### 1

#### Interp: Affs must affirm the resolution as a statement and in it’s entirety

#### Violation: They advocate an OST

#### Standards:

#### Limits – space is literally infinite – allowing the Aff to pick specific practices to ban or regulate creates infinite Affs that make neg prep and research impossible

#### Predictability – the resolution as a whole is the only predictable stasis point – exacerbated by regular topic changes – makes predictability key to fairness

#### Intrinsicness – “space faring nations should” isn’t even implied by the res – means they can add literally anything to the Aff and get away with it – further limits explosion

#### Vote neg for fairness and education – it’s key to deterrence and abuse has already happened

### Debris Advantage

#### Concede value criterion – it’s only a matter of who wins util better, we’ll concede Kessler syndrome, GET READY FOR SOME DE-DEV!!!

#### Economic decline caused by Kessler syndrome is good to create a mindset shift, growth is unsustainable and causes extinction

#### First is defense -

#### Multiple early warning sats exist, no reason one going down causes nuke war, they will look via others

#### ISS and other space stations can moniter satellites, and see what causes sats to explode

**They don’t solve all warming – at best they’re a drop in the bucket**

**No warming – historical data disproves the climate change hypothesis and statistical analysis disproves the predictive capability of climate models**

**Fyfe,** Research Scientist with the Canadian Centre for Climate Modeling, **et** **al,** **13** [John, with Nathan Gillett, Research Scientist with the Canadian Centre for Climate Modeling, and Francis Zwiers, Director of the Pacific Climate Impacts Consortium and Adjunct Professor in the Dept. of Mathematics and Statistics of the University of Victoria, September, “Overestimated Global Warming Over the Past 20 Years,” *Nature*, Vol. 3, p. 767-769]

Global mean surface temperature over the past 20 years (1993–2012) rose at a rate of 0.14 ± 0.06 °C per decade (95% confidence interval)1. This rate of warming is **significantly slower than that simulated by** the climate **models** participating in Phase 5 of the Coupled Model Intercomparison Project (CMIP5). To illustrate this, we considered trends in global mean surface temperature computed from **117 simulations** of the climate by 37 CMIP5 models (see Supplementary Information). These models generally simulate natural variability — including that associated with the El Niño–Southern Oscillation and explosive volcanic eruptions — as well as estimate the combined response of climate to changes in greenhouse gas concentrations, aerosol abundance (of sulphate, black carbon and organic carbon, for example), ozone concentrations (tropospheric and stratospheric), land use (for example, deforestation) and solar variability. By averaging simulated temperatures only at locations where corresponding observations exist, we find an average simulated rise in global mean surface temperature of 0.30 ± 0.02 °C per decade (using 95% confidence intervals on the model average). The observed rate of warming given above is **less than half of this simulated rate**, and only a few simulations provide warming trends within the range of observational uncertainty (Fig. 1a). The inconsistency between observed and simulated global warming is even more striking for temperature trends computed over the past fifteen years (1998–2012). For this period, the observed trend of 0.05 ± 0.08 °C per decade is more than four times smaller than the average simulated trend of 0.21 ± 0.03 °C per decade (Fig. 1b). It is worth noting that the observed trend over this period — not significantly different from zero — suggests a temporary **‘hiatus’ in global warming** 2–4. The divergence between observed and CMIP5- simulated global warming begins in the early 1990s, as can be seen when comparing observed and simulated running trends from 1970–2012 (Fig. 2a and 2b for 20-year and 15-year running trends, respectively). The evidence, therefore, indicates that the current generation of climate models (when run as a group, with the CMIP5 prescribed forcings) do not reproduce the observed global warming over the past 20 years, or the slowdown in global warming over the past fifteen years. This interpretation is **supported by statistical tests** of the null hypothesis that the observed and model mean trends are equal, assuming that either: (1) the models are exchangeable with each other (that is, the ‘truth plus error’ view); or (2) the models are exchangeable with each other and with the observations (see Supplementary Information). Differences between observed and simulated 20-year trends have p values (Supplementary Information) that drop to close to zero by 1993–2012 under assumption (1) and to 0.04 under assumption (2) (Fig. 2c). Here we note that the smaller the p value is, the stronger the evidence against the null hypothesis. On this basis, the rarity of the 1993–2012 trend difference under assumption (1) is obvious. Under assumption (2), this implies that such an inconsistency is only expected to occur by chance once in 500 years, if 20-year periods are considered statistically independent. Similar results apply to trends for 1998–2012 (Fig. 2d). In conclusion, we reject the null hypothesis that the observed and model mean trends are equal at the 10% level. One possible explanation for the discrepancy is that forced and internal variation might combine differently in observations than in models. For example, the **forced trends in models are modulated** up and down by simulated sequences of ENSO events, which are **not expected to coincide with** the **observed sequence** of such events. For this reason the moderating influence on global warming that arises from the decay of the 1998 El Niño event does not occur in the models at that time. Thus we employ here an established technique to estimate the impact of ENSO on global mean temperature, and to incorporate the effects of dynamically induced atmospheric variability and major explosive volcanic eruptions 5,6. Although these three natural variations account for some differences between simulated and observed global warming, these differences do not substantively change our conclusion that **observed and simulated global warming are not in agreement** over the past two decades (Fig. 3). Another source of internal climate variability that may contribute to the inconsistency is the Atlantic multidecadal oscillation7 (AMO). However, this is difficult to assess as the observed and simulated variations in global temperature that are associated with the AMO seem to be dominated by a large and concurrent signal of presumed anthropogenic origin (Supplementary Fig. S1). It is worth noting that in any case the AMO has not driven cooling over the past 20 years. Another possible driver of the difference between observed and simulated global warming is increasing stratospheric aerosol concentrations. Results from several independent datasets show that stratospheric **aerosol abundance has increased** since the late 1990s, owing to a series of comparatively small tropical volcanic eruptions8 . Although none of the CMIP5 simulations take this into account, two independent sets of model simulations estimate that increasing stratospheric aerosols have had a surface cooling impact of about **0.07 °C per decade** since 1998,9. If the CMIP5 models had accounted for increasing stratospheric aerosol, and had responded with the same surface cooling impact, the simulations and observations would be in closer agreement. Other factors that contribute to the discrepancy could include a missing **decrease in stratospheric water vapour**10 (whose processes are not well represented in current climate models), **errors in aerosol forcing** in the CMIP5 models, a **bias in the** prescribed **solar irradiance trend**, the possibility that the transient climate sensitivity of the CMIP5 models could be on average too high 11,12 or a **possible unusual episode** of internal climate variability not considered above 13,14. Ultimately the causes of this inconsistency will only be understood after careful comparison of simulated internal climate variability and climate model forcings with observations from the past two decades, and by waiting to see how global temperature responds over the coming decades.

#### No impact to asteroids – the solar system is safer than its ever been and there are no civilization ending asteroids that pose a risk for 2400 years – don’t vote aff on a vague assertion that an asteroid \*could\* hit earth

Siegel 16 (Ethan. 12/21. Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. “No, Earth is not overdue for a massive asteroid strike” <https://medium.com/starts-with-a-bang/no-earth-is-not-overdue-for-a-massive-asteroid-strike-59ce8edc0cf8>)

It’s only a matter of time before a massive asteroid strike occurs on our world. There’s no doubt about it, as the Solar System and beyond is filled with massive rocks that travel, under the influence of gravity, through the interplanetary and interstellar medium. Every year carries with it a rough probability of such an impact for bodies of all sizes, from the pebbles that will never make it to the ground (a virtual certainty) to a 5–10 kilometer behemoth like the one that wiped out the dinosaurs (less than 0.000001% odds). But there’s a myth going around — propagated by scientists\* at reputable agencies like Los Alamos National Laboratory, the American Geophysical Union and NASA’s Planetary Defense Coordination Office — that we’re overdue for one, and so one is likelier-than-normal in our future. The scientific truth indicates otherwise. A map of the known asteroids in the Solar System. Image credit: The United Kingdom Spaceguard Centre. The asteroid population in our Solar System is the number one source of potentially hazardous impacts for our world. Almost all of the Earth-orbit-crossing objects we know of originate from the asteroid belt; of the impacts we find on our world and the other terrestrial planets (Mercury, Venus, Mars and even the Moon), the vast majority indicate an ultimate origin from our asteroid belt as well. A map of the Solar System’s asteroid population by size. Image credit: Marco Colombo, DensityDesign Research Lab, under a c.c.a.-s.a.-4.0 license. Based on what we’ve found in our Solar System, there are approximately a few million potential “10”s on the Torino scale, over 50 million potential “9”s and nearly a billion estimated potential “8”s. With lower likelihoods, Earth is also at risk from impacts due to centaurs, Kuiper belt objects, the Oort cloud and passing objects from the interstellar medium. But when rare events occur, they seem to inspire the worst fears in us. A meteorite trail is seen above a residential apartment block in the Urals city of Chelyabinsk, following the meteor strike on February 15, 2013. Image credit: Oleg Kargopolov/AFP/Getty Images. 2013 was a banner year for collision terror. The year started off with the Chelyabinsk meteor, which caused millions of dollars of property damage and injured more than a thousand people. Then, a fast-moving Oort cloud comet — Comet C/2013 A1 (Siding Spring) — was discovered on a near-collision course with Mars. It was approximately half a kilometer across and wound up missing Mars by only 140,000 kilometers, or roughly 11 Earth diameters. If that object had struck Earth, it would have been a Torino-scale “9” disaster. A composite image of Comet Siding Spring/C2013 A1 near Mars at closest approach, as taken with the Hubble Space Telescope. Image credit: NASA, ESA, PSI, JHU/APL, STScI/AURA. But a near-miss is still a miss. In fact, the largest impact in all of human history — both recorded and archaeologically discovered after-the-fact — is Barringer (meteor) crater in Arizona, which itself only rated an “8” on the Torino scale: the same rating as the 1908 Tunguska event. These events occur every few hundred years at most, and we can often go thousands or perhaps even ten thousand years between them. The Chelyabinsk event’s damage came mostly from broken glass; no meteors of the past century have had enough energy to rate above a “0” on the Torino scale. Meteor (Barringer) crater, in the Arizona desert, is over 1.1 km (0.7 mi) in diameter, and represents only a 3–10 MegaTon release of energy. A 300–400 meter asteroid strike would release 10–100 times the energy. Image credit: USGS/D. Roddy. Moreover, the Solar System itself is more cleared of potential impactors than at any time in history. They still occur, of course, but with lower frequency than ever before. Getting hit by a giant, fast-moving massive space rock is still a real threat, but there are only two common classes of impact. The most common type of impacts — from asteroids — are the most easily trackable. If we do a dedicated ongoing sky survey of the asteroid belt and all near-Earth asteroids, we could give ourselves decades or even centuries of lead time when it comes to these potentially hazardous objects. Asteroids in the early Solar System were more numerous, and cratering was catastrophic. The rate has plummeted over the past 4.5 billion years. Image credit: NASA / GSFC, BENNU’S JOURNEY — Heavy Bombardment. The less common type — from long-period objects — are likely to give us less than two years of lead time, and potentially only months. If a fast-moving, massive body from beyond Jupiter, Neptune or even farther out plummets in towards the Sun, and happens to be on a collision course with Earth, our best option is to get to it as fast as possible with a nuclear impactor to try and divert it or break it up as much as possible. It’s the worst-case scenario, but thankfully, it’s a very unlikely one. While asteroids (grey) and Kuiper Belt objects beyond Neptune (blue and orange) are generally considered Earth’s greatest threats, the centaurs (green) number over 44,000. Image credit: WilyD at English Wikipedia. Trans-Neptunian objects are most likely to head towards Earth after a recent encounter with a nearby, passing star. But we haven’t had one in many hundreds of thousands of years, and there isn’t one slated for perhaps millions more. The odds of a city-killer asteroid striking Earth are below 0.1% every year, and most of the ones that will hit us will land in the ocean (70%) or over a relatively unpopulated area (25%). Only around 5% of the Earth’s surface has a sizable human population density inhabiting it, and the fallout from those events are minor even a small distance away from the direct impact. The extinction-level events are so low-risk that the most dangerous object known to humanity doesn’t pose any danger at all for more than the next 2400 years. The orbital path of Comet Swift-Tuttle, which passes perilously close to crossing Earth’s actual path around the Sun. Image credit: Howard of Teaching Stars, via http://www.teachingstars.com/2012/08/08/the-2012-perseid-meteor-shower/orbital-path-of-swift-tuttle-outer-solar-system\_crop-2/. The odds of a massive asteroid strike are lower than they’ve ever been at any point in Earth’s history. Small asteroids will still hit us and we should still invest in the study and exploration of our Solar System and beyond, but we shouldn’t be afraid. The “quietness” of the past few millennia doesn’t mean we’re overdue for a city-killer asteroid; if anything, it means we’re living in a period of relatively low risk. Don’t let the catastrophic consequences in the game of “what if” blind you to the realities that of all the natural and human-caused disasters facing Earth, asteroids aren’t the one that should be topping our priority lists.

#### \*\*\*Space isn’t where conflict starts and the status quo solves deterrence

Harold et al 17 Harold, Scott W., et al. The US-Japan Alliance and Deterring Gray Zone Coercion in the Maritime, Cyber, and Space Domains. RAND Corporation, 2017. dw

For the United States and China, each is the other’s most challenging potential adversary in the western Pacific, and hence a major focus of their respective political, diplomatic, and military activities has been dissuading the other from challenging key security concerns. The space domain has been steadily rising in importance in this regard. Given the very different extent to which each side relies on space, as well as the diverging demands of alliances, the potential for deterring conflict in space is increasingly challenging. But while there may be clashes in space, the actual source of any Sino-American conflict **will remain earthbound**, most likely stemming from tensions associated with the situation in the East China Sea, the Taiwan Strait, or the South China Sea. This suggests that U.S. and allied decisionmakers (both in Asia and Europe) should be focusing on deterring aggression in general, rather than concentrating primarily on trying to forestall actions in space. Indeed, there is **little evidence** that Chinese military planners are contemplating a conflict limited to space. While there may be actions against space systems, Chinese writings suggest that they would either be limited in nature, as part of a signaling and coercive effort, or else would be integrated with broader terrestrial military operations. This would suggest that current U.S. strategy can be effective in at least limiting the success of any Chinese effort at degrading and denying space to the United States and its allies. Enhancing resilience of space-based systems—including through hosted payloads, deployment of on-orbit spares, and increased ability to rapidly replace space systems—will likely affect the Chinese calculus for undertaking action against space-based systems. At the same time, efforts must be made to improve the resilience of the terrestrial components of space-based systems’ architectures. Proliferating ground control links (as is under way with the GPS constellation), establishing additional mission control facilities, and moving away from a handful of fixed launch sites (e.g., through sea-based space launch options) all need to be taken into consideration as part of a solution to complicating adversary targeting and thereby bolstering deterrence through denial. The growing array of nongovernmental space players, including space launch (e.g., SpaceX, Blue Horizons) and remote sensing (e.g., GeoEye, Digital Globe), may provide additional resiliency because they can augment governmental assets and capabilities. This has long been the case in the area of satellite communications, with such firms as Intelsat and Inmarsat providing the bulk of global satellite communications services.

#### Miscalculation won’t escalate

MacDonald, 13 – Teaches at the United States Institute of Peace on strategic posture and space/cyber security issues, leads a study on China and Crisis Stability in Space, and is adjunct professor at the Johns Hopkins School of Advanced International Studies.

Bruce W. MacDonald, “Deterrence and Crisis Stability in Space and Cyberspace,” in Anti-satellite Weapons, Deterrence and Sino-American Space Relations, September 2013. <https://apps.dtic.mil/dtic/tr/fulltext/u2/a587431.pdf>

As was the case during the Cold War nuclear standoff, massive “bolt-out-of-blue” space or cyberattacks are unlikely. Generally speaking, it would be prudent to assume that any seeming offensive action of more than nuisance impact is a one-off, possibly accidental or even rogue event, or at most a way to demonstrate capabilities and send a signal. Some modest increase in defensive alert level also would be prudent, accompanied by a priority inquiry at an appropriate level to the suspected country of origin for explanation. This would be easier to accomplish if there would be some modality comparable to the US-Russian Risk Reduction Center or Hotline in existence, particularly between Washington and Beijing. Improved communication channels might usefully accompany an international code of conduct for responsible spacefaring nations, if one can be agreed to, and is worthy of consideration even if it not.

#### Kessler effect destroys the economy—causes rapid collapse.

Walter Tam 15. Ph.D. Walden University. “The Space Debris Environment and Satellite Manufacturing.” https://pdfs.semanticscholar.org/a90d/20a5a824b639f0688bdbfd0ceb2e2120a37c.pdf

Contribution to Business Practice

Space-based systems are prevalent in modern society and critical to the global economy. The capabilities they provide are indispensable to the global community (Buckerfield de la Roche, 2013). The space debris problem is a global problem (Chen, 2011) with the potential to affect billions of consumers subscribing to space services (Meek, 2012). The knowledge base on space debris includes politics, behavior and ethics, space economy, and the space environment. There is also knowledge on the economic benefits of space use. However, no researchers have focused on the implications of the space debris problem on satellite manufacturers. The topic addressed was the space debris problem from the perspective of satellite manufacturers and provided business leaders additional information upon which they can make future business decisions. By providing business leaders at satellite manufacturing organizations insights into an SRM for effective space debris risk mitigation, business leaders seeking strategic solutions to update their business models might find the research findings helpful. The research findings could lead to improved business operations that promote lower operational risk, higher profitability, enhanced competitiveness, and organizational sustainability. By promoting the long-term sustainability of the space environment, business leaders at satellite manufacturing organizations could contribute to technology advancement, economic development, and positive social change. Implications for Social Change The benefits of space technology are far reaching. The use of the space environment contributes to economic growth, higher standards of living, increased knowledge base, and technology advancement (Williamson, 2012). Social benefits of space activities include employment-associated hardware manufacture, technology research, and technology spin-offs (Abiodun, 2012; Jarritt, Peeters, & Schrogl, 2011; Machay, 2012). Investments into space technology serve as a source for the technology overflow that contributes to the economic development of nations and benefits many terrestrial industries (Venturini, Verbano, & Matsumoto, 2013). Such technology development could lead to new products, processes, applications, materials, or services to benefit societies (Petroni, Verbano, Bigliardi, & Galati, 2013). Earth observation using satellites in space facilitates the monitoring of the planetary health (Lele, 2012). For example, Earth observation satellites capable of oil spill detection could provide early warnings that reduce clean-up costs and prevent further damage to the environment (Jarritt et al., 2011). New entrepreneurial ventures in space tourism are becoming a source of job creation and economic growth (Beery, 2012; Reddy, Nica, & Wilkes, 2012). Many developing economies are implementing knowledge-based economies through research in space exploration and the development of advanced products and services to promote human welfare (Acevedo, Becerra, Orihuela, & Varela, 2011; Manikowski, 2013). Economically depressed Africa is adopting space technology to meet continent-wide development needs (Abiodun, 2012). The sustainability of the space environment would 15 specifically benefit the African economy by providing application opportunities inherent in space efforts and preventing brain drain from Africa (Abiodun, 2012). Examples of application opportunities include research and development to develop future industries and applications in medical research. Satellite systems are important research platforms for investigative studies of Earth sciences, including weather and global climate changes. Climate change is a risk multiplier that affects social issues such as poverty, disease, and food and water scarcity (Rosa, Ehrenfreund, Hornect, & Thiele, 2013). In some parts of the world, the changing climate is contributing to increased levels of famine and food price volatility. The demand for increasingly scarce resources is consequently contributing to regional tension that leads to instability and regional and global security concerns (Rosa et al., 2013). The preceding examples are indications that the preservation of the fragile space environment for continued space systems application is important for improving living standards, increasing prosperity, and promoting consumer welfare. All space missions contribute to the space debris problem and the pollution of the space environment. The continued destruction of the global commons is an increasing threat to the sustainability of the space environment and directly threatens the global economy. The increasing threat coincides with modern society’s growing dependency on space systems and the capabilities they provide. Space resources are not renewable (Meek, 2012), which means it is difficult to eliminate debris from a contaminated space environment. The space debris problem might one day erase the economic advantages provided by space systems that modern society has built since the 1960s. Every individual on planet Earth is a stakeholder in the sustainable use of space CPR (Weeden & Chow, 2012). The collective knowledge and improved understanding of the fragility of the space environment are prerequisites to implementing social change. Space pollution contributes to the continued destruction of the space environment. If left unmitigated, space debris might one day deny humanity the use of space and the many benefits space systems provide. The goal of conducting this case study was to advocate the preservation of the space environment through improved business practices by drawing attention to the increasingly threatening space debris problem. The study could contribute to positive social change by revealing strategies that might preserve the space environment. This will allow future generations continued access to this critical resource. The accessibility of the space environment will continue to provide incentives and opportunities to derive new benefits for humanity.

#### Growth causes war

Clary 15 – PhD in political science from MIT, MA in national security affairs, postdoctoral fellow, Watson Institute for International Studies, Brown University

(Christopher, “Economic Stress and International Cooperation: Evidence from International Rivalries”, 4/25/15, <http://poseidon01.ssrn.com/delivery.php?ID=719105092024097121124100018083011118038069081083039091121092126090087109098065027066123029119022059121027020065094083094082064017078060077029075100073095001126072113085042032004073009085104092002020027086072104017023079122098123108013079003000082124078&EXT=pdf>, MIT political science department)

Do economic downturns generate pressure for diversionary conflict? Or might downturns encourage austerity and economizing behavior in foreign policy? This paper provides new evidence that economic stress is associated with conciliatory policies between strategic rivals. For states that view each other as military threats, the biggest step possible toward bilateral cooperation is to terminate the rivalry by taking political steps to manage the competition. Drawing on data from 109 distinct rival dyads since 1950, 67 of which terminated, the evidence suggests rivalries were approximately twice as likely to terminate during economic downturns than they were during periods of economic normalcy. This is true controlling for all of the main alternative explanations for peaceful relations between foes (democratic status, nuclear weapons possession, capability imbalance, common enemies, and international systemic changes), as well as many other possible confounding variables. This research questions existing theories claiming that economic downturns are associated with diversionary war, and instead argues that in certain circumstances peace may result from economic troubles. I define a rivalry as the perception by national elites of two states that the other state possesses conflicting interests and presents a military threat of sufficient severity that future military conflict is likely. Rivalry termination is the transition from a state of rivalry to one where conflicts of interest are not viewed as being so severe as to provoke interstate conflict and/or where a mutual recognition of the imbalance in military capabilities makes conflict-causing bargaining failures unlikely. In other words, rivalries terminate when the elites assess that the risks of military conflict between rivals has been reduced dramatically. This definition draws on a growing quantitative literature most closely associated with the research programs of William Thompson, J. Joseph Hewitt, and James P. Klein, Gary Goertz, and Paul F. Diehl.1 My definition conforms to that of William Thompson. In work with Karen Rasler, they define rivalries as situations in which “[b]oth actors view each other as a significant politicalmilitary threat and, therefore, an enemy.”2 In other work, Thompson writing with Michael Colaresi, explains further: The presumption is that decisionmakers explicitly identify who they think are their foreign enemies. They orient their military preparations and foreign policies toward meeting their threats. They assure their constituents that they will not let their adversaries take advantage. Usually, these activities are done in public. Hence, we should be able to follow the explicit cues in decisionmaker utterances and writings, as well as in the descriptive political histories written about the foreign policies of specific countries.3 Drawing from available records and histories, Thompson and David Dreyer have generated a universe of strategic rivalries from 1494 to 2010 that serves as the basis for this project’s empirical analysis.4 This project measures rivalry termination as occurring on the last year that Thompson and Dreyer record the existence of a rivalry. Economic crises lead to conciliatory behavior through five primary channels. (1) Economic crises lead to austerity pressures, which in turn incent leaders to search for ways to cut defense expenditures. (2) Economic crises also encourage strategic reassessment, so that leaders can argue to their peers and their publics that defense spending can be arrested without endangering the state. This can lead to threat deflation, where elites attempt to downplay the seriousness of the threat posed by a former rival. (3) If a state faces multiple threats, economic crises provoke elites to consider threat prioritization, a process that is postponed during periods of economic normalcy. (4) Economic crises increase the political and economic benefit from international economic cooperation. Leaders seek foreign aid, enhanced trade, and increased investment from abroad during periods of economic trouble. This search is made easier if tensions are reduced with historic rivals. (5) Finally, during crises, elites are more prone to select leaders who are perceived as capable of resolving economic difficulties, permitting the emergence of leaders who hold heterodox foreign policy views. Collectively, these mechanisms make it much more likely that a leader will prefer conciliatory policies compared to during periods of economic normalcy. This section reviews this causal logic in greater detail, while also providing historical examples that these mechanisms recur in practice. Economic Crisis Leads to Austerity Economic crises generate pressure for austerity. Government revenues are a function of national economic production, so that when production diminishes through recession, revenues available for expenditure also diminish. Planning almost invariably assumes growth rather than contraction, so the deviation in available revenues compared to the planned expenditure can be sizable. When growth slowdowns are prolonged, the cumulative departure from planning targets can grow even further, even if no single quarter meets the technical definition of recession. Pressures for austerity are felt most acutely in governments that face difficulty borrowing to finance deficit expenditures. This is especially the case when this borrowing relies on international sources of credit. Even for states that can borrow, however, intellectual attachment to balanced budgets as a means to restore confidence—a belief in what is sometimes called “expansionary austerity”—generates incentives to curtail expenditure. These incentives to cut occur precisely when populations are experiencing economic hardship, making reductions especially painful that target poverty alleviation, welfare programs, or economic subsidies. As a result, mass and elite constituents strongly resist such cuts. Welfare programs and other forms of public spending may be especially susceptible to a policy “ratchet effect,” where people are very reluctant to forego benefits once they have become accustomed to their availability.6 As Paul Pierson has argued, “The politics [of welfare state] retrenchment is typically treacherous, because it imposes tangible losses on concentrated groups of voters in return for diffuse and uncertain gains.”7 Austerity Leads to Cutbacks in Defense Spending At a minimum, the political costs of pursuing austerity through cutbacks in social and economic expenditures alone make such a path unappealing. In practice, this can spur policymakers to curtail national security spending as a way to balance budgets during periods of economic turmoil. There is often more discretion over defense spending than over other areas in the budget, and it is frequently distantly connected to the welfare of the mass public. Many militaries need foreign arms and foreign ammunition for their militaries, so defense expenditures are doubly costly since they both take up valuable defense budget space while also sending hard currency overseas, rather than constituencies at home. Pursuing defense cuts may also conform to the preferences of the financial sector, which shows a strong aversion to military conflict even if that means policies of appeasement and conciliation.8 During periods of economic expansion, the opportunity costs associated with defense expenditure—the requirement for higher taxes or foregone spending in other areas—are real but acceptable. Economic contraction heightens the opportunity costs by forcing a choice between different types of spending. There is a constituency for defense spending in the armed services, intelligence agencies, and arms industries, but even in militarized economies this constituency tends to be numerically much smaller than those that favor social and economic expenditures over military ones. Defense Cutbacks Encourage Rapprochement An interest in defense cutbacks can lead to conciliatory behavior through two paths. First, the cutbacks themselves serve as a concrete signal to adversaries that the military threat posed by the economically distressed state is declining. This permits the other state to halt that portion of defense spending dedicated to keeping up, breaking the back of ongoing arms races through reciprocated, but non-negotiated moves. Unilateral conventional force reductions were a major element of Gorbachev’s foreign policy in the late 1980s, alongside negotiated strategic arms control, and diplomatic efforts to achieve political understandings with the United States.9 Gorbachev similarly used force reductions in Afghanistan, Mongolia, and the Soviet Far East to signal to China in 1987 that he was serious about political negotiations.10 Elsewhere, non-negotiated, tit-for-tat military redeployments facilitated Argentina-Brazil rapprochement.11 Second, leaders may believe cutbacks are necessary, but would be dangerous in the absence of negotiated improvements with traditional foes. Economic downturns can serve as motivation to pursue arms control or political settlement. During periods of normalcy, such outcomes would be positives, but are viewed as “too hard” by political leaders that move from one urgent problem to the next. During periods of economic crisis, however, arms control or political improvements might allow for much needed cuts in defense spending, and are pursued with greater vigor. The Johnson administration attempted both unilateral and negotiated arms limitations because of budgetary concerns as President Johnson and Secretary McNamara struggled to pay for the “Great Society” domestic programs and the increasingly costly Vietnam War. They first attempted unilateral “caps” on costly nuclear forces and anti-ballistic missile defenses and when this failed to lead to a reciprocal Soviet response they engaged in formal arms control talks. Détente continued in the Nixon administration, accelerating in 1971 and 1972, simultaneous with rising budget deficits and inflation so serious that Nixon instituted price controls. Nixon’s decision to sharply limit anti-ballistic missile defenses to enable arms control talks was contrary to his strategic views, but necessitated by a difficult budgetary environment that made paying for more missile defense emplacements unrealistic.12 As Nixon told his national security advisor Kissinger in an April 1972 discussion of ballistic missile and anti-ballistic missile developments: “You know we've got a hell of a budget problem. We've got to cut it down, we've got to cut 5 billion dollars off next year's defense budget. So, I don't want to [inaudible: do it?] unless we've got some settlement with the Russians.”13 In practice, unilateral defense cuts and force reductions are frequently combined with negotiated political agreements in a sequential, iterative fashion, where a unilateral reduction will signal seriousness that opens the way for political agreement, which in turn permits even deeper reductions. Defense cuts and force reductions are not only a means to achieve rivalry termination, but also a goal in and of themselves that rivalry termination helps secure. Leaders are seeking resources from defense they can use elsewhere. Thus when Argentine leader Raul Alfonsín campaigned for the need for drastic budgetary austerity, his specific “platform was the reduction of military spending to use it for the other ministries, connected with the concept of eliminating the hypothesis of conflict” with Argentinian rivals, according to Adalberto Rodríguez Giavarini, who served in Alfonsín’s ministry of defense (and later was Argentina’s foreign minister).14 Similarly, Gorbachev was motivated to reduce arms in the late 1980s because he determined it was necessary to cut Soviet defense spending and defense production, and repurpose part of the defense industry to make consumer and civilian capital goods, according to contemporary U.S. Central Intelligence Agency classified assessments.15 Thus the “main reason” why strategic arms control breakthroughs occurred from 1986 to 1988 and the Soviet Afghan intervention concluded in 1989 was a realization within the Politburo of “excessively high expenditures on defense,” according to Nikolai Ryzhkov, Gorbachev’s prime minister.16 Economic Downturns Provoke Strategic Reassessment: Threat Deflation and Prioritization Economic downturns encourage leaders to seek new ideas to use to frame their policy problems. During periods of economic difficulty, elites can come to realize that their problems are not amenable to old solutions, and search for new ideas.17 During an economic crisis, politics and policy are “more fluid,” as old answers seem stale and insufficient.18 An ideational entrepreneur that can link economic lemons to foreign policy lemonade can find a patron when leaders are casting about for ways to reframe the world in acceptable ways to their peers and publics. The behavior of an old foe is often ambiguous, and can be viewed as either injurious to one’s interests or neutral toward them. During periods of normalcy, the motivation of defense establishments is tilted toward threat and danger. During periods of economic crisis, national leaders have a counteracting motivation to downplay such dangers, so that the threats faced by a nation are manageable through available resources. Economic difficulties provide a motivation for leaders to view equivocal signals from the international system in a way that is benign. To the extent that rivalries are perpetuated because of threat inflation, economic downturns provide incentives to deflate the threat, potentially disrupting cycles of competition and enmity. South Korean president Kim Dae-jong came to power in the aftermath of the 1998 Asian economic crisis, pursued a “sunshine policy” toward the North, cut South Korean defense spending in nominal and real terms, and pursued a policy toward North Korea that political scientist Dong Sun Lee called “threat deflation” despite the growing North Korean nuclear weapons threat.19 Economic crises can also spur strategic reassessment through another channel. If leaders view economic problems as structural, rather than a temporary gale, they may come to question whether available national resources are sufficient to confront all of the national threats identified in the past. This creates incentives to economize threats, seeking political settlements where possible in order to focus remaining resources on competitions that can be won. A concrete example: in 1904, the chancellor to the Exchequer wrote his cabinet colleagues: “[W]e must frankly admit that the financial resources of the United Kingdom are inadequate to do all that we should desire in the matter of Imperial defense.”20 The result was a British decision to minimize political disagreement with the United States and focus on other defense challenges. While such a decision is in line with realist advice, it occurred not when the power trajectories were evident to British decisionmakers but when the budget situation had reached a crisis that could no longer be ignored. Economic Downturns Increase Incentives for International Economic Cooperation Economic downturns not only create incentives to cut spending, they encourage vigorous pursuit of opportunities for economic cooperation. This, too, can engender conciliatory behavior. Economic downturns can increase motives to pursue trade and investment. Rivalries with old foes often directly impinge on trade and investment with the adversary and may indirectly impinge on trade and investment with third parties, especially if the rivalry is viewed as being likely to generate disruptive military conflict. Additionally, economic aid is sometimes used as an inducement for adversaries to set aside a political dispute. This aid can either serve as a side payment from one rival to another, or it can be offered by a third party to one or both rivals as an incentive to set aside lingering disputes. Such aid is more attractive during periods of economic turmoil than during periods of comparative normalcy. In South Asia, India and Pakistan struggled from 1947 to 1960 with how to manage water resources in the Indus Rivers basin, inheriting a canal system meant to service pre-partitioned India. Pakistan, suffering an economic downturn, and India, reliant on foreign aid to avert economic crisis, agreed to an Indus Waters Treaty in 1960 to resolve the lingering dispute, made possible in substantial part because of World Bank financing that was especially attractive to the struggling economies. In the Middle East, Egypt and Israel made the hard choices necessary for the Camp David accord in 1979 precisely because the Sadat and Begin governments faced difficult economic situations at home that made the U.S. aid guarantee in exchange for a peace agreement especially attractive.21 In 1982, the Yemen’s People’s Republic agreed to stop its attempts to destabilize Oman, because otherwise Yemen would not receive economic assistance from Arab oil producing states that it desperately needed.22 In the late 1990s, El Niño-induced flooding devastated Ecuador and Peru, spurring reconciliation as leaders sought to increase trade, secure investment, and slash military expenditures so they could be used at home.23 As one Western diplomat assessed at the time, Ecuador and Peru “have decided it's better to see reason…. They see foreign companies eager to invest in South America, and if Peru and Ecuador are in conflict, it makes them less attractive than, say, Argentina or Brazil or Chile for investment purposes. That's the last thing either country wants.”24 Economic Downturns Can Cause Meaningful Leadership Change The above mechanisms have identified how economic difficulties can alter the preferences of an incumbent leader. Additionally, economic crises can lead to leadership turnover and, during periods of difficulty, the selection process that determines new leadership can loosen ideological strictures that relate to extant rivalries. Leaders may be selected based on judgments about their ability to cope with economic problems, with greater elite acceptance of ideological heterogeneity in foreign policy beliefs than in periods of normalcy.25 In Stephen Brooks and William Wohlforth’s words, “If everything is going well or is stable, then why select leaders who might subvert the triedand-true identity? But if that identity is leading to increased material difficulties, pressure for change will likely mount. In these circumstances, those who are willing to alter or adjust the hallowed precepts of the existing identity and its associated practices are more likely to assume power.”26 Economic crisis, then, can spur incumbent leaders to either abandon the “baggage” of rivalry or facilitate the selection of new leaders that do not carry such baggage. The most well-known example of an incumbent selectorate looking for a reformer, even one without much foreign policy experience, involves Mikhail Gorbachev’s ascension to the Soviet premiership. In political scientist Jerry Hough’s words, “If the rate of economic growth continued to decline, if administrative and labor efficiency continued to fall, if corruption was not punished, these conditions would have dangerous consequences for the [Soviet Union in the] 1980s and 1990s…. Gorbachev’s promotion was an answer to these concerns.”27

#### Growth causes extinction

Phys, 16—citing a study by Roberto Cazzolla Gatti, associate professor in ecology and biodiversity at Tomsk State University (“Western lifestyle spells the end of biodiversity,” <https://phys.org/news/2016-04-western-lifestyle-biodiversity.html>, dml)

Contrary to what many economists suggest, development is not always good for nature, a biologist at Tomsk State University argues. It is broadly accepted that biodiversity and the ecosystem are both fundamental to sustaining humanity and life on Earth, but in recent centuries, they have been subject to heavy pressures due to overexploitation. Environmental protection is also raising concerns because of our improved understanding of the interconnections between human wellness and ecosystem health. "The problem is that, even if the will to follow a sustainable lifestyle in Western countries is increasing, many developing countries are experiencing economic growth, which threatens to subject their environments to overexploitation," writes Roberto Cazzolla Gatti, associate professor in ecology and biodiversity at Tomsk State University in "Trends in human development and environmental protection," a paper published in the International Journal of Environmental Studies. This could be a catastrophe for the planet. This study compares the trends seen in the Living Planet Index (LPI) and the Human Development Index (HDI) and applies an economic-ecologic historical analysis. The TSU ecologist suggests that societies follow common development patterns as they move from an indigenous lifestyle to an undeveloped society before entering a transitional phase as they move toward a developed state. As they go through this process, each society exploits local, regional and sometimes global natural resources to nourish its economic growth. "Today, we can see that higher-latitude countries populated by 2 billion people consume their entire environmental capital in one year, while lower-latitude countries that are home to more than 5 billion people are depleting resources at a growing rate that will in a few years catch up with Western levels," Cazzolla Gatti says. "If developing countries do not implement strategies to skip this 'intermediate' stage of natural resource overuse during the intense growth phase, the Earth's systems will not be able to support the global biodiversity and ecosystems that sustain humanity. The planet is facing a series of challenges that could lead to a significant loss of ecosystem integrity. These challenges are caused by human demand, natural resource and space use. The recent agreement signed at the United Nations climate summit in Paris (December 2015) has been hailed as historic, ground-breaking and unprecedented. However, the targets it sets seem so ambitious that many climate analysts do not believe they will have any impact on the current climatic situation. This agreement aims to limit temperature increases to a level below 2° C, above pre-industrial levels, and recognizes that avoiding 1.5° C of warming "would significantly reduce the risks and impacts of climate change." Unfortunately, participating countries' emissions reduction commitments are not sufficient to achieve these targets and it seems impossible to avoid the 1.5°C limit without development of "negative emissions," such as absorbing carbon dioxide out of the air using technologies that are still at worst unavailable and at best ineffective. "In addition to climate change, the major cause of the reduction in biodiversity we have seen in recent times is the associated rates of habitat destruction and degradation. Over half of the estimated original extent of temperate broadleaf forests had already been converted to agriculture, forest plantations and urban areas by 1950," Cazzolla Gatti writes. "In contrast, deforestation and land-use change accelerated in the tropics after 1950. Freshwater ecosystem exploitation has moved well beyond levels that can be sustained, even at current demand. Moreover, forecasts suggest that demand for water will continue to rise globally. Add to this the impact of the increasing global demand for palm oil products, which continues to be a key factor behind the recent dramatic decline in forest cover in Southeast Asia," Gatti says. "Data suggests that two orangutan species have already undergone a tenfold decrease in population size over the 20th century and many populations are now at very low numbers. Looking at the marine environment, the high demand for fish and fish products combined with overcapacity in the global fishing fleet and inefficient fishing techniques have led to massive overfishing." This alarming study suggests that societies seem to follow common development patterns and few countries are currently living sustainably, with the majority overexploiting natural resources and ecosystems. This is fundamentally unsustainable and there is no end in sight. Moving away from this will be anything but painless. In coming years, 5 to 7 billion people will follow the global patterns described in this study, and ecosystems and biodiversity will continue to be subjected to a high level of stress with no assurance of resilience.

#### Growth causes chemical emissions which cause extinction

**Cribb, 17**—principal of JCA, Fellow of the Australian Academy of Technological Sciences and Engineering, former Director, National Awareness, CSIRO (Julian, “The Poisoner,” *Surviving the 21st Century* Chapter 6, dml)

There are two essential points about the Earthwide chemical flood. First it is quite new. It began with the industrial revolution of the late nineteenth century, but expanded dramatically in the wake of the two world wars—where chemicals were extensively used in munitions—and has exploded in deadly earnest in the past 50 years, attaining a new crescendo in the early twenty-first century. It is something our ancestors never faced—and to which we, in consequence, lack any protective adaptations which might otherwise have evolved due to constant exposure to poisons. Second, the toxic flood is, for the most part, preventable. It is not compulsory—but is an unwanted by-product of economic growth. Though driven by powerful industries and interests, it still lies within the powers and rights of citizens, consumers and their governments to demand it be curtailed or ended and to encourage industry to safer, healthier products and production systems. The issue is whether, or not, a wise humanity would choose to continue poisoning our children, ourselves and our world. Regulatory Failure Despite the fact that around 2000 new chemicals are released onto world markets annually, most have not received proper health, safety or environmental screening—especially in terms of their impact on babies and small children. Regulation has so far failed to make any serious curtailment of this flood: only 21 out of 144,000 known chemicals have been banned internationally, and this has not eliminated their use. At such a rate of progress it will take us more than 50,000 years to identify and prohibit or restrict all the chemicals which do us harm. Even then, bans will only apply in a handful of well-regulated countries, and will not protect the Earth system nor humanity at large. Clearly, national regulation holds few answers to what is now an out-of-control global problem. Furthermore, the chemical industry is relocating from the developed world (where it is quite well regulated and observes its own ethical standards) and into developing countries, mainly in Asia, where it is largely beyond the reach of either ethics or the law. However, its toxic emissions return to citizens in well-regulated countries via wind, water, food, wildlife, consumer goods, industrial products and people. The bottom line is that it doesn’t matter how good your country’s regulations are: you and your family are still exposed to a growing global flood of toxins from which even a careful diet and sensible consumer choices cannot fully protect you. The wake-up call to the world about the risks of chemical contamination was issued by American biologist Rachel Carson when she published Silent Spring in 1962, in which she warned specifically about the impact of certain persistent pesticides used in agriculture. Since her book came out, the volume of pesticide use worldwide has increased 30-fold, to around four million tonnes a year in the mid-2010s. Since the modern chemical age began there has been a string of high-profile chemical disasters: Minamata, the Love Canal, Seveso, Bhopal, Flixborough, Oppau, Toulouse, Hinkley, Texas City, Jilin, Tianjin. Most of these display a familiar pattern of unproductive confrontation between angry citizens, industry and regulators, involving drawn-out legal battles that deliver justice to nobody. By their spectacular and local nature, such events serve to distract from the far larger, more insidious and ubiquitous, universal toxic flood. Chemists and chemical makers often claim that their products are ‘safe’ because individual exposure (e.g. in a given product, like a serve of food) is too low to result in a toxic dose, a theory first put forward by the mediaeval scholar Paracelsus in the sixteenth century. This ‘dose related’ argument is disingenuous, if not dishonest—as modern chemists well know—for the following reasons: Most chemicals target a receptor or receptors on certain of your body cells, to cause harm. There may be not one, but hundreds or even thousands of different chemicals all targeting the same receptor, so a particular substance may contribute an unknowable fraction to an overall toxic dose. That does not make it ‘safe’. Chemicals not known to be poisonous in small doses on their own can combine with other substances in water, air, food or your body to create a toxin. No manufacturer can truthfully assert this will not happen to their products. Chemical toxicity is a function of both dose and the length of time you are exposed to it. In the case of persistent chemicals and heavy metals, this exposure may occur over days, months, years, even a lifetime in some cases. Tiny doses may thus accumulate into toxic ones. Most chemical toxicity is still measured on the basis of an exposed adult male. Babies and children being smaller and using much more water, food and air for their bodyweight, are therefore more at risk of receiving a poisonous dose than are adults. Chemicals and minerals are valuable and extremely useful. They do great good, save many lives and much money. No-one is suggesting they should all be banned. But their value may be for nothing if the current uncontrolled, unmonitored, unregulated and unconscionable mass release and planetary saturation continues. Chemical Extinction Two billion years ago, excessive production of one particular poisonous chemical by the inhabitants of Earth caused a colossal die-off and threatened the extermination of all life. That chemical was oxygen and it was excreted by the blue-green algae which then dominated the planet, as part of their photosynthetic processes. After several hundred million of years, the planet’s physical ability to soak up the surplus O2 in iron formations, oceans and sediments had reached saturation and the gas began to poison the existing life. This event was known as the ‘oxygen holocaust’, and is probably the nearest life on Earth has ever come to complete disaster before the present (Margulis and Sagan 1986). Since it developed slowly, over tens of millions of years, the poisonous atmosphere permitted some of these primitive organisms to evolve a tolerance to O2—and this in time led to the rise of oxygen-dependent species such as fish, mammals and eventually, us. The takehome learning from this brush with total annihilation is that it is possible for living creatures to pollute themselves into oblivion, if they don’t take care to avoid it or rapidly adapt to the new, toxic environment. It’s a message that humans, with our colossal planetary chemical impact, would do well to ponder. While it is unlikely that human chemical emissions alone could reach such a volume and toxic state as to directly threaten our entire species with extinction (other than through carbon emissions in a runaway global warming event) or even the collapse of civilisation, it is likely they will emerge as a serious contributing factor during the twenty-first century in combination with other factors such as war, climate change, pandemic disease and ecosystem breakdown. Credible ways in which man-made chemicals might imperil the human future include: Undermining the immune systems, physical and mental health of the population through growing exposure to toxins Reducing the intelligence of current and future generations through the action of nerve poisons on the developing brains and central nervous systems of children, rendering humanity less able to solve its problems and adapt to major changes; and by increasing the level of violent crime and conflict in society, which is closely linked to lower IQ. Bringing down the economy through the massive healthcare costs of having to nurse, treat and maintain a growing proportion of the population disabled by lifelong chronic chemical exposure. By poisoning the ecosystem services—clean air, water, soil, plants, insects and wildlife—on which humanity depends for its own survival and thereby contributing to potential global ecosystem breakdown By augmenting the global arsenal of weapons of mass destruction and hence the risk of their use by nations or uncontrollable fanatics.

#### Growth causes terrorism

Cronin 3Senior Associate at the Oxford Leverhulme Programme on the Changing Character of War (Audrey Kurth, “Behind the Curve: Globalization and International Terrorism”, Project MUSE)

The objectives of international terrorism have also changed as a result of globalization. Foreign intrusions and growing awareness of shrinking global space have created incentives to use the ideal asymmetrical weapon, terrorism, for more ambitious purposes. The political incentives to attack major targets such as the United States with powerful weapons have greatly increased. The perceived corruption of indigenous customs, religions, languages, economies, and so on are blamed on an international system often unconsciously molded by American behavior. The accompanying distortions in local communities as a result of exposure to the global marketplace of goods and ideas are increasingly blamed on U.S.- sponsored modernization and those who support it. The advancement of technology, however, is not the driving force behind the terrorist threat to the United States and its allies, despite what some have assumed. Instead, at the heart of this threat are frustrated populations and international movements that are increasingly inclined to lash out against U.S.-led globalization. As Christopher Coker observes, globalization is reducing tendencies toward instrumental violence (i.e., violence between states and even between communities), but it is enhancing incentives for expressive violence (or violence that is ritualistic, symbolic, and communicative). The new international terrorism is [End Page 51] increasingly engendered by a need to assert identity or meaning against forces of homogeneity, especially on the part of cultures that are threatened by, or left behind by, the secular future that Western-led globalization brings. According to a report recently published by the United Nations Development Programme, the region of greatest deficit in measures of human development—the Arab world—is also the heart of the most threatening religiously inspired terrorism. Much more work needs to be done on the significance of this correlation, but increasingly sources of political discontent are arising from disenfranchised areas in the Arab world that feel left behind by the promise of globalization and its assurances of broader freedom, prosperity, and access to knowledge. The results are dashed expectations, heightened resentment of the perceived U.S.-led hegemonic system, and a shift of focus away from more proximate targets within the region. Of course, the motivations behind this threat should not be oversimplified: Anti-American terrorism is spurred in part by a desire to change U.S. policy in the Middle East and Persian Gulf regions as well as by growing antipathy in the developing world vis-à-vis the forces of globalization. It is also crucial to distinguish between the motivations of leaders such as Osama bin Laden and their followers. The former seem to be more driven by calculated strategic decisions to shift the locus of attack away from repressive indigenous governments to the more attractive and media-rich target of the United States. The latter appear to be more driven by religious concepts cleverly distorted to arouse anger and passion in societies full of pent-up frustration. To some degree, terrorism is directed against the United States because of its engagement and policies in various regions. Anti-Americanism is closely related to antiglobalization, because (intentionally or not) the primary driver of the powerful forces resulting in globalization is the United States. Analyzing terrorism as something separate from globalization is misleading and potentially dangerous. Indeed globalization and terrorism are intricately intertwined forces characterizing international security in the twenty-first century. The main question is whether terrorism will succeed in disrupting the [End Page 52] promise of improved livelihoods for millions of people on Earth. Globalization is not an inevitable, linear development, and it can be disrupted by such unconventional means as international terrorism. Conversely, modern international terrorism is especially dangerous because of the power that it potentially derives from globalization—whether through access to CBNR weapons, global media outreach, or a diverse network of financial and information resources.

#### All resources are running out

Jackson and Webster, 16—Professor of Sustainable Development and director of the Centre for the Understanding of Sustainable Prosperity at the University of Surrey AND former policy analyst at Carbon Brief, masters from University College London in conservation and a degree in biology (Tim and Robin, “LIMITS REVISITED,” <http://limits2growth.org.uk/wp-content/uploads/2016/04/Jackson-and-Webster-2016-Limits-Revisited.pdf>

What does this all mean for the future of our economy? In the standard run scenario, natural resources (for example oil, iron and chromium) become harder and harder to obtain. The diversion of more and more capital to extracting them leaves less for investment in industry, leading to industrial decline starting in about 2015. Around 2030, the world population peaks and begins to decrease as the death rate is driven upwards by lack of food and health services.21

The similarity between Limits to Growth’s standard run and the patterns observed over the last forty years doesn’t necessarily mean that the same trends will continue into the future. Some researchers argue that it’s possible, however. Author of the University of Melbourne studies, Dr Graham Turner, asked in 2014 whether global collapse could be “imminent”. Turner explicitly linked the global financial crisis, high commodity prices and the Limits to Growth projections.22

Another set of studies has modelled the availability of over 40 essential materials using an updated and expanded version of the Limits to Growth model. Based on US Geological Survey data, the authors analysed changing patterns of resource extraction. Using earlier work, which suggests there is a time delay of about 40 years between ‘peak discovery’ and ‘peak production’ across a wide range of different minerals, the authors aim to forecast when ‘peak production’ might arrive.

The work, led by Harald Sverdrup from the University of Lund in Sweden and Vala Ragnarsdottír from the University of Iceland, concluded that most of the resources they studied had either already reached peak production or will do so within the next 50 years.23 Phosphorous - which is critical to fertilising soil and sustaining agriculture - has already peaked, and will start declining around 2030- 2040, they said. Coal production will peak in around 2015-20 and ‘peak energy’ around the same period. From that point on, they concluded, “we will no longer be able to take natural-resource fuelled global GDP growth for granted’.24

A book published by the Club of Rome in 2014 also examined the future availability of a wide variety of mined resources, including chromium, copper, tin, lithium, coal oil and gas. The book included specialist contributions from experts across a wide range of fields. It concluded that the rate of production of many mineral commodities is already on the verge of decline.25

These analyses are understandably controversial. In a technologically optimistic world, it is often assumed that enough food, water energy and minerals will be available for the foreseeable future, with the only problems being those of distribution.26 Neo-classical economists also argue that when one resource runs out it can be substituted for another. But this is also controversial. In the case of some key elements (phosphorus is an example), there are no known substitutes.27

#### Outweighs—we’d survive nuke war

Denkenberger, et al, 17—Tennessee State University, Global Catastrophic Risk Institute (David, with D. Dorothea Cole, Mohamed Abdelkhaliq, Michael Griswold, Allen B. Hundley, and Joshua M. Pearce, “Feeding Everyone if the Sun is Obscured and Industry is ~~Disabled~~ [Shut Down],” International Journal of Disaster Risk Reduction 21, (2017), 284–290, dml)

A number of catastrophes could block the sun, including asteroid/comet impact, super volcanic eruption, and nuclear war with the burning of cities (nuclear winter). The problem of feeding 7 billion people would arise (the food problem is more severe than other problems associated with these catastrophes). Previous work has shown this is possible converting stored biomass to food if industry is present. A number of risks could destroy electricity globally, including a series of high-altitude electromagnetic pulses (HEMPs) caused by nuclear weapons, an extreme solar storm, and a super computer virus. Since industry depends on electricity, it is likely there would be a collapse of the functioning of industry and machines. Additional previous work has shown that it is technically feasible to feed everyone given the loss of industry without the loss of the sun. It is possible that one of these sun-blocking scenarios could occur near in time to one of these industry-disabling scenarios. This study analyzes food sources in these combined catastrophe scenarios. Food sources include extracting edible calories from killed leaves, growing mushrooms on leaves and dead trees, and feeding the residue to cellulose-digesting animals such as cattle and rabbits. Since the sun is unlikely to be completely blocked, fishing and growing ultraviolet (UV) and cold-tolerant crops in the tropics could be possible. The results of this study show these solutions could enable the feeding of everyone given minimal preparation, and this preparation should be a high priority now.

#### No nuclear winter or famine

Reisner, J., D’Angelo, G., Koo, E., Even, W., Hecht, M., Hunke, E., et al. (2018). Climate impact of a regional nuclear weapons exchange: An improved assessment based on detailed source calculations. Journal of Geophysical Research: Atmospheres, 123, 2752–2772. <https://doi.org/10.1002/2017JD027331>

* Specific to regional and limited use

There have recently been new simulations of a limited nuclear exchange in the India-Pakistan region using modern climate models (e.g., Mills et al., 2014; Stenke et al., 2013) that suggest devastating impacts on climate over a decadal time scale, although somewhat less extreme consequences have also been suggested (Pausata et al., 2016). Our team has taken a careful look at some of the assumptions that were used in those studies, using an end-to-end modeling sequence. Our series of simulations started with a nuclear weapon explosion followed by a simulation of the fireball and cloud rise. The key improvement in this study is our simulation of fire spread and soot transport in the environment that results from fires initiated by the fireball. Due to the heat of the fire and of the BC particles that are produced, some of the particles are lofted into the stratosphere. However, our comprehensive urban fire simulations indicate that the bulk of the carbon mass remains in the troposphere, where it is quickly removed from the atmosphere. In most previous work, for example, that of Stenke et al. (2013) and Mills et al. (2014), all of the soot produced by the urban fires is directly injected near the top of the troposphere, and therefore much of it rises into the stratosphere, where it shades and cools the Earth. In contrast, if we use a realistic vertical profile for the BC aerosols as input to the climate model, the long-term global impacts on climate are much less severe than predicted by previous studies. This was true even with conservative, worst case assumptions regarding BC production. To assess the significance of differences between a limited nuclear exchange scenario and the control climate, we created an ensemble of forced (BC-loaded) simulations using a range of realistic vertical emission profiles, all consistent with our detailed fire simulation. A similar ensemble generated using small atmospheric temperature perturbations allows a robust statistical comparison of our simulated results with and without the carbon forcing. This analysis demonstrates that while modest, statistically significant differences occur during the first few years, longer-term impacts are unlikely, regional in scope, and limited in scale. None of the simulations produced a nuclear winter effect. We also completed a thorough nuclear weapon simulation, determining that it was not necessary for this study and that the impact on climate of the fireball and cloud rise is negligible. There are other, worse effects than those on climate, however, such as nuclear fallout in the region. Such consequences will be the focus of our future work using both xRage and HIGRAD-FIRETEC. Likewise, we will conduct a more comprehensive investigation of regional effects, such as potential consequences for the Asian monsoon during the first few years after the nuclear exchange in follow-on work. Additionally, although this study examines a possible exchange between India and Pakistan via the injection of soot over this region, our modeling system could be used to examine potential impacts of other regional exchange scenarios.

#### Growth is unsustainable, decoupling is impossible, transition away now is key

Ward, et al, 16—School of Natural and Built Environments, University of South Australia (James, with Paul Sutton, Department of Geography, University of Denver, Adrian Werner, School of the Environment and National Centre for Groundwater Research and Training, Flinders University, Robert Costanza, Crawford School of Public Policy, The Australian National University, Steve Mohr, Institute for Sustainable Futures, University of Technology Sydney, and Craig Simmons, School of the Environment and National Centre for Groundwater Research and Training, Flinders University, “Is Decoupling GDP Growth from Environmental Impact Possible?,” PLoS One11.10 (Oct 2016), dml)

Our model demonstrates that growth in GDP ultimately cannot plausibly be decoupled from growth in material and energy use, demonstrating categorically that GDP growth cannot be sustained indefinitely. It is therefore misleading to develop growth-oriented policy around the expectation that decoupling is possible. However, we also note that GDP has been shown to be a poor proxy for societal wellbeing, something it was never designed to measure, and GDP growth is therefore a questionable long-term societal goal in any case. The mounting costs of "uneconomic growth" [43] suggest that the pursuit of decoupling-if it were possible-in order to sustain GDP growth would be a misguided effort. Society can sustainably improve wellbeing, including the wellbeing of its natural assets, but only by discarding the goal of GDP growth in favor of more comprehensive measures of societal wellbeing [44]. The 17 UN Sustainable Development Goals (SDGs), recently agreed to by all UN countries, represent a much broader conception of the goals of society. These goals include eliminating poverty and hunger, reducing inequality, protecting and restoring the climate, and terrestrial and marine ecosystems. Only one of the 17 goals mentions GDP growth, but it is qualified as "inclusive and sustainable growth". Certainly, GDP growth over the last several decades has not been inclusive-inequality is getting worse in most countries. For GDP growth to be sustainable it would have to be decoupled from energy and material use and environmental impacts. We have shown that there is little evidence that GDP growth can be decoupled in the long-term (i.e. it is not sustainable). If GDP growth as a societal goal is unsustainable, then it is ultimately necessary for nations and the world to transition to a steady or declining GDP scenario. We contend that it will be easier to start this transition now while there is still capacity for technological gains, rather than go down the path of decoupling and be forced to make a transition post 2050 when we are closer to the theoretical limits to technological efficiency gains. We argue that now is the time to recognize the biophysical limits, and to begin the overdue task of re-orienting society around a more achievable and satisfying set of goals than simply growing forever [44,45].

#### **There is no absolute decoupling – their cooper evidence uses incorrect data**

Ward et al 16 October 14, 2016 James D. Ward, Associate Head: Teaching and Learning School of Natural and Built Environments at the University of South Australia Paul C. Sutton, Professor in the Department of Geography & the Environment at the University of Denver Adrian D. Werner, Professor of Hydrogeology at Flinders University Robert Costanza, ecological economist and Professor of Public Policy at the Crawford School of Public Policy at The Australian National University Steve H. Mohr, Senior Research Consultant, Institute for Sustainable Futures University of Technology Sydney Craig T. Simmons Professor/Director National Centre Groundwater Research and Training “Is Decoupling GDP Growth from Environmental Impact Possible?” <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0164733&type=printable> DW

Decoupling is defined as either ‘relative’ (aka ‘weak’) or ‘absolute’ (aka ‘strong’). Relative decoupling refers to higher rates of economic growth than rates of growth in material and energy consumption and environmental impact. As a result, relative decoupling implies a gain in efficiency rather than removal of the link between impact and GDP. Recent trends (1990 to 2012) for GDP [25], material use [26] and energy use [27] in different countries and regions exhibit different behavior (Fig 1). In China, relative decoupling has occurred as GDP (market prices, in current US$) increased by a factor of more than 20 over the 22-year period,while energy use rose by a factor of slightly more than four and material use by almost five. Germany, meanwhile, exhibited slower GDP growth than China, but at the same time reduced energy use by 10% and total material use by 40%. The OECD follows a similar story to Germany, albeit with flat rather than falling energy and material consumption. Although Germany and the OECD give hope that absolute decoupling may be achievable, at the global level we see only relative decoupling with energy and material use increasing by 54% and 66% over the 22 years, respectively. Similar evidence to that in Fig 1, showing apparent decoupling of GDP from specific resources, has been shown throughout much of the OECD [28]. However, there are several limitations to the inference of decoupling from national or regional data. There are three distinct mechanisms by which the illusion of decoupling may be presented as a reality when in fact it is not actually taking place at all: 1) substitution of one resource for another; 2) the financialization of one or more components of GDP that involves increasing monetary flows without a concomitant rise in material and/or energy throughput, and 3) the exporting of environmental impact to another nation or region of the world (i.e. the separation of production and consumption). These illusory forms of decoupling are describedwith respect to energy by our colleague [29]. An additional mechanism of decoupling is associated with growing inequality of income and wealth, which can allow GDP to grow overall while the majority of workers do not see a real gain in income [30]. This growth in inequality can manifest as higher GDP without a proportional increase in material and energy flow (i.e. relative decoupling) when a wealthy minority of the population derives the largest fraction of GDP growth but does not necessarily increase their level of consumption with as much demand for energy and materials [31]. In such cases, at the aggregate level decoupling would be observed, but it is doubtful that such unequal sharing of growth in GDP represents an improvement in wellbeing. At the World aggregate level, Fig 1 shows relative decoupling with a growing gap between GDP and resource consumption. In the context of reaching planetary boundaries and global environmental limits, however, relative decoupling will be insufficient to maintain a GDP growth-oriented human civilization. The only way to achieve truly sustainable growth would be via permanent absolute decoupling. Absolute decoupling theoretically occurs when environmental impacts are reduced while economic growth continues. While relative decoupling has been observed in multiple countries, **absolute decoupling remains elusive** [32–34]. According to one study [35] no country has achieved absolute decoupling during the past 50 years. Another study [36] reports that population growth and increases in affluence are overwhelming efficiency improvements at the globalscale. They find no evidence for absolute reductions in environmental impacts, and little evidence to date even for significant relative decoupling. It should be noted that technological advances can lead to absolute decoupling for specific types of impact [37]. It is possible, for instance, to substitute a polluting activity with a non-polluting activity, and notable examples have included the removal of tetraethyl lead from automotive fuel and CFCs from refrigerants and propellants. It is also possible to envisage a scenario in which GDP growth is decoupled from the use of fossil fuels and related CO2 emissions by switching to 100% renewable energy, but this is not the same as decoupling GDP growth from energy use. In the context of this study, we are primarily interested in fundamental resources (matter and energy) as the foundations of economic activity. In the current paper, we show that decoupling scenarios can be interpreted using an easily understood model of economic growth and environmental impact. The simple model was calibrated against published data derived from sophisticated predictive studies of decoupling, and used to develop a long-term prognosis of environmental impact under continued GDP growth. The results are then used to draw conclusions about the long-term viability of GDP growth as a societal goal.

#### Crisis now solves the transition

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Meanwhile, many political and public debates seem to be primarily concerned with standard, relatively short-term, economic issues, such as monetary losses, stop-and-start economic growth, increasing unemployment, falling real estate prices, failing banks, virtually bankrupt nations, and how to get back on course to economic growth. The standard responses when national governments are struggling to get their economies healthy again are mostly about inducing more money, austerity measures, and introducing financial regulations, all often part of a broader financial–economic logic (Stiglitz 2010). The dominant focus on fighting economic deficits and problems at the expense of investing in social and ecological deficits—thereby failing to address persistent problems in these areas—can be argued to be a short-term strategy to prop up an inherently unmanageable system. Examples are the support of system banks with public money and the green growth strategy (OECD 2009, 2013a). Transition theory (Grin et al. 2010, Markard et al. 2012) suggests that such short-term fixes are typical regime-based strategies to sustain existing structures, cultures, and practices, and to fend off the threats of more radical systemic change. The transition perspective suggests that most regular policy and governance strategies essentially reproduce existing systems and, by definition, do not address the root causes of problems that are embedded in the same structures and cultures that determine how solutions are framed and implemented. Such path-dependent development optimizing existing institutional structures will inevitably lead to recurring crises and ultimately a more disruptive, shock-wise structural change of an incumbent regime. Transition studies thus argue that solutions that address symptoms rather than the underlying structural causes tend to reinforce a lock-in and result in further emergent problems (Rotmans and Loorbach 2010, Schuitmaker 2012). We argue that the underlying causes and mechanisms of the economic crises have not been thoroughly analyzed, let alone addressed through effective policies. In a globalized economy, fundamental changes will not likely come from actions by (national) governments or incumbent businesses, as these are inherently intertwined with and dependent upon the currently still dominant financial– economic systems and their governance. The need for alternative economic approaches, discourses, and systems is increasingly emphasized (Schor 2010, Simms 2013, Jackson 2013, van den Bergh 2013, Schor and Thompson, 2014). Even though the benefits of liberalization are still significant, it seems that the transfer of control from government to markets has substantially diminished possibilities for top-down policy making, adding to brittleness, complexity, and lock-in (Loorbach and LijnisHuffenreuter 2013). In this paper, we take a transition perspective on transformative social innovation to conceptualize and map the systemic dynamics that have caused the economic crisis, as well as how it influences the dynamics of social transformation. We explore how the economic crisis might be considered as a phase in a broader economic transition and which types of changes coincide to develop into this direction. We thus view the economic crisis not as a phenomenon in isolation within a relatively short time frame, but as an intrinsic part, or perhaps a symptom, of deeper underlying structural societal changes over the longer term. The question we seek to address is how the economic crisis interacts with broader societal changes as well as which dynamics might accelerate or hamper more structural (sustainability) transitions. To this end, we ask when and how a macrolevel or landscape development like the economic crisis fundamentally changes the dominant logic, rules, and conditions of incumbent regimes. In other words, when does a macrodevelopment become a game changer (cf. Avelino et al. 2014)? The paper builds upon theoretical work from the European FP7 project TRANSIT, which draws on transition theory to develop an empirically grounded theory on transformative social innovation. In this paper, we introduce the analytical perspective that we developed on transformative social innovation and two empirical examples. Although our analytical perspective suggests that alternatives and breakthroughs can come from any sector or actor, in this paper, we focus on the agency of social innovation and civil-society-led initiatives in providing and producing alternatives. The paper was developed through a number of iterations, workshops, and theoretical synthesizing. To develop our arguments, we build upon insights from sustainability transitions literature (Grin et al. 2010, Markard et al. 2012), social innovation research (Mulgan 2006, Murray et al. 2010, Franz et al. 2012, Westley 2013, Moulaert et al. 2013) and other fields aiming to understand the economic crisis. In addition, we include two empirical cases, transnational networks of social innovation, time banks, and the transition movement. For both cases, we draw upon a general literature review. The paper is structured as follows. In the next section, “Economic change or transition?,” we introduce the economic crisis as a multifarious phenomenon, how we understand it from a transition perspective, and how it is understood from an economist’s point of view. We illustrate that it is an ambiguous phenomenon that is simultaneously seen as part of regular changes in that it is part of disruptive or transformative change. In the section “Making sense of the economic crisis?,” we present a number of alternative perspectives on the economic crisis that put forward particular fundamental and systemic causes of the economic crisis and how these are translated in so called “narratives of change.” In “Transformative social innovations,” we highlight two specific social innovation initiatives, time banks and transition towns, which have an evident transformative claim and potential, and reflect upon how such transformative social innovations relate (themselves) to the economic crisis. In “Reconceptualizing societal transformations and the role of the economic crisis,” we synthesize our findings and argue that the concepts of game changers and narratives could help to unpack the landscape and better understand how macro- and microlevels interact to trigger transformative changes at the mesolevel. In conclusion, we address the need for a better understanding of the transformative impacts of the different shades of change (in coevolution) vis-é-vis the restorative dynamics associated with incumbent regimes.

#### Crisis is key—

#### 1. Galvanizes existing movements

Alexander, 15—lecturer at the Office for Environmental Programs, University of Melbourne (Samuel, *Sufficiency Economy* pg 150-152)

The largest empirical analysis of the Voluntary Simplicity Movement (Alexander and Ussher, 2012) shows that there could now be as many as 200 million people in the developed regions of the world exploring, to varying degrees, lifestyles of reduced and restrained consumption. This signifies an emerging social movement of potentially transformative significance, especially if it were ever to radicalise and organise itself with political intent. Notably, that same empirical study showed that the movement was developing both a ‘group consciousness’ and a ‘political sensibility’, features that are arguably necessary for any social movement to use its collective power in influential ways. As more people are exposed to the type of reasoning unpacked by Kevin Anderson – that is, as more people see that responding to climate change actually requires consuming less – the Voluntary Simplicity Movement could well grow in size and influence, perhaps with surprising speed.

Interestingly, the justification for embracing a lifestyle of voluntary simplicity does not begin and end with ecological or humanitarian arguments. In recent decades there has been a huge amount of literature exploring the relationship between income and subjective wellbeing (see Alexander, 2012b), and the results undermine the culturally entrenched assumption that ‘money buys happiness’. Although the empirical debate is not over, the weight of evidence strongly suggests that money and material wealth is important at low levels of income, but once basic material needs for food, shelter, clothing, etc. have been met, money has fast diminishing marginal returns. In other words, beyond the basic needs threshold, the things that really contribute most to human wellbeing are not monetary or material, but instead things like socialising, creative activity, meaningful work, and other nonmaterial sources of meaning and satisfaction. This literature is arguably a ticking time bomb for consumer culture, because if more people came to see that consumerist lifestyles are not a reliable path to a happy and meaningful existence, they would presumably give up the consumerist lifestyle and seek happiness and meaning in realms other than consumption. Although this culture shift might be motivated primarily by self-interest, clearly it would have beneficial social and ecological implications. The point is that a very strong case is developing for people to explore post-consumerist lifestyles of reduced or restrained consumption, suggesting that the conditions for a cultural revolution are ripe.

It is also worth acknowledging a new and controversial analysis presented by David Holmgren (2013), co-originator of the permaculture concept, which provides further grounds for thinking that the Voluntary Simplicity Movement could have disruptive potential. Voluntary simplicity has always been an implicit feature of the permaculture worldview, insofar as permaculture is about designing a way of life that minimises waste in order to work with nature rather than against nature (Holmgren, 2002). But Holmgren recently placed voluntary simplicity at the centre of his thinking, and arrived at a theory of change that has received a vast amount of online attention.

Always doubtful of the prospects of convincing politicians to lead the necessary transition to a low-carbon world, Holmgren has grown increasingly sceptical that any mass movement at the social level is going to produce significant change either. Accordingly, his pessimism has driven him to conclude that the best we can hope at this late stage is to deliberately ‘crash’ the existing fossil fuel-based system and build a permaculture alternative as the existing system deteriorates. His provocative theory, to oversimplify, is that if a new, relatively small social movement of anti-consumers were able to radically reduce their consumption, this reduction in demand for commodities could destabilise the global economy, which is already struggling. More precisely, Holmgren hypothesises that if merely 10% of people in a nation could reduce their consumption by 50%, this could signify a 5% reduction in total demand, which, although small, would likely cause havoc with any growth-based economy. It is important to emphasise that Holmgren does not romanticise the process of collapse; he acknowledges the worrying risks his strategy poses. First and foremost, it is unpredictable in its consequences. Nevertheless, he argues that whatever risks his strategy poses, there are greater risks – both socially and environmentally – in letting the existing system continue to degrade planetary ecosystems. What is most interesting about Holmgren’s strategy is that it does not rely on a mass movement. He believes that a relatively small but radical anti-consumerist movement could be a truly disruptive force.

#### 2. Gets everyone else on board

**Alexander, 15**—lecturer at the Office for Environmental Programs, University of Melbourne (Samuel, *Sufficiency Economy* pg 270-272)

In many ways this final ‘pathway’ could be built into all of the previous perspectives, because none of the theorists considered above (especially the DGR camp) would think that the transition to a deep green alternative could ever be smooth, rational, or painless. Even many radical reformers, whose strategy involves working within the institutions of liberal democracy rather than subverting or ignoring them, clearly expect political conflict and economic difficulties to shape the pathway to the desired alternative (Gilding, 2011). Nevertheless, for those who are deeply pessimistic about the likelihood of any of the previous strategies actually giving rise to a deep green alternative (however coherent or well justified they may be), there remains the possibility that some such alternative could arise not by **design** so much as by **disaster**. In other words, it is worth considering whether a crisis situation – or a series of crises – could either (i) **force an alternative way of life** upon us; or (ii) be **the provocation needed** for cultures or politicians to **take radical alternatives seriously**. Those two possibilities will now be considered briefly, in turn.

As industrial civilisation continues its global expansion and pursues growth without apparent limit, the possibility of economic, political, or ecological crises forcing an alternative way of life upon humanity seems to be **growing in likelihood** (Ehrlich and Ehrlich, 2013). That is, if the existing model of global development is not stopped via one of the pathways reviewed above, or some other strategy, then it seems clear enough that at some point in the future, industrial civilisation will **grow itself to death** (Turner, 2012). Whether ‘collapse’ is initiated by an ecological tipping point, a financial breakdown of an overly indebted economy, a geopolitical disruption, an oil crisis, or some confluence of such forces, the possibility of collapse or deep global crisis can no longer be dismissed merely as the intellectual playground for ‘doomsayers’ with curdled imaginations. Collapse is a prospect that ought to be taken seriously based on the logic of limitless growth on a finite planet, as well as the evidence of existing economic, ecological, or more specifically climatic instability. As Paul Gilding (2011) has suggested, perhaps it is already too late to avoid some form of ‘great disruption’.

Could collapse or deep crisis be the most likely pathway to an alternative way of life? If it is, such a scenario must not be idealised or romanticised. Fundamental change through crisis would almost certainly involve great suffering for many, and quite possibly significant population decline through starvation, disease, or war. It is also possible that the ‘alternative system’ that a crisis produces is equally or even more undesirable than the existing system. Nevertheless, it may be that this is **the only way** a post-growth or post-industrial way of life will **ever arise**. The **Cuban oil crisis**, prompted by the collapse of the USSR, provides one such example of a deep societal transition that arose not from a political or social movement, but from sheer force of circumstances (Piercy et al., 2010). Almost overnight Cuba had a large proportion of its oil supply cut off, forcing the nation to move away from oil-dependent, industrialised modes of food production and instead take up local and organic systems – or **perish**. David Holmgren (2013) published a deep and provocative essay, ‘Crash on Demand’, exploring the idea that a relatively small anti-consumerist movement could be enough to destabilise the global economy, which is already struggling. This presents one means of bringing an end to the status quo by inducing a voluntary crisis, without relying on a mass movement. Needless to say, should people adopt such a strategy, it would be imperative to ‘prefigure’ the alternative society as far as possible too, not merely withdraw support from the existing society.

Again, one must not romanticise such theories or transitions. The Cuban crisis, for example, entailed much hardship. But it does **expose the mechanisms** by which crisis can induce **significant societal change** in ways that, in the end, are **not always negative**. In the face of a **global crisis** or **breakdown**, therefore, it could be that elements of the deep green vision (such as organic agriculture, frugal living, sharing, radical recycling, post-oil transportation, etc.) come to be **forced upon humanity**

, in which case the question of strategy has **less** to do with **avoiding** a deep crisis or **collapse** (which may be inevitable) and more to do with **negotiating the descent** as wisely as possible. This is hardly a reliable path to the deep green alternative, but it presents itself as a possible path.

Perhaps a more reliable path could be based on the possibility that, rather than imposing an alternative way of life on a society through sudden collapse, a deep crisis could provoke a social or political **revolution in consciousness** that **opens up space** for the deep green vision to be **embraced** and **implemented** as some form of crisis management strategy. Currently, there is **insufficient social** or **political support** for such an alternative, but perhaps a **deep crisis** will **shake the world awake**. Indeed, perhaps that is **the only way** to create the **necessary mindset**. After all, today we are hardly lacking in evidence of the need for radical change (Turner, 2012), suggesting that shock and response may be the form the transition takes, rather than it being induced through orderly, rational planning, whether from ‘top down’ or ‘from below’. Again, this ‘nonideal’ pathway to a post-growth or post-industrial society could be built into the other strategies discussed above, adding some realism to strategies that might otherwise appear too utopian. That is to say, it may be that **only deep crisis** will **create the social support** or **political will needed** for radical reformism, eco-socialism, or ecoanarchism to emerge as social or political movements capable of **rapid transformation**. Furthermore, it would be wise to keep an open and evolving mind regarding the best strategy to adopt, because the relative effectiveness of various strategies may change over time, depending on how forthcoming crises unfold.

### Space War Advantage

#### This evidence is literally in the context of Trump – they have no warrants why Russia or China would retaliate now.

#### Also Ukraine thumps – seems to be a bigger deal than asteroid mining on the moon. That’s just a truth claim.