of Space Warfare in the 21st Century: Arming the Heavens. Views expressed are those of the author alone. Theresa Hitchens is a Senior Research Scholar at the Center for International and Security Studies at Maryland (CISSM), and the former Director of the United Nations Institute for Disarmament Research (UNIDIR) in Geneva, Switzerland. Stop The Fearmongering Over War In Space: The Sky’s Not Falling, Part 1. December 27, 2016. https://breakingdefense.com/2016/12/stop-the-fearmongering-over-war-in-space-the-skys-not-falling-part-1/

In the last two years, we’ve seen rising hysteria over a future war in space. Fanning the flames are not only dire assessments from the US military, but also breathless coverage from a cooperative and credulous press. This reporting doesn’t only muddy public debate over whether we really need expensive systems. It could also become a self-fulfilling prophecy. The irony is that nothing makes the currently slim possibility of war in space more likely than fearmongering over the threat of war in space.

Two television programs in the past two years show how egregious this fearmongering can get. In April 2015, the CBS show 60 Minutes ran a segment called “The Battle Above.” In an interview with General John Hyten, the then-chief of U.S. Air Force Space Command, it came across loud and clear that the United States was being forced to prepare for a battle in space — specifically against China — that it really didn’t want.

It was explained by Hyten and other guests that China is building a considerable amount of hardware and accumulating significant know-how regarding space, all threatening to space assets Americans depend on every day. If viewers weren’t frightened after watching the segment, it wasn’t for lack of trying on the part of CBS.

Using terms like “offensive counterspace” as a 1984 NewSpeak euphemism for “weapons,” it was made clear that the United States had no choice but to spend billions of dollars on offensive counterspace technology to not just thwart the Chinese threat, but control and dominate space. While it didn’t actually distort facts — just omit facts about current U.S. space capabilities — the segment was basically a cost-free commercial for the military-industrial complex.

In retrospect though, “The Battle Above” was pretty good compared to CNN’s recent special, War in Space: The Next Battlefield. The latter might as well have been called Sharknado in Space – because the only far-out weapons technology our potential adversaries don’t have, according to the broadcast, seems to be “sharks with frickin’ laser beams attached to their heads!”

First, CNN needs to hire some fact checkers. Saying “unlike its adversaries, the U.S. has not yet weaponized space” is deeply misleading, like saying “unlike his political opponents, President-Elect Donald Trump has not sprouted wings and flown away”: A few (admittedly alarming) weapons tests aside, no country in the world has yet weaponized space. Contrary to CNN, stock market transactions are not timed nor synchronized through GPS, but a closed system. Cruise missiles can find their targets even without GPS, because they have both GPS and precision inertial measurement units onboard, and IMUs don’t rely on satellite data. Oh, and the British rock group Pink Floyd holds the only claim to the Dark Side of the Moon: There is a “far side” of the Moon — the side always turned away from the Earth — but not a “dark side” — which would be a side always turned away from the Sun.

More nefariously, the segment sensationalized nuggets of truth within a barrage of half-truths, backed by a heavy bass, dramatic soundtrack (and gravelly-voiced reporter Jim Sciutto) and accompanied by sexy and scary visuals.

Make no mistake there are dangers in space, and the United States has the most to lose if space assets are lost. The question is how best to protect them. Here are a few facts CNN omitted.

The Reality

The U.S. has all of the technologies described on the CNN segment and deemed potentially offensive: maneuverable satellites, nano-satellites, lasers, jamming capabilities, robotic arms, ballistic missiles that can be used as anti-satellite weapons, etc. In fact, the United States is more technologically advanced than other countries in both military and commercial space.

That technological superiority scares other countries; just as the U.S. military space community is scared of other countries obtaining those technologies in the future. The U.S. military space budget is more than 10 times greater than that of all the countries in the world combined. That also causes other countries concern.

More unsettling still, the United States has long been leery of treaty-based efforts to constrain a potential arms race in outer space, as supported by nearly every other country in the world for decades. Indeed, under the administration of George W. Bush, the U.S. talking points centered on the mantra “there is no arms race in outer space,” so there is no need for diplomat instruments to constrain one. Now, a decade later, the U.S. military – backed by the Intelligence Community which operates the nation’s spy satellites – seems to be shouting to the rooftops that the United States is in danger of losing the space arms race already begun by its potential adversaries. The underlying assumption — a convenient one for advocates of more military spending — is that now there is nothing that diplomacy can do.

However, it must be remembered that most space-related technologies – with the exception of ballistic missiles and dedicated jammers – have both military and civil/commercial uses; both benign — indeed, helpful — and nefarious uses. For example, giving satellites the ability to maneuver on orbit can allow useful inspections of ailing satellites and possibly even repairs.

Further, the United States is not unable to protect its satellites, as repeated during the CNN broadcast by various interviewees and the host. Many U.S. government-owned satellites, including precious spy satellites, have capabilities to maneuver. Many are hardened against electro-magnetic pulse, sport “shutters” to protect optical “eyes” from solar flares and lasers, and use radio frequency hopping to resist jamming.

Offensive weapons, deployed on the ground to attack satellites, or in space, are not a silver bullet. To the contrary, U.S. deployment of such weapons may actually be detrimental to U.S. and international security in space (as we argued in a recent Atlantic Council publication, Towards a New National Security Space Strategy). Further, there are benefits to efforts started by the Obama Administration to find diplomatic tools to restrain and constrain dangerous military activities in space.

These diplomatic efforts, however, would be undercut by a full-out U.S. pursuit of “space dominance.” This includes dialogue with China, the lack of which Gen. William Shelton, retired commander of Air Force Space Command, lamented in the CNN report.

Given CNN’s “cast,” the spin was not surprising. Starting with Ghost Fleet author Peter Singer set the sensationalist tone, which never altered. The apocalyptic opening, inspired by Ghost Fleet, posited a scenario where all U.S. satellites are taken off-line in nearly one fell swoop. Unless we are talking about an alien invasion, that scenario is nigh on impossible. No potential adversary has such capabilities, nor will they ever likely do so. There is just too much redundancy in the system.

#### 3] International norms

Pavur and Martinovic 19

[James, DPhil Researcher at the Cybersecurity Centre for Doctoral Training at Oxford University, and Ivan Martinovic, Professor of Computer Science in the Department of Computer Science at Oxford University, “The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space”, 2019 11th International Conference on Cyber Conflict: Silent Battle, <https://ccdcoe.org/uploads/2019/06/Art_12_The-Cyber-ASAT.pdf>]

Limited Accessibility Space is difficult. Over 60 years have passed since the first Sputnik launch and only nine countries (ten including the EU) have orbital launch capabilities. Moreover, a launch programme alone does not guarantee the resources and precision required to operate a meaningful ASAT capability. Given this, one possible reason why space wars have not broken out is simply because only the US has ever had the ability to fight one [21, p. 402], [22, pp. 419–420]. Although launch technology may become cheaper and easier, it is unclear to what extent these advances will be distributed among presently non-spacefaring nations. Limited access to orbit necessarily reduces the scenarios which could plausibly escalate to ASAT usage. Only major conflicts between the handful of states with ‘space club’ membership could be considered possible flashpoints. Even then, the fragility of an attacker’sown space assets creates de-escalatory pressures due to the deterrent effect of retaliation. Since the earliest days of the space race, dominant powers have recognized this dynamic and demonstrated an inclination towards de-escalatory space strategies [23]. B. Attributable Norms There also exists a long-standing normative framework favouring the peaceful use of space. The effectiveness of this regime, centred around the Outer Space Treaty (OST), is highly contentious and many have pointed out its serious legal and political shortcomings [24]–[26]. Nevertheless, this status quo framework has somehow supported over six decades of relative peace in orbit. Over these six decades, norms have become deeply ingrained into the way states describe and perceive space weaponization. This de facto codification was dramatically demonstrated in 2005 when the US found itself on the short end of a 160-1 UN vote after opposing a non-binding resolution on space weaponization. Although states have occasionally pushed the boundaries of these norms, this has typically occurred through incremental legal re-interpretation rather than outright opposition [27]. Even the most notable incidents, such as the 2007-2008 US and Chinese ASAT demonstrations, were couched in rhetoric from both the norm violators and defenders, depicting space as a peaceful global commons [27, p. 56]. Altogether, this suggests that states perceive realcosts to breaking this normative tradition and may even moderate their behaviours accordingly. One further factor supporting this norms regime is the high degree of attributability surrounding ASAT weapons. For kinetic ASAT technology, plausible deniability and stealth are essentially impossible. The literally explosive act of launching a rocket cannot evade detection and, if used offensively, retaliation. This imposes high diplomatic costs on ASAT usage and testing, particularly during peacetime. C. Environmental Interdependence A third stabilizing force relates to the orbital debris consequences of ASATs. China’s 2007 ASAT demonstration was the largest debris-generating event in history, as the targeted satellite dissipated into thousands of dangerous debris particles [28, p. 4]. Since debris particles are indiscriminate and unpredictable, they often threaten the attacker’s own space assets [22, p. 420]. This is compounded by Kessler syndrome, a phenomenon whereby orbital debris ‘breeds’ as large pieces of debris collide and disintegrate. As space debris remains in orbit for hundreds of years, the cascade effect of an ASAT attack can constrain the attacker’s long-term use of space [29, pp. 295– 296]. Any state with kinetic ASAT capabilities will likely also operate satellites of its own, and they are necessarily exposed to this collateral damage threat. Space debris thus acts as a strong strategic deterrent to ASAT usage.

#### Asteroid mining saves us from climate change – 2 scenarios

#### 1] REMs are key for renewable growth – even the most extreme current models are not sufficient to prevent warming. We would need more than double the REMs we have now to even get close

Serpell ‘21

Serpell, Oscar, et al. “RARE EARTH ELEMENTS A RESOURCE CONSTRAINT OF THE ENERGY TRANSITION.” Kleinman Center for Energy Policy, May 2021, [https://kleinmanenergy.upenn.edu/wp-content/uploads/2021/05/KCEP-Rare-Earth-Elements.pdf. //](https://kleinmanenergy.upenn.edu/wp-content/uploads/2021/05/KCEP-Rare-Earth-Elements.pdf.%20//) Phoenix

* REEs = Rare Earth Elements (not too different than REMs – just a few things don’t fit both labels)

The history and present state of the REE supply chain exhibits the important role these materials already play in the world economy. Projections of a sharp increase in demand over the coming decades raise several questions about the future environmental impacts and supply risks to this industry. A 2012 MIT study by Alonso et al. thoroughly explores this question of future supply, and projects total global demand out to 2035 under five divergent scenarios. One of these scenarios uses the IEA Blue Map scenario to estimate future wind and automotive electrification (IEA 2010). This model only seeks to reduce global carbon emissions by 50% by 2050. Given our understanding of climate sensitivities in 2021, these projections should be considered far too limited to reach global emissions targets. They provide us with a conservative estimate of demand for the purpose of this analysis (IPCC 2018). Under this scenario the study projects that by 2035 global demand for REEs will reach close to 450,000 tons per year, compared to approximately 200,000 tons per year today (USGS 2021). This represents more than a doubling in the size of the industry in just 15 years, which is again overly conservative according to present day decarbonization targets. Furthermore, the rate of demand growth in Alonso et al. accelerates rapidly, as do projections of wind turbine and EV production out to 2050, indicating that this increase in industry demand is only the beginning of a pattern of accelerating growth that will likely last for decades (Larson et al., 2020). As technology advances and demand for clean energy solutions intensifies, overall production of REEs will have to scale to accommodate growing demand for only a small handful of elements needed for magnets— specifically neodymium (Nd) and dysprosium (Dy). Whereas Alonso et al. predicts that 2035 demand for yttrium (Y) and terbium (Tb) will only be approximately 250% of 2010 supply, 2035 demand for Dy will be over 2500% the supply of Dy in 2010. REEs are typically co-located in small concentrations, so global mine operations may need to produce a significant excess of many lesser-used elements to produce sufficient Dy. This effort to match production of elements to their relative demand is called mine yield balancing and promises to be a growing challenge in the REE industry. Industrial use of REEs is a relatively recent economic development and uses for these elements developed to accommodate their natural abundance and take advantage of low market prices. It is, therefore, uncertain how the global market will respond to the excess supply and lower prices of REEs not used for magnet production, since uses for many other REEs are still limited. Because production of these minerals is almost always complementary, market demand for each element is important to consider in investment and operational decision-making. If insufficient demand for these other elements emerges, it could significantly increase the long-term cost of critical elements such as neodymium and dysprosium. For emerging and sustainable energy solutions to effectively utilize rare earth elements, a higher premium for these materials will likely be necessary

#### Asteroid mining creates less carbon emissions per kilogram of REMs

MIT Technology Review ‘20

“Asteroid Mining Might Actually Be Better for the Environment.” MIT Technology Review, MIT Technology Review, 2 Apr. 2020, https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/. // Phoenix

Today, that changes thanks to the work of Andreas Hein and colleagues at the University of Paris-Saclay in France. These guys have calculated the greenhouse-gas emissions from asteroid-mining operations and compared them with the emissions from similar Earth-based activities. Their results provide some eyebrow-raising insights into the benefits that asteroid mining might provide.

The calculations are relatively straightforward. Rocket launches release significant amounts of greenhouse gases into the atmosphere. The fuel on board the first stage of a rocket burns in Earth’s atmosphere to form carbon dioxide. For kerosene-burning rockets, one kilogram of fuel creates three kilograms of CO2. (The second and third stages operate outside the Earth’s atmosphere and so can be ignored.)

Reentries are just as damaging. That’s because a significant mass of a re-entering vehicle ablates in the upper atmosphere, producing NOx such as nitrous oxide (N2O), a greenhouse gas that is about 300 times more potent than CO2. By one estimate, the space shuttle released about 20% of its mass in the form of N2O every time it returned to Earth.

Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO2 into Earth’s atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO2 per kilogram of platinum.

That needs to be compared with the emission from Earth-based mining. Here, platinum mining generates significant greenhouse gases, mostly from the energy it takes to remove this stuff from the ground.

Indeed, the numbers are huge. The mining industry estimates that producing one kilogram of platinum on Earth releases around 40,000 kilograms of carbon dioxide. “The global warming effect of Earth-based mining is several orders of magnitude larger,” say Hein and co.

#### 2] Asteroids can make solar power satellites and are accessible for mining – it only takes one

Lee ‘2

Valentine, Lee. “A SPACE ROADMAP: MINE THE SKY, DEFEND THE EARTH, SETTLE THE UNIVERSE.” Space Studies Institute, 2002, https://ssi.org/reading/papers/space-studies-institute-roadmap/. // Phoenix

When the European probe Gaia is launched at the end of this decade, we will be able to discover asteroids in those most accessible orbits, one asteroid already has been discovered in an analogous orbit about a Mars Lagrange point and there are suggestions of material in one of the earth’s Lagrange points.

Professor Ed Belbruno of Princeton has discovered a clever technique to return mass from these locations to geostationary orbit for a nominal change in delta V using a lunar resonance capture orbit. Many bodies in these highly accessible earth-crossing orbits will also be easily returnable to geostationary earth orbit. Ed Belbruno has done detailed calculations showing that this is so. NEO’s in halo orbits about the Lagrange points in the Earth sun system are still hypothetical. Nonetheless, if a concerted effort is made to find them, even small ones of the proper composition could be enormously valuable. A metallic asteroid 100 meters in diameter has a mass of roughly eight million tons, this would be sufficient to construct most of the mass of 80 five Gigawatt satellite solar power stations.

#### Solar power satellites are key to shifting to a renewable-powered economy

GDE ‘21

Energy, GlobalData. “Here Comes the Sun: Space-Based Solar Power Is on the Horizon.” Power Technology, 28 Jan. 2021, https://www.power-technology.com/comment/here-comes-the-sun-space-based-solar-power-is-on-the-horizon/. // Phoenix

Space-based solar power (SBSP) is edging closer to becoming a reality and, in the long term, could help complete the transition to green energy sources.

The idea of lasers in the sky was the exclusive domain of science fiction novels or scheming James Bond villains. Now it is becoming a reality, and, unlike the movies, it can be used as a force for good, helping tackle some of the most pressing challenges facing the world.

In its Tech, Media and Telecom (TMT) Predictions 2021 report, GlobalData identified sustainability as a key theme for 2021.

Transitioning to clean sources of energy is perhaps the most pressing item on the agenda to limit global warming to the 1.5 °C target set by the Paris Agreement. The energy sector is the world’s number one pollutant, accounting for over 30% of global greenhouse gas (GHG) emissions, according to the Centre for Climate and Energy Solutions.

SBSP could be a solution to the energy problem. As GlobalData predicts in its report, Earth-facing activities in space will experience significant growth in the next decade, increasingly affecting our everyday lives and contributing to solving complex challenges.

Use of satellite based solar reflectors

But how would energy from space be collected? The optimum solution is using huge mirror-like solar reflectors installed on satellites in orbit which will concentrate energy from the sun onto solar panels. These, in turn, turn the energy into electromagnetic radiation which is beamed back to Earth in either laser or microwave form by an antenna. Finally, a rectifying antenna on the ground collects the waves or electromagnetic radiations from lasers and converts them back into electricity to be distributed to the grid.

This technology has several advantages over normal solar power. Firstly, it eliminates downtime due to bad weather and nighttime. In an average winter month in Europe, only 3% of sunlight reaches Earth, while satellites in space could gather energy for 99% of the year.

Secondly, it bypasses the problem of energy storage as the continuous stream of power from the sun would allow the energy to be beamed down directly when needed. Finally, the light in space, unfiltered by the atmosphere, is much stronger. For this reason, according to energy matching service Greenmatch, SBSP could generate 40 times as much energy as Earth-based solar power.

#### Renewables are essential to combat climate change – but they need a drastic increase to be effective

Miliken ‘21

Milliken, Lindsay. “Countering Climate Change with Renewable Energy Technologies.” Federation Of American Scientists, 8 July 2021, https://fas.org/blogs/sciencepolicy/countering-climate-change-with-renewable-energy-technologies/. // Phoenix

Renewable energy technologies, such as advanced biofuels for transportation, are key for U.S. efforts to mitigate climate change

Climate change is bringing about rising temperatures, which have significant negative impacts on humans and the environment, and transitioning to renewable energy sources, such as biofuels, can help meet this challenge. One consequence of higher global temperatures is the increasing frequency of extreme weather events that cause massive amounts of harm and damage. As depicted in Figure 1, six of the 10 costliest extreme weather events in the U.S. have [occurred](https://www.c2es.org/content/extreme-weather-and-climate-change/) in the last 10 years, amounting to over $411 billion in damages (in 2020 dollars and adjusted for inflation). The other four [occurred](https://www.c2es.org/content/extreme-weather-and-climate-change/) between 2004 and 2008, and the costs of future extreme weather events are expected to [keep climbing](https://www.americanprogress.org/issues/green/reports/2017/10/27/441382/extreme-weather-extreme-costs/).

Moreover, the World Health Organization [estimates](https://www.who.int/heli/risks/climate/climatechange/en/) that, globally, climate change is responsible for over 150,000 deaths per year. This is because in addition to extreme weather events, climate change contributes to the spread of diseases, reduced food production, and many other problems.

Transitioning to renewable energy, and reducing reliance on fossil fuels, is one way to help slow down the effects of climate change. While renewables used to be a more expensive option, new clean energy technologies are lowering costs and helping to move economies away from fossil fuels. For example, solar panel prices [decreased 75 to 80 percent](https://www.un.org/en/chronicle/article/how-renewable-energy-can-be-cost-competitive)between 2009 and 2015. Due to similar trends in other renewables like wind and hydropower, renewable energy generation technology accounts for [over half of all new power generation capacity](https://www.un.org/en/chronicle/article/how-renewable-energy-can-be-cost-competitive) brought online worldwide every year since 2011.

More must be done to ensure that renewable energy technologies are key contributors to the mitigation of climate change. As of 2018, solar and wind accounted for [less than 4%](https://www.pewresearch.org/fact-tank/2020/01/15/renewable-energy-is-growing-fast-in-the-u-s-but-fossil-fuels-still-dominate/) of all the energy used in the U.S. (Figure 2). The amount of energy generated by solar panels has increased almost 46-fold since 2008, but still only amounts to about [1%](https://www.pewresearch.org/fact-tank/2020/01/15/renewable-energy-is-growing-fast-in-the-u-s-but-fossil-fuels-still-dominate/) of the total energy generated in the country. Unfortunately, renewables currently provide only a small fraction of the total energy produced, and to counter climate change, this contribution must drastically increase.

**Climate change causes extinction – ocean acidification, water and resource wars, econ collapse, and regional conflicts.**

Pachauri and Meyer 15

(Rajendra K. Pachauri Chairman of the IPCC, Leo Meyer Head, Technical Support Unit IPCC were the editors for this IPCC report, “Climate Change 2014 Synthesis Report” <http://epic.awi.de/37530/1/IPCC_AR5_SYR_Final.pdf> IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp)

SPM 2.3 Future risks and impacts caused by a changing climate Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development. {2.3} Risk of climate-related impacts results from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability and exposure of human and natural systems, including their ability to adapt. Rising rates and magnitudes of warming and other changes in the climate system, accompanied by ocean acidification, increase the risk of severe, pervasive and in some cases irreversible detrimental impacts. Some risks are particularly relevant for individual regions (Figure SPM.8), while others are global. The overall risks of future climate change impacts can be reduced by limiting the rate and magnitude of climate change, including ocean acidification. The precise levels of climate change sufficient to trigger abrupt and irreversible change remain uncertain, but the risk associated with crossing such thresholds increases with rising temperature (medium confidence). For risk assessment, it is important to evaluate the widest possible range of impacts, including low-probability outcomes with large consequences. {1.5, 2.3, 2.4, 3.3, Box Introduction.1, Box 2.3, Box 2.4} A large fraction of species faces increased extinction risk due to climate change during and beyond the 21st century, especially as climate change interacts with other stressors (high confidence). Most plant species cannot naturally shift their geographical ranges sufficiently fast to keep up with current and high projected rates of climate change in most landscapes; most small mammals and freshwater molluscs will not be able to keep up at the rates projected under RCP4.5 and above in flat landscapes in this century (high confidence). Future risk is indicated to be high by the observation that natural global climate change at rates lower than current anthropogenic climate change caused significant ecosystem shifts and species extinctions during the past millions of years. Marine organisms will face progressively lower oxygen levels and high rates and magnitudes of ocean acidification (high confidence), with associated risks exacerbated by rising ocean temperature extremes (medium confidence). Coral reefs and polar ecosystems are highly vulnerable. Coastal systems and low-lying areas are at risk from sea level rise, which will continue for centuries even if the global mean temperature is stabilized (high confidence). {2.3, 2.4, Figure 2.5} Climate change is projected to undermine food security (Figure SPM.9). Due to projected climate change by the mid-21st century and beyond, global marine species redistribution and marine biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity and other ecosystem services (high confidence). For wheat, rice and maize in tropical and temperate regions, climate change without adaptation is projected to negatively impact production for local temperature increases of 2°C or more above late 20th century levels, although individual locations may benefit (medium confidence). Global temperature increases of ~4°C or more 13 above late 20th century levels, combined with increasing food demand, would pose large risks to food security globally(high confidence). Climate change is projected to reduce renewable surface water and groundwater resources in most dry subtropical regions (robust evidence, high agreement), intensifying competition for water among sectors (limited evidence, medium agreement). {2.3.1, 2.3.2} Until mid-century, projected climate change will impact human health mainly by exacerbating health problems that already exist (very high confidence). Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions and especially in developing countries with low income, as compared to a baseline without climate change (high confidence). By 2100 for RCP8.5, the combination of high temperature and humidity in some areas for parts of the year is expected to compromise common human activities, including growing food and working outdoors (high confidence). {2.3.2} In urban areas climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges (very high confidence). These risks are amplified for those lacking essential infrastructure and services or living in exposed areas. {2.3.2} Rural areas are expected to experience major impacts on water availability and supply, food security, infrastructure and agricultural incomes, including shifts in the production areas of food and non-food crops around the world (high confidence). {2.3.2} Aggregate economic losses accelerate with increasing temperature (limited evidence, high agreement), but global economic impacts from climate change are currently difficult to estimate. From a poverty perspective, climate change impacts are projected to slow down economic growth, make poverty reduction more difficult, further erode food security and prolong existing and create new poverty traps, the latter particularly in urban areas and emerging hotspots of hunger (medium confidence). International dimensions such as trade and relations among states are also important for understanding the risks of climate change at regional scales. {2.3.2} Climate change is projected to increase displacement of people (medium evidence, high agreement). Populations that lack the resources for planned migration experience higher exposure to extreme weather events, particularly in developing countries with low income. Climate change can indirectlyincrease risks of violent conflicts by amplifying well-documented drivers of these conflicts such as poverty and economic shocks (medium confidence). {2.3.2} 2010 )

#### Also, Asteroid mining solves resource shortages

Honan ‘21

Honan, David. “The First Trillionaires Will Make Their Fortunes in Space.” Big Think, 30 Sept. 2021, https://bigthink.com/technology-innovation/the-first-trillionaires-will-make-their-fortunes-in-space/. // DebateUS

Just as explorers during the Age of Discovery established new trade routes in pursuit of resources such as gold, silver and spices, the future explorers of space will be chasing unimaginable riches. As Peter Diamandis told the International Space Development Conference, “**There are twenty-trillion-dollar checks up there, waiting to be cashed!” These cosmic cash cows are so-called Near-Earth asteroids that contain a wide range of precious resources.** Sure, this may sound a lot like the movie Avatar, in which the RDA Corporation mined the mineral unobtanium on the planet of Pandora. But this is no pie-in-the-sky idea. **Twenty trillion USD is the estimated market value of a relatively small metallic asteroid** that was first calculated by John S. Lewis in his bookMining The Sky: Untold Riches from the Asteroids, Comets, and Planets. Lewis argued that “**using presently available or readily foreseeable technologies, we can relieve Earth of its energy problem, make astronomical amounts of raw materials available, and raise the living standard of people worldwide**.” Peter Diamandis, who founded the non-profit X Prize Foundation to create a rewards incentive program to bring about “radical breakthroughs for the benefit of humanity,” believes the enormous financial opportunities in space will spur innovation. He notes that **everything we hold of value, “the things we fight wars over,” such as metals, minerals and real estate, exist “in infinite quantities in space.”** What’s the significance? While the idea of mining space for resources is not a new one, we are closer than ever today to realizing that reality. As NASA is set to retire its space shuttle fleet and get out of the business of developing and operating its own spacecraft, it will rely on private companies to transport its astronauts to the orbiting International Space Station. Already this has created an enormous opening for commercial space enterprises. In the coming decades, according to Diamandis, we will see “private companies and private teams making b-lines for the moon.” Bretton Alexander, President of the Commercial Spaceflight Federation noted the historic change that is expected to happen later this year. After the final space shuttle mission of the Endeavor, “the next vehicle to carry astronauts into space from Florida’s Space Coast will be a commercial spacecraft,” he said. Diamandis sees a promising price improvement curve as what used to take one billion dollars and twenty thousand people to get a space shuttle into orbit can now happen with “a team of twenty people funded by a single individual.” In the evolution of space travel, he says “the military industrial complex of Boeing, Lockheed and NASA are the dinosaurs” and today’s entrepreneurs are “the furry mammals.” Why Should I Care? Asteroids represent a dual threat and opportunity for humanity. In the starkest terms, an asteroid collision could lead to the extinction of the human race, as presented in this terrifying computer-simulated video. And yet, **asteroids also represent an opportunity for the salvation of the human race. Asteroids contain a wide range of resources, including nickel-iron metal, silicate minerals, trapped or frozen gasses, and water, which could be utilized by a spacecraft’s steam propulsion rocket for a return trip to Earth. Asteroids have also been thought of as a possible site for the colonization of space. After all, it was the impact of asteroids that transformed life on Earth and may have made human life possible in the first place.** As Peter Diamandis has noted, there are many motivations for going to space. It was curiosity that drove NASA’s budgets for fifty years. **Another fundamental motivator to go to space is to back up the biosphere. Diamandis suggests that we “record all of the genomes on this planet, all the works of art, and back it up off earth.” Twenty trillion dollars isn’t bad motivation either, and the drive to create wealth from space may very well prove the key to human survival and our future prosperity.**

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

Lehane ‘15

Lehane, Sinéad. “Shaping Conflict in 21st Century: Food and Water Security.” BRINK, 16 Jan. 2015, https://www.brinknews.com/shaping-conflict-in-the-21st-century-the-future-of-food-and-water-security/. // DebateUS!

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

### US/Russia

#### 1] Ukraine is an alt cause – the U.S is threatening war with Russia over their invasion of Ukraine, they don’t care about random space launches

#### 2] No internal link – SpaceX has launched thousands of satellites with no response from Russia

#### 3] Their ev doesn’t take COVID-19 into account – it killed hegemony

Rachman ‘20

<https://www.ft.com/content/2e8c8f76-7cbd-11ea-8fdb-7ec06edeef84> “Coronavirus and the threat to US supremacy” Gideon Rachman for The Financial Times – bio: Gideon Rachman became chief foreign affairs columnist for the Financial Times in July 2006. He joined the FT after a 15-year career at The Economist, which included spells as a foreign correspondent in Brussels, Washington and Bangkok.He also edited The Economist’s business and Asia sections. His particular interests include American foreign policy, the European Union and globalisation. Lindale PP

At the height of the cold war, Ronald Reagan argued that rivalries between nations would vanish if the world was invaded by aliens. The former US president was too optimistic. Today, the US and China are facing a common threat in the form of coronavirus. Far from uniting these two rivals, the pandemic seems to be intensifying their competition. You can see why China might sniff an opportunity in this crisis. Coronavirus has targeted America’s weaknesses, while making many of its strengths temporarily irrelevant. The world’s most powerful military machine is not much use against a virus. But a lack of universal healthcare coverage is suddenly a threat not just to the poor but to the whole of US society.  The American economic and political systems are both reeling. One in 10 US workers has lost their job inside three weeks. Both Republicans and Democrats suspect the other side will use the pandemic to try and rig the upcoming presidential election. Paul Krugman, the economist and columnist, argued recently that American democracy itself is in danger. Meanwhile, the Chinese government claims it has almost completely suppressed domestic transmission of the virus. Combine the relative stabilisation of China, with the threat of a new Great Depression and a deep political crisis in America, and it is clearly possible that Covid-19 will trigger a big shift in power from the US to China. It could even mark the end of American primacy.

#### 4] Retrenchment is better - The only comprehensive study proves retrenchment is comparatively more peaceful

Dr. Paul K. MacDonald 18, Assistant Professor of Political Science at Williams College, PhD in Political Science from Columbia University, and Dr. Joseph M. Parent, Assistant Professor of Political Science at the University of Miami, PhD in Political Science from the University of Columbia, Twilight of the Titans: Great Power Decline and Retrenchment, p. 1-2

In this book, we argue that the conventional wisdom is wrong. Specifically, we make three main arguments. First, relative decline causes prompt, proportionate retrenchment because states seek strategic solvency. The international system is a competitive place, and great powers did not get to the top by being imprudent, irrational, or irresponsible. When their fortunes ebb, states tend to retain the virtues that made them great. In the face of decline, great powers have a good sense of their relative capability and tend not to give away more than they must. Expanding or maintaining grand strategic ambitions during decline incurs unsustainable burdens and incites unwinnable fights, so the faster states fall, the more they retrench. Great powers may choose to retrench in other circumstances as well, but they have an overriding incentive to do so when confronted by relative decline.

Second, the depth of relative decline shapes not only how much a state retrenches, but also which policies it adopts. The world is complex and cutthroat; leaders cannot glibly pull a policy off the shelf and expect desired outcomes. Because international politics is a self-help system, great powers prefer policies that rely less on the actions of allies and adversaries. For lack of a better term, we refer to these as domestic policies, which include reducing spending, restructuring forces, and reforming institutions—all to reallocate resources for more efficient uses. But international policies may also help, and they include redeploying forces, defusing flashpoints, and redistributing burdens—all to avoid costly conflicts and reinforce core strongpoints. The faster and deeper states fall, the more they are willing to rely on others to cushion their fall. Retrenchment is not a weapon but an arsenal that can be used in different amounts and combinations depending on conditions and the enemies faced.

Third, after depth, structural conditions are the most important factors shaping how great powers respond to relative decline. Four conditions catalyze the incentives for declining states to retrench. One is the declining state’s rank. States in the top rungs of the great power hierarchy have more resources and margin for error than those lower down, so there is less urgency for them to retrench. Another is the availability of allies. Where states can shift burdens to capable regional powers with similar preferences, retrenchment is less risky and difficult. Yet another is the interdependence of commitments. When states perceive commitments in one place as tightly linked to commitments elsewhere, pulling back becomes harder and less likely. The last catalyst is the calculus of conquest. If aggression pays, then retrenchment does not, and great powers will be loath to do it. The world is not just complex and cutthroat, it is also dynamic. No set of conditions is everlasting, and leaders must change with the times.

Empirically, this work aims to add value by being the first to study systematically all modern shifts in the great power pecking order. We find sixteen cases of relative decline since 1870, when reliable data for the great powers become available, and compare them to their non-declining counterparts across a variety of measures. To preview the findings, retrenchment is by far the most common response to relative decline, and declining powers behave differently from non-declining powers. States in decline are more likely to cut the size of their military forces and budgets and in extreme cases are more likely to form alliances. This does not, however, make them ripe for exploitation; declining states perform comparatively well in militarized disputes. Our headline finding, however, is that states that retrench recover their prior rank with some regularity, but those that fail to retrench never do. These results challenge theories of grand strategy and war, offer guidance to policymakers, and indicate overlooked paths to peace.