### 2NR

### 1NC – T

#### Medicines are substances used to prevent, diagnose, or treat harms.

**MRS 20** [(MAINE REVENUE SERVICE SALES, FUEL & SPECIAL TAX DIVISION) “A REFERENCE GUIDE TO THE SALES AND USE TAX LAW” <https://www.maine.gov/revenue/sites/maine.gov.revenue/files/inline-files/Reference%20Guide%202020.pdf> December 2020] SS

[Medicines](https://www.lawinsider.com/dictionary/medicines) means antibiotics, analgesics, antipyretics, stimulants, sedatives, antitoxins, anesthetics, antipruritics, hormones, antihistamines, certain “dermal fillers” (such as BoTox®), injectable contrast agents, vitamins, oxygen, vaccines and other substances that are used in the prevention, diagnosis or treatment of disease or injury and that either (1) require a prescription in order to be purchased or administered to the retail consumer or patient; or (2) are sold in packaging.

#### CRISPR is a platform technology, not a medicine.

Editas Medicine [(a clinical-stage biotechnology company which is developing therapies based on CRISPR–Cas9 gene editing technology)., No Date, CRISPR Gene Editing, <https://www.editasmedicine.com/crispr-gene-editing/>] Justin

CRISPR (pronounced “crisper”) is an acronym for “Clustered, Regularly Interspaced, Short Palindromic Repeats,” and refers to a recently developed gene editing technology that can revise, remove, and replace DNA in a highly targeted manner. CRISPR is a dynamic, versatile tool that allows us to get to and edit nearly any location in the genome, and has the potential to help us develop medicines for people with a wide variety of diseases. We view CRISPR as a “platform” technology because of its ability to target DNA in any cell or tissue.

#### Their evidence proves the violation—it says CRISPR has the potential to treat which is distinct and the only example, CTX001, is a drug resulting from CRISPR tech, not CRISPR itself—we read blue.

Sfera 2/24 [(Dan, entrepreneur. Clinical Trials) “CRISPR Therapeutics creates gene-based medicines”, Real Dan Sfera, 2/24/2021. <https://therealdansfera.medium.com/crispr-therapeutics-creates-gene-based-medicines-25a66c674998>] BC

Gene-Editing Genius

CRISPR (clustered regularly interspaced short palindromic repeats) has been making news about research and investment. Scientists learned that CRISPR, a naturally occurring gene-editing function of bacteria, has potential for treating genetic diseases. Now a number of companies are using gene-editing to try to cure illnesses caused by errors on a single gene. They include sickle cell disease, hemophilia and cystic fibrosis.

Swiss-based CRISPR Therapeutics, a biopharmaceutical company attempting to create transformative gene-based medicines for serious diseases, “has produced results that could not only make it a winner in single-gene disorders, but position it to tackle much more complex — and profitable — diseases in the years ahead,” according to Jason Hawthorne of The Motley Fool (https://www.fool.com/investing/2020/12/15/where-will-crispr-therapeutics-be-in-10-years/). CRISPR Therapeutics, a gene-editing company, attempts to develop gene-based medicines for serious diseases using its proprietary CRISPR/Cas9 platform. CRISPR/Cas9 is a gene-editing technology that allows for precise, directed changes to genomic DNA. The company has a wholly-owned U.S. subsidiary, CRISPR Therapeutics, Inc., and R&D operations based in Cambridge, Massachusetts, and business offices in London, United Kingdom.

CRISPR’s CTX001 is a potential drug to treat sickle cell disease and beta-thalassemia, disorders that affect the oxygen-carrying cells in the blood. After harvesting a patient’s own cells from his or her own bone marrow, medical professionals use CTX001 to edit the gene responsible for red blood cell production and infuse the cells back into the body. In 2015, CRISPR entered into a partnership with Vertex Pharmaceuticals to develop a number of treatments using this technology, receiving cash, equity and future royalties, while Vertex obtained the rights to market the treatments to be developed.

Even if it can be used in that way not all applications can be so they can’t solve for the aff advantages.

#### Negate –

#### 1] Limits – their model explodes it to medical devices, any form of strategy for medical research, databases that are used to create medicines and more – only our definition creates a reasonable caselist for medicines while they make prep impossible and wreck engagement

#### 2] Precision – MRS is a legal definition of medicines from codified law and has intent to define which proves we’re right and consistent with topic lit

### 1NC – WTO

#### Economic growth guarantees civilizational collapse by 2050 – decoupling is impossible and tech is a pipeline dream

**Kallis et al 18** Giorgos Kallis [ICREA Research Professor at Universitat Autònoma de Barcelona, environmental scientist working on ecological economics and political ecology, formerly Marie Curie International Fellow at the Energy and Resources Group of the University of California at Berkeley, PhD in Environmental Policy and Planning from the University of the Aegean in Greece], Vasilis Ragnar [Nurkse School of Innovation and Governance, Tallinn University of Technology], Steffen Lange [Institute for Ecological Economy Research, Berlin, Germany], Barbara Muraca [College of Liberal Arts, Oregon State University], Susan Paulson [Center for Latin American Studies, University of Florida], and Matthias Schmelzer [DFG Research Group, University of Jena], 5-31-2018, "Research On Degrowth," Annual Review of Environment and Resources, Vol. 43:291-316,  [https://www.annualreviews.org/doi/abs/10.1146/annurev-environ-102017-025941 //](https://www.annualreviews.org/doi/10.1146/annurev-environ-102017-025941%20//) ash

Although driven by political, institutional, and discursive processes, growth is also biophysical. The economic process converts energy, resources, and matter to goods, services, and waste (34). In theory, it seems possible to decouple material throughput from economic output by improving the resource efficiency of production. Ecological economists, however, argue that in practice absolute decoupling is unlikely, even though relative decoupling is common (34). Efficiency should not be confused with scale (35): The more efficiently we use resources, the lower they cost, and the more of them we end up using (36). This is, in essence, growth. Just as increases in labor productivity lead to growth and new jobs, not to less employment, increases in resource productivity increase output and resource use (37). Capitalist economies grow by using more resources and more people, more intensively. Accelerating this is unlikely to spare resources.

Growth can become “cleaner” or “greener” by substituting, for example, fossil fuels with solar power, or scarce, environmentally intensive metals with more abundant and less intensive metals. But new substitutes have resource requirements, and life-cycle impacts that cross space and time. Energy is a vital source of useful work (38); growth has been possible because fossil fuels did things human labor alone could not do. Ending the use of fossil fuels is likely to reduce labor productivity and limit output (34). Solar and wind power are constrained only by their rate of flow, but unlike fossil fuels, they are diffuse—more like rain than a lake (3). To collect and concentrate a diffuse flow of energy, more energy is necessary and more land is required. The EROIs (energy returns on energy investment) of renewable energies are between 10:1 and 20:1, compared to more than 50:1 for earlier deposits of oil and coal (39). An economy powered by a diffuse energy flow is then likely to be an economy of lower net energy and lower output than one powered by concentrated stocks (3). Land use for solar or wind also competes with the use of land for food production, and rare materials are necessary for infrastructures and batteries that store their intermittent flows, with significant environmental effects.

Historical data corroborate ecological economic theory (40). Ayres & Warr (38) find that the use of net energy after conversion losses explains a big portion of the United States’ total factor productivity and economic growth. At the global level, GDP and material use have increased approximately 1:1. Carbon emissions have increased somewhat slower than GDP, but still have increased (34). This is unlikely to be a coincidence. Exceptions may exist, but cross-panel data analysis shows that overall, 1% growth of a national economy is associated with 0.6% to 0.8% increase in its carbon emissions (41) and 0.8% growth in its resource use (42).

Global resource use follows currently the “collapse by 2050” scenario foreseen in the “Limits to Growth” 1971 report (43–45). Domestic material use in some developed OECD economies has reached a plateau, but this is because of globalization and trade. If we take into account imported goods, then the material requirements of products and services consumed in OECD countries have grown hand in hand with GDP, with no decoupling (46). For water use, the effects of growth overwhelm any realistic savings from technologies and efficiency (47); water footprints have increased even in regions such as California where water withdrawals were stabilized (40).

Carbon emissions in some EU (European Union) countries have been declining, even after trade is taken into account, suggesting some substitution of fossil fuels by cleaner energies. [Although recession also played a role (34).] These declines are nowhere near the 8–10%, year-afteryear reductions in carbon emissions required for developed nations under scenarios compatible with a 50% chance of limiting warming to 2◦C (48). Further reductions will be harder to sustain once one-off substitutions of oil or coal with natural gas are exhausted (34).

Resource use or carbon emissions are a product of the scale of the economy (GDP) times its resource or carbon intensity (kg/GDP or kgCO2/GDP). With 1.5% annual increase in global income per capita, carbon intensity has to decline 4.4% each year for staying within 2◦C; with 0% growth, carbon intensity has to fall 2.9% each year (49). In the period 1970–2013, the average annual reduction rate for carbon intensity was less than 1.5%—and this gets harder to sustain as the share of carbon-intensive economies in global output increases (49). As Jackson (50) showed in his seminal work, it is practically impossible to envisage viable climate mitigation scenarios that involve growth. This calls for research on managing, or prospering, without growth (50, 51).

Some scenarios deem possible meeting climate targets while sustaining growth, but these generally assume after 2050 some sort of “negative emissions technology,” geo-engineering or otherwise. According to a recent Nature editorial, these technologies remain currently “magical thinking” (52). Clean energy investments can stimulate the economy in the short run, but in the long run growth may be limited by their low EROIs. Studies suggest that economic growth requires a minimum EROI of close to 11:1 (53). Less EROI means less labor productivity, and hence less growth. Indeed, “Limits to Growth” scenarios do not predict growth ending when resources are exhausted but, rather, when the quality of resources declines to such an extent that further extraction diverts more and more investment away from productive industry (44).

Degrowth is defined by ecological economists as an equitable downscaling of throughput, with a concomitant securing of wellbeing. If there is a fundamental coupling of economic activity and resource use, as ecological economics suggests there is, then serious environmental or climate policies will slow down the economy. Vice versa, a slower economy will use less resources and emit less carbon (40). This is not the same as saying that the degrowth goal is to reduce GDP (54); slowing down the economy is not an end but a likely outcome in a transition toward equitable wellbeing and environmental sustainability.

#### Only stopping growth solves extinction from eco collapse – decoupling is impossible even under perfect conditions, and transition dangers are overhyped

Hickel 18 [Jason Hickel is an anthropologist, author, and a fellow of the Royal Society of Arts. Why Growth Can’t Be Green. Foreign Policy Magazine. September 12, 2018. https://foreignpolicy.com/2018/09/12/why-growth-cant-be-green/]

Warnings about ecological breakdown have become ubiquitous. Over the past few years, major newspapers, including the Guardian and the New York Times, have carried alarming stories on soil depletion, deforestation, and the collapse of fish stocks and insect populations. These crises are being driven by global economic growth, and its accompanying consumption, which is destroying the Earth’s biosphere and blowing past key planetary boundaries that scientists say must be respected to avoid triggering collapse.

Many policymakers have responded by pushing for what has come to be called “green growth.” All we need to do, they argue, is invest in more efficient technology and introduce the right incentives, and we’ll be able to keep growing while simultaneously reducing our impact on the natural world, which is already at an unsustainable level. In technical terms, the goal is to achieve “absolute decoupling” of GDP from the total use of natural resources, according to the U.N. definition.

It sounds like an elegant solution to an otherwise catastrophic problem. There’s just one hitch: New evidence suggests that green growth isn’t the panacea everyone has been hoping for. In fact, it isn’t even possible.

Green growth first became a buzz phrase in 2012 at the United Nations Cosnference on Sustainable Development in Rio de Janeiro. In the run-up to the conference, the World Bank, the Organization for Economic Cooperation and Development, and the U.N. Environment Program all produced reports promoting green growth. Today, it is a core plank of the U.N. Sustainable Development Goals.

But the promise of green growth turns out to have been based more on wishful thinking than on evidence. In the years since the Rio conference, three major empirical studies have arrived at the same rather troubling conclusion: Even under the best conditions, absolute decoupling of GDP from resource use is not possible on a global scale.

A team of scientists led by the German researcher Monika Dittrich first raised doubts in 2012. The group ran a sophisticated computer model that predicted what would happen to global resource use if economic growth continued on its current trajectory, increasing at about 2 to 3 percent per year. It found that human consumption of natural resources (including fish, livestock, forests, metals, minerals, and fossil fuels) would rise from 70 billion metric tons per year in 2012 to 180 billion metric tons per year by 2050. For reference, a sustainable level of resource use is about 50 billion metric tons per year—a boundary we breached back in 2000.

The team then reran the model to see what would happen if every nation on Earth immediately adopted best practice in efficient resource use (an extremely optimistic assumption). The results improved; resource consumption would hit only 93 billion metric tons by 2050. But that is still a lot more than we’re consuming today. Burning through all those resources could hardly be described as absolute decoupling or green growth.

In 2016, a second team of scientists tested a different premise: one in which the world’s nations all agreed to go above and beyond existing best practice. In their best-case scenario, the researchers assumed a tax that would raise the global price of carbon from $50 to $236 per metric ton and imagined technological innovations that would double the efficiency with which we use resources. The results were almost exactly the same as in Dittrich’s study. Under these conditions, if the global economy kept growing by 3 percent each year, we’d still hit about 95 billion metric tons of resource use by 2050. Bottom line: no absolute decoupling.

Finally, last year the U.N. Environment Program—once one of the main cheerleaders of green growth theory—weighed in on the debate. It tested a scenario with carbon priced at a whopping $573 per metric ton, slapped on a resource extraction tax, and assumed rapid technological innovation spurred by strong government support. The result? We hit 132 billion metric tons by 2050. This finding is worse than those of the two previous studies because the researchers accounted for the “rebound effect,” whereby improvements in resource efficiency drive down prices and cause demand to rise—thus canceling out some of the gains.

Study after study shows the same thing. Scientists are beginning to realize that there are physical limits to how efficiently we can use resources. Sure, we might be able to produce cars and iPhones and skyscrapers more efficiently, but we can’t produce them out of thin air. We might shift the economy to services such as education and yoga, but even universities and workout studios require material inputs. Once we reach the limits of efficiency, pursuing any degree of economic growth drives resource use back up.

These problems throw the entire concept of green growth into doubt and necessitate some radical rethinking. Remember that each of the three studies used highly optimistic assumptions. We are nowhere near imposing a global carbon tax today, much less one of nearly $600 per metric ton, and resource efficiency is currently getting worse, not better. Yet the studies suggest that even if we do everything right, decoupling economic growth with resource use will remain elusive and our environmental problems will continue to worsen.

Preventing that outcome will require a whole new paradigm. High taxes and technological innovation will help, but they’re not going to be enough. The only realistic shot humanity has at averting ecological collapse is to impose hard caps on resource use, as the economist Daniel O’Neill recently proposed. Such caps, enforced by national governments or by international treaties, could ensure that we do not extract more from the land and the seas than the Earth can safely regenerate. We could also ditch GDP as an indicator of economic success and adopt a more balanced measure like the genuine progress indicator (GPI), which accounts for pollution and natural asset depletion. Using GPI would help us maximize socially good outcomes while minimizing ecologically bad ones.

But there’s no escaping the obvious conclusion. Ultimately, bringing our civilization back within planetary boundaries is going to require that we liberate ourselves from our dependence on economic growth—starting with rich nations. This might sound scarier than it really is. Ending growth doesn’t mean shutting down economic activity—it simply means that next year we can’t produce and consume more than we are doing this year. It might also mean shrinking certain sectors that are particularly damaging to our ecology and that are unnecessary for human flourishing, such as advertising, commuting, and single-use products.

But ending growth doesn’t mean that living standards need to take a hit. Our planet provides more than enough for all of us; the problem is that its resources are not equally distributed. We can improve people’s lives right now simply by sharing what we already have more fairly, rather than plundering the Earth for more. Maybe this means better public services. Maybe it means basic income. Maybe it means a shorter working week that allows us to scale down production while still delivering full employment. Policies such as these—and countless others—will be crucial to not only surviving the 21st century but also flourishing in it.

#### Warming is inevitable absent a shift to zero emissions --- we’re busting through the carbon budget and renewables and CCS don’t arrive in time

Mooney and Dennis 10/7

Chris Mooney and Brady Dennis, Reporters for the Washington Post, “The world has barely 10 years to get climate change under control, U.N. scientists say.” The Washington Post. October 7, 2018. https://www.washingtonpost.com/energy-environment/2018/10/08/world-has-only-years-get-climate-change-under-control-un-scientists-say/?utm\_term=.25de27d0202d

--Also an answer to CCS!

The world stands on the brink of failure when it comes to holding global warming to moderate levels, and nations will need to take “unprecedented” actions to cut their carbon emissions over the next decade, according to a landmark report by the top scientific body studying climate change.

With global emissions showing few signs of slowing and the United States — the world’s second-largest emitter of carbon dioxide — rolling back a suite of Obama-era climate measures, the prospects for meeting the most ambitious goals of the 2015 Paris agreement look increasingly slim. To avoid racing past warming of 1.5 degrees Celsius (2.7 degrees Fahrenheit) over preindustrial levels would require a “rapid and far-reaching” transformation of human civilization at a magnitude that has never happened before, the group found.

“There is no documented historic precedent” for the sweeping change to energy, transportation and other systems required to reach 1.5 degrees Celsius, the U.N. Intergovernmental Panel on Climate Change (IPCC)[wrote](https://www.ipcc.ch/) in a report requested as part of the 2015 Paris climate agreement.

At the same time, however, the report is being received with hope in some quarters because it affirms that 1.5 degrees Celsius is still possible — if emissions stopped today, for instance, the planet would not reach that temperature. It is also likely to galvanize even stronger climate action by focusing on 1.5 degrees Celsius, rather than 2 degrees, as a target that the world cannot afford to miss.

“Frankly, we’ve delivered a message to the governments,” said Jim Skea, a co-chair of the IPCC panel and professor at Imperial College London, at a press event following the document’s release. “It’s now their responsibility … to decide whether they can act on it.” He added, “What we’ve done is said what the world needs to do.”

The transformation described in the document is breathtaking, and the speed of change required raises inevitable questions about its feasibility.

Most strikingly, the document says the world’s annual carbon dioxide emissions, which amount to more than 40 billion tons per year, would have to be on an extremely steep downward path by 2030 to either hold the world entirely below 1.5 degrees Celsius, or allow only a brief “overshoot” in temperatures.

Overall reductions in emissions in the next decade would probably need to be more than 1 billion tons per year, larger than the current emissions of all but a few of the very largest emitting countries. By 2050, the report calls for a total or near-total phaseout of the burning of coal.

'Understanding the Arctic is really a key to understanding the whole global system'

Mark Furze, a geoscientist and professor at MacEwan University, discusses the importance of understanding how climate change is impacting the Arctic. (Alice Li/TWP)

“It’s like a deafening, piercing smoke alarm going off in the kitchen. We have to put out the fire,” said Erik Solheim, executive director of the U.N. Environment Program. He added that the need to either stop emissions entirely by 2050 or find some way to remove as much carbon dioxide from the air as humans put there “means net zero must be the new global mantra.”

The radical transformation also would mean that, in a world projected to have more than 2 billion additional people by 2050, large swaths of land currently used to produce food would instead have to be converted to growing trees that store carbon and crops designated for energy use. The latter would be used as part of a currently nonexistent program to get power from trees or plants and then bury the resulting carbon dioxide emissions in the ground, leading to a net subtraction of the gas from the air — bioenergy with carbon capture and storage, or BECCS.

“Such large transitions pose profound challenges for sustainable management of the various demands on land for human settlements, food, livestock feed, fibre, bioenergy, carbon storage, biodiversity and other ecosystem services,” the report states.

The document in question was produced relatively rapidly for the cautious and deliberative IPCC, representing the work of nearly 100 scientists. It went through an elaborate peer-review process involving tens of thousands of comments. The final 34-page “summary for policymakers” was agreed to in a marathon session by scientists and government officials in Incheon, South Korea, over the past week.

#### Economic growth causes global disease spread—turns advantage 1.

Tong Wu et al, 2017. Tong Wu (1), Charles Perrings (2), Ann Kinzig (3, 4), James P. Collins (5), Ben A. Minteer (6), Peter Daszak (7). 1. School of Life Sciences, Arizona State University, Tempe, USA 2. School of Life Sciences, Arizona State University, Tempe, USA 3. School of Life Sciences, Arizona State University, Tempe, USA 4.Global Institute of Sustainability, Arizona State University, Tempe, USA 5. School of Life Sciences, Arizona State University, Tempe, USA 6. School of Life Sciences, Arizona State University, Tempe, USA 7. EcoHealth Alliance, New York, USA. Ambio February 2017, Volume 46, Issue 1, pp 18–29. “Economic growth, urbanization, globalization, and the risks of emerging infectious diseases in China: A review” [https://doi.org/10.1007/s13280-016-0809-2 Accessed 7/11/18](https://doi.org/10.1007/s13280-016-0809-2%20Accessed%207/11/18) //WR-NCP

Today, an increasingly urban and interconnected world faces growing threats from emerging infectious diseases (McMichael 2004; Kapan et al. 2006; Bradley and Altizer 2007). This is of particular concern in the developing world, where managing fast-spreading epidemics in the growing number of megacities is a pressing challenge (Rees 2013). Recent epidemics have underscored the importance of linkages between host habitats and the global network of cities. The Ebola virus, for example, has long survived among wildlife reservoirs in the hinterlands of Africa, ‘‘breaking out’’ in towns and cities in conspicuous but otherwise local epidemics. As in earlier outbreaks, the 2014 epidemic is thought to have origins in the consumption of wild animal protein, while its spread occurred in densely populated African cities. The international threat it posed stemmed from the increasing air travel connections between these and other cities around the world. In the case of arboviruses like Zika, dengue, chikungunya, West Nile, and malaria, whose vectors have found ready habitat in urban areas, the primary mechanism for the spread of disease from one city to the next is international trade and travel (Hay et al. 2005; Tatem et al. 2006; Alirol et al. 2011; Weaver 2013; Kraemer et al. 2015). The same is true of coronaviruses such as Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrome (MERS). The latter emerged in Saudi Arabia in 2012, having been transmitted between animal reservoirs such as camels and their human handlers. It has since spread throughout the surrounding region, and travel-related human infections have been recorded in Europe, North America, and East and Southeast Asia (Parlak 2015; Zumla et al. 2015). Urbanization and globalization have made outbreaks of these diverse zoonoses difficult to control, even with unprecedented levels of international cooperation (Khan et al. 2013; Weaver 2013; Chan 2014; Kraemer et al. 2015). For most emerging infectious diseases, prevention is better than cure—ex ante mitigation of disease risk is more economically efficient than ex post adaptation to an outbreak (Murphy 1999; Graham et al. 2008; Voyles et al. 2014; Langwig et al. 2015). Among mitigation strategies, vaccination has been a widespread and long-established practice for many DNA viruses such as chicken pox or small pox. However, vaccination remains problematic for most RNA viruses, including Ebola, SARS, and avian influenza, due to their higher mutation rate; vaccination is simply not a feasible way to prevent the emergence of many novel zoonoses, which will inevitably encounter immunologically naïve populations. Therefore, mitigating the risks from emerging and reemerging zoonoses requires preemptive measures against their socioecological drivers (Pike et al. 2014). Identifying areas where the convergence of risk factors is occurring with greatest intensity, and at the largest scales, is a logical first step in the development of a mitigation strategy. In this regard, China may be an important outlier among countries. Assessment of the risks posed by zoonotic diseases requires an understanding of how socioeconomic, and ecological conditions affect two phenomena: emergence (the irruption of a pathogen originating in wildlife or livestock into human populations) and spread (the transmission of disease among both animals and people). In this article, we review the evidence for changes in zoonotic risks in China. More particularly, we show how income growth, urbanization, and globalization affect the likelihood of emergence and spread, using SARS and avian influenza as topical and representative examples, but also referring to other diseases when relevant. We discuss the policy implications of changes in the epidemiological environment in China, and consider how the mitigation of zoonotic risk in China could benefit the global risk environment.

#### Strong economy fuels nanotech development

Gkanas et al. 13 (Evangelos I. Gkanas, PhD, professor at Coventry University. Vasso Magkou-Kriticou, expert in the field. Sofoklis S. Makridis, professor at University of Patras. Athanasios K. Stubos, PhD, Research Director, National Research Center Demokritos, Head of Environmental Research Laboratory. Ioannis Bakouros, PhD, Professor, Management of Technology Research Lab, University of Western Macedonia. " Nanotechnology and Innovation: Recent status and the strategic implication for the formation of high tech clusters in Greece, in between a global economic crisis," International Journal of Technology Innovations and Research, Vol.2, Cornell University Library, 2013, https://arxiv.org/pdf/1303.5290.pdf)//Bennerz

Innovation in nanotechnology, generally involves a complex value chain, including large and small companies, research organizations, equipment suppliers, intermediaries, finance and insurance, end users (who may be in the private and public sectors), regulators and other stakeholder groups in a highly distributed global economy [22, 23, 24, 25]. Between 1990 and 2008 about 17600 companies worldwide published about 52600 scientific articles and applied for 45.052 patents in the nanotechnology domain. The ratio of corporate nanotechnology patent applications to corporate nanotechnology applications increased rapidly from about 0.23 in 1998 to 1.2 in 2008. Due to the nature of nanotechnology, indicates that many geographical regions will have opportunities to engage in the development of nanotechnology. For example while leading high technology regions in the United States are at the forefront of nanotechnology innovation, some other U.S cities and regions also have clusters of corporation engaged in nanotechnology innovations. A key factor for commercialized innovation and economic development is the nanotechnology development and the «general technology development strength» of each nation [26]. Some other key factors for innovation and corporate decision making in nanotechnology are recognizing consumer values, their perception of acceptability of the products and their response to labeling. Consumer perception are affected by awareness education and access to information. According to D.A. Hart [27] there are four explicit, and one implicit, aspects of the definition of innovation are important to us. In terms of the explicit dimensions: Evangelos I. Gkanas, Vasso Magkou-Kriticou, Sofoklis S. Makridis, Athanasios K. Stubos and Ioannis Bakouros, Nanotechnology and Innovation: Recent status and the strategic implication for the formation of high tech clusters in Greece, in between a global economic crisis. 4 Firstly, innovation is a commercial concept not simply a technological, or even an intellectual property one. However novel an innovation is, unless firms are able to successfully exploit their innovation in commercial terms it is not relevant for our present purposes. Secondly, there are degrees of innovation. The innovative process can involve the creation of completely new products or services or, more commonly, simply the improvement of existing products and services. Innovation can thus be radical or incremental in character. Thirdly, whatever the degree of innovation it normally arises because individuals working in groups have learned from each other how new or improved goods and services can be created and commercially exploited. Fourthly, the basic unit of innovative process is not necessarily an individual, or even an individual firm working in isolation, it is a network of individuals, or firms, working together to produce the innovation. As noted in the above the role of nanotechnology in increasing the innovation process is very important and significant. Also the nature of nanotechnology gives the chance to small countries and regions to develop the own regional innovation. The best strategy for doing these is the establishing of innovation clusters.

#### Those are exponentially more dangerous than nuclear weapons—they take an axe to the nuclear balance, spark use or lose pressures, create unavoidable scenarios for miscalc, and make terrorism infinitely more devastating.

[Louis A. Del Monte (2017), Award winning physicist, inventor, futurist, featured speaker, CEO of Del Monte and Associates, Inc., “Nanoweapons: A Growing Threat To Humanity,” Potomac Books, p. 107-110]//SLC PK

The use of autonomous weapons is in its infancy. There are many military and moral questions regarding their use. However, nations are developing and deploying them even as I write these words. To my eye, it appears they make the world more dangerous because these first- generation autonomous weapons lack human judgment. Will later generations have the capability of human judgment? At this point no one can definitively answer the question. That is why the United Nations is working with its members to ban the use of autonomous weapons, but that process is just beginning, and it appears to be almost at a standstill.

Let us use this information to understand what this may mean regarding nanoweapons. In my view, we can formulate three critical implications regarding nanoweapons in the 2030s:

1. Computers, with ai equal to human intelligence, will design nanoweapons, especially electronics and robots. Humans will define the nanoweapon parameters, and the computer will perform the design with low human and computer interactions.

2. Nanoweapons will become autonomous, including weapon systems like drones and nanobots.

3. A nation’s military prowess will equate primarily to its nanoweapons capabilities and less on its nuclear weapons capabilities. Thus nanoweapons will define the balance of power.

To understand the basis of these implications, let’s discuss them in detail. The first two points are already happening. Nanoweapons and nanoelectronics are designed using computers. This is not new. The more sophisticated a weapon system or integrated circuit, the more we rely on computers to assist with the design. As computers become more capable, this trend will increase. The term that describes this methodology is “computer- aided design,” or cad. We are also seeing a trend toward more autonomy in weapon systems, like the Navy swarmboats we discussed in chapter 5. The reason for this trend is that computers can function faster than humans and typically with greater expertise. The rationale for the third point is multifold. Let us consider a nanobots attack versus a nuclear weapons attack.

A nuclear attack aimed at destroying a nation requires the use of missiles. Military powers are capable of detecting a nuclear missile launch. Indeed, with the use of satellites, the United States can detect when a potential adversary begins fueling their land- based nuclear missiles. In essence, it would be difficult for any nation to launch nuclear missiles and avoid detection. This would invite a counterstrike. In the case of a nuclear attack on the United States, all nato nations would consider it an attack on them as well. The retaliation would be devastating. In contrast, a nanoweapons attack that involves the release of billions of autonomous ai nanobots would be hard to detect prior to the attack. Their ai capability may allow them to attack only when all nanobots are strategically in place. In a matter of hours, a nation may have no leadership or even a clue as to the nature of the attack. The stealth and lethal capabilities of a nanoweapons attack suggest that nations with smart nanoweapons will overshadow other nations with less advanced nanoweapons and even nations with nuclear weapons. The same applies to weapon systems that rely on nanoelectronics, such as hypersonic ballistic missiles with nuclear warheads. A hypersonic missile attack could occur faster than a nation could respond or determine the adversary. Nuclear submarines, the “boomers,” would not know which nations to target. Even if they do launch their nuclear missiles at likely perpetrators, the adversary would be expecting retaliation and would be ready with antimissile defenses. The boomers themselves would give away their positions by launching their missiles and become targets for “killer subs.”

It is conceivable that a nation could develop autonomous smart nanobots capable of traversing space and water, like viruses, to attack a nation’s land- based, air- based, and sea- based weapons.

Again, they could lie dormant until all nanobots are in place before performing their assigned military tasks. For example, a military commander could assign nanobots to find and destroy enemy submarines, missile silos, and bombers with nuclear weapons. This would render the doctrine of mutual assured destruction useless. I recognize that today this example sounds like science fiction. However, given sufficient funding, nanotechnologists could develop such nanobots. No law of science prohibits their existence. The task would be monumental, similar in scope to putting a man on the moon, which was once also science fiction. In addition, given that such nanobots may require years to carry out their assigned mission, it would likely require nanobots to generate their own power. For example, they could use solar power or wind power to charge a nanoscale battery. Similar to nuclear- powered submarines that are able to generate their own power for decades, self-powered nanobots would pose a viable threat indefinitely.

Even if nations control their nanoweapons, terrorists and mad scientists may still initiate an attack. Consider this scenario. A disgruntled nanoweapons scientist decides to seek revenge for some perceived unjust treatment. The scientist makes billions of autonomous smart nanobots at home and takes them to a reservoir in a suitcase. There, the scientist releases the nanobots, which contaminate the drinking water of a major metropolis. Within a few weeks, people drinking the contaminated water begin to show signs of illness. However, at this point, it is too late for countermeasures. Millions of innocent people begin to die. The nation is in shock, and its citizens live in fear. The government wants to act, but it is not clear what they should do. Even if they discover the mad scientist, beyond prosecuting him, what can they do to prevent a similar attack?

One nanoweapons attack could ignite a global conflict. Consider the mad scientist scenario, but replace him with a terrorist group. If terrorists launch autonomous smart nanobots on a nation, that nation may retaliate against any nation known to harbor such terrorists. Such a widespread retaliation may ignite a global conflict as nations attempt to defend themselves. In the fog of war, it may be impossible to determine who is doing what to whom. A nation may face a “use it or lose it” situation. This means that if they do not use their weapons, they may lose them. In such a scenario, any outcome is possible.

I have examined many scenarios related to autonomous smart nanoweapons attacks. Every scenario led me to the same two conclusions:

1. Nanoweapons are inherently dangerous, even to the nations that deploy them. One incident, intentional or accidental, could ignite a global conflict.

2. Nations deploying nanoweapons will garner military respect, but they will also garner high scrutiny, even to the point of paranoia. We may find ourselves in a new and even more dangerous cold war.

By 2045, most researchers and futurists in artificial intelligence predict that computers will exceed the combined cognitive intelligence of humanity. Google’s director of engineering, Ray Kurzweil, calls this point in time the “singularity.” In my opinion, singularity level computers will design nanobots capable of self- replication, and they will do this with minimal human assistance. Once self- replicating nanobots become a reality, just a few nanobots gaining entry to a submarine would eventually result in the swarms necessary to destroy it. I have found that the easiest way to think about nanobot attacks is to liken them to biological agents. In effect, self- replicating nanobots become an artificial life- form, and we become their gods.

#### Expert opinion proves that it’s probabilistically the most likely scenario for human extinction.

[Louis A. Del Monte 17 (2017), Award winning physicist, inventor, futurist, featured speaker, CEO of Del Monte and Associates, Inc., “Nanoweapons: A Growing Threat To Humanity,” Potomac Books, p. xi]//SLC PK

Nanoweapons are the most likely military weapons to render humanity extinct in this century. This is not a philosophical issue. This is about whether you and yours will survive through this century. Having made such a dire assertion, you may wonder if I am being an alarmist. Consider this. The events that most people consider likely to cause humanity’s extinction, such as a large asteroid impact or a super- volcanic eruption, actually have a relatively low probability of occurring, in the order of 1 in 50,000 or less. In 2008 experts surveyed at the Global Catastrophic Risk Conference at the University of Oxford suggested a 19 percent chance of human extinction by the end of this century, citing the top four most probable causes:

1. Molecular nanotechnology weapons: 5 percent probability

2. Super intelligent ai: 5 percent probability

3. Wars: 4 percent probability

4. Engineered pandemic: 2 percent probability

Obviously nanoweapons are at the top of the list, having a 1 in 20 probability of causing human extinction by the end of this century. Notice that biological weapons (item 4), which have been a mainstay apocalyptic theme in both fiction and nonfiction, come in as a distant fourth, with only a 1 in 50 probability of causing human extinction.

#### Globalization causes war

Irandoust 17 Manuchehr Irandoust 17, Department of Economics and Finance, School of Business Studies, Kristianstad University, “Militarism and globalization: Is there an empirical link?” Quality and quantity, June 16, 2017, Springer Open Access

[GLOB = globalization index, MIS = militarized spending]

The results of the bootstrap panel Granger causality test are shown in Table 2. The findings show that GLOB and MIS are causally related in most of the countries under review. There is a bi-directional causality in UK, US, Saudi Arabia, and Russia. The causality is unidirectional running from GLOB to MIS in Australia, Brazil, India, and China, and running from MIS to GLOB in Turkey. The degree of significance level varies from country to country. There is no any causal relationship between military spending and globalization in France, Italy, South Korea, Germany, and Japan. Overall, this evidence shows a relatively robust association between changes in globalization and changes in military expenditure. In other words, countries experiencing greater globalization have relatively large increases in militarization over the past 20 years.

However, it has been shown that globalization may not lead to more peaceful relations or demilitarization. As we discussed in Sect. 2, bilateral trade increases the opportunity cost of bilateral war and may hinder bilateral war. Globalization (equivalent to multilateral economic openness) reduces this opportunity cost with any given country and devitalize the incentive to make concessions during negotiations, and, therefore, increases the probability of war between any given pair of country. Thus, an increase in trade or openness between two countries may restore peace between those but may increase the probability of conflict with third countries.

6 Conclusion

While previous studies mostly focused on the causal nexus between military expenditure and economic growth, those studies have not considered the role of globalization. This study uses data from the top 15 military expenditure spenders over the period 1990–2012 to examine the relationship between militarism and globalization. The bootstrap panel Granger causality that accounts for both cross-sectional dependence and heterogeneity across countries is utilized to detect the direction of causality. The results show that military expenditures and globalization are causally related in most of the countries under review. Despite the increasing role of globalization, the results show that military expenditures are growing and pointing to a strengthening in nationalist sentiments and militarism. This paper suggests that changes in domestic political and economic conditions might hinder the process of globalization. The results are consistent with those of Acemoglu and Yared (2010) who conclude that high military spending endangers globalization. This study also supports the results of Martin et al. (2008) who find that an increase in multilateral trade raises the chance of conflict between states. The policy implication of the findings is that greater military spending by a country increases the likelihood of military conflict in the future, the anticipation of which discourages globalization.

#### Collapse prevents war

Clary 15

* Controls for other confounding factors in its analysis
* Revenues decrease when a recession hits – less money to spend on military / elsewhere
  + Leads to arms control since leaders don’t want to spend precious $ on arms races – empirically proven by Gorbachev, Nixon
* Cooperation due to decline increases cost of conflict
  + Proven by potential warring powers (Saudis, Israel, Egypt, etc) so no war

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

#### No diversionary war – they use rhetoric instead

* Evidence on diversionary war is mixed at best
* They use hostile rhetoric instead of war to have their cake and eat it too – achieves same benefits without conflict
* Prefer our study because its based on 50,000 US diplomatic events classified by interstate interactions across economic crises

Carter 18 [Erin Baggott Carter, Assistant Professor, School of International Relations, University of Southern California. Diversionary Cheap Talk: Unemployment and US Foreign Policy Rhetoric, 1945-2010. August 29, 2018. www.erinbcarter.org/documents/diversionUS.pdf]

There is a large literature on diversionary conflict in international relations, but it focuses on material conflicts like militarized interstate disputes rather than foreign policy rhetoric. It is based in social identity theory, which suggests that leaders can increase ingroup affinity by making intergroup distinctions more salient (Closer, 1950; Simmel, 1955; Tajfel and Turner, 1979). A recent review concludes that though the internal logic of diversionary conflict is “compelling and theoretically well supported,” the empirical evidence is “decidedly mixed” (Baum and Potte r, 2008, 48). Several studies find evidence of diversionary aggression in US foreign policy (Clark, 2003; DeRouen, 2000; DeRouen and Peake, 2002; Fordham, 1998a, 6; Hess and Orphanides, 1995; Howell and Pevehouse, 2005; James and Hristoulas, 1994; James and Oneal, 1991; Levy, 1989«,fc; Morgan and Bickers, 1992; Ostrom and Job, 1986) and elsewhere (Bennett, 2000; Dassel and Reinhardt, 1000; Davies, 2002; Enterline and Gleditsch, 2000; Gelpi, 1997; Heldt, 1999; Lebow, 1981; Mansfield and Snyder, 1995; Oneal and Tir, 2006; Russett, 1990; Sobek, 2007; Tir, 2010). Yet skeptics have amassed opposing evidence (Chiozza and Gormans, 2003, 2004; Foster and Palmer, 2006; Gowa, 1998; Johnston, 1998; Leeds and Davis, 1997; Lian and Oneal, 1993; Meernik, 2000, 2004; Meeraik and Waterman, 1996; Moore and Lanoue, 2003; Potter, 2007). Some cases are hard to reconcile with the theory: in Britain, there were rallies in the Falklands War and the Gulf War but not in other cases in which rallies would be expected, such as the Korean, Suez, and Kosovo wars (Lai and Reiter, 2005). Some go so far as to call diversionary aggression a “myth” (Meernik and Waterman, 1996).

Others have developed scope conditions for diversionary aggression. It is more likely between states with pre-standing rivalries (McLaughlin and Prins, 2004), when leaders are accountable (Carter, 2018; Kisangani and Pickering, 2011), and in mature democracies, consolidating autocracies, and transitional polities (Pickering and Kisangani, 2005). It is less likely when states avoid provoking troubled adversaries (Clark, 2003; Fordham, 2005; Leeds and Davis, 1997; Miller, 1999). Diversion appears more likely to produce a rally when supported by Security Council authorization (Chapman, 2011; Chapman and Reiter, 2004), when the White House draws attention to a dispute (Baker and Oneal, 2001), and in conditions of media attention, popular leadership, divided government, non election years, and first terms (Colaresi, 2007). Most recently, scholars have asked whether diversion occurs outside democracies. They find some autocracies, especially single party regimes, divert as well (Carter, 2018; Pickering and Kisangani, 2011).

This study extends the logic of diversionary conflict to foreign policy rhetoric. There is surprisingly little research on rhetoric in international relations. The international relations literature deems talk “cheap” (Fearon, 1995; Kydd, 2005). The audience cost literature considers rhetoric meaningful, but only if it invokes audience costs through explicit, public threats (Fearon, 1994; Schultz, 2001; Smith, 1998; Tomz, 2007). However, if foreign policy rhetoric can activate ingroup identity, then it may be appealing for leaders who wish to improve their ratings without incurring the substantial risks of militarized interstate disputes. While it might be “outlandish” for presidents to engage in the impeachable exercise of diversionary war (Meernik and Waterman, 1996), hostile foreign policy rhetoric is far less outlandish a risk.

To develop a theory of diversionary cheap talk, this paper draws upon research in political psychology and political communication. These literatures find persuasive evidence that elite statements influence citizen beliefs (Behr and Iyengar, 19s."); Bennett. Lawrence and Livingston, 2006; Brody, 1991; Cohen, 1995; Jentleson, 1992; Zaller and Chiu, 2000). I draw on social identity theory to argue that diversionary cheap talk highlights intergroup differences between nations and leads citizens to evaluate their leader favorably. When a leader criticizes foreigners, she cues ingroup identity, which increases citizens’ social attachment to the nation and to herself as its leader. This is a “solidarity mechanism,” through which “[c]ollective group goals and common group identity are highlighted, norms of group-based altruism are strengthened, punishment and rejection of defectors are increased, and perceptions of the in-group and out-group are manipulated” (Halevy, Bernstein and Sagiv, 2008, 405).

The theory generates observable implications about when leaders use diversionary cheap talk and who they target. I follow the consensus in the diversionary conflict literature in focusing on poor economic conditions as the most important source of public disapproval for leaders. Low approval ratings limit leaders’ ability to advance their domestic agenda. Therefore, when the economy deteriorates, leaders will criticize foreign nations to improve their approval ratings and restore the political capital necessary for them to govern. Second, a key observation from social identity theory is that the depth of intergroup differences is important for group attachment. Therefore, consonant with recent empirical findings in the diversionary conflict literature (McLaughlin and Prins, 2004), I expect diversionary rhetoric to be most effective when it targets threatening outgroups. In the context of foreign policy, these are best represented by historical adversaries. And finally, because diversionary cheap talk shifts the focus of political competition from the partisan to the international level, it has differential partisan effects. Because national identity cues widen the tent of the political ingroup, diversionary cheap talk is most effective at boosting support among the leader’s nonpartisans: liberal citizens for conservative leaders, and conservative citizens for liberal leaders.

I test these hypotheses with the American Diplomatic Dataset, an original record of over 50,000 US diplomatic events between 1945 and 2010 drawn from New York Times articles on foreign affairs. I used tools from computational social science to classify bilateral interstate interactions into hundreds of specific types and four aggregate categories: verbal cooperation, verbal conflict, material cooperation, and material conflict. This is by far the most historically extensive event dataset. As such, it allows an exploration of US foreign policy behavior across a variety of administrations and economic crises.

I find robust evidence of diversionary cheap talk in US foreign policy. First, I establish that US presidents face incentives to divert verbally rather than materially: while militarized interstate dispute initiation does not affect presidential approval ratings, critical rhetoric about other nations is associated with increased ratings, especially among nonpartisans. Responding to this incentive, presidents between 1945 and 2010 typically diverted in the form of words, not deeds. Simulations indicate that as unemployment varied from its minimum to its maximum observed value, hostile foreign policy rhetoric nearly doubled, depending on the administration. Throughout this study, estimates are conservative: I operationalize conflict as events the United States initiated, although findings are robust to a redefinition of conflict as events the United States participated in. The verbal statements in the dataset are high profile and likely to be noticed by the American public: all appeared in the headlines of the New York Times.

This study contributes to existing scholarship in several ways. First, it demonstrates that US foreign policy rhetoric responds significantly to domestic economic conditions. International relations scholars should therefore continue to focus more seriously on the communicative aspects of foreign policy, and in particular its relationship to domestic politics (Johnston, 2001, 2008; Kurizaki, 2007; Ramsay, 2011; Sartori, 2002, 2005; Trager, 2010, 2011, 201(i). The American Diplomacy Dataset will enable researchers to further explore the communicative aspects of foreign policy, and their relationships to material and economic factors, in more detail than existing datasets permit.

Second, this study contributes to the diversionary conflict literature by showing that in many cases where diversionary theory predicts conflict initiation, leaders instead choose rhetorical hostility. In this sense, leaders may have their cake and eat it too: They benefit from an ingroup rally without inviting an international crisis. The mixed empirical findings in the diversionary conflict literature may be partly due to the fact that existing scholarship considers only the most serious forms of diversion like militarized interstate disputes. It is possible that a wide range of diversionary behavior takes place at less extreme levels, such as the rhetorical hostility documented in this paper.1

**\*\*\*BEGIN FOOTNOTE 1\*\*\***

In the language of the foreign policy substitutability literature (Bennett and Nordstrom, 2000; Clark, Nordstrom and Reed, 2008; Most and Starr, 1984, 1989; Oakes, 2012), rhetorical hostility, like the development of new economic policies, may be seen as a substitute for diversionary conflict.

**\*\*\*END FOOTNOTE 1\*\*\***

#### Crisis gets everyone else on board

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

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.

### 1NC – Innovation

#### Disease won’t cause extinction—

#### Burnout and empirics.

Owen Cotton-Barratt 17, et al, PhD in Pure Mathematics, Oxford, Lecturer in Mathematics at Oxford, Research Associate at the Future of Humanity Institute, 2/3/2017, Existential Risk: Diplomacy and Governance, https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf

For most of human history, natural pandemics have posed the greatest risk of mass global fatalities.37 However, there are some reasons to believe that natural pandemics are very unlikely to cause human extinction. Analysis of the International Union for Conservation of Nature (IUCN) red list database has shown that of the 833 recorded plant and animal species extinctions known to have occurred since 1500, less than 4% (31 species) were ascribed to infectious disease.38 None of the mammals and amphibians on this list were globally dispersed, and other factors aside from infectious disease also contributed to their extinction. It therefore seems that our own species, which is very numerous, globally dispersed, and capable of a rational response to problems, is very unlikely to be killed off by a natural pandemic.

One underlying explanation for this is that highly lethal pathogens can kill their hosts before they have a chance to spread, so there is a selective pressure for pathogens not to be highly lethal. Therefore, pathogens are likely to co-evolve with their hosts rather than kill all possible hosts.39

#### Resilience and countermeasures prevent spread – distinct from burnout

Adalja 16

Amesh Adalja is an infectious-disease physician at the University of Pittsburgh, The Atlantic, June 17, 2016, “Why Hasn't Disease Wiped out the Human Race?”, https://www.theatlantic.com/health/archive/2016/06/infectious-diseases-extinction/487514/

But when people ask me if I’m worried about infectious diseases, they’re often not asking about the threat to human lives; they’re asking about the threat to human life. With each outbreak of a headline-grabbing emerging infectious disease comes a fear of extinction itself. The fear envisions a large proportion of humans succumbing to infection, leaving no survivors or so few that the species can’t be sustained.

I’m not afraid of this apocalyptic scenario, but I do understand the impulse. Worry about the end is a quintessentially human trait. Thankfully, so is our resilience.

For most of mankind’s history, infectious diseases were the existential threat to humanity—and for good reason. They were quite successful at killing people: The 6th century’s Plague of Justinian knocked out an estimated 17 percent of the world’s population; the 14th century Black Death decimated a third of Europe; the 1918 influenza pandemic killed 5 percent of the world; malaria is estimated to have killed half of all humans who have ever lived.

Any yet, of course, humanity continued to flourish. Our species’ recent explosion in lifespan is almost exclusively the result of the control of infectious diseases through sanitation, vaccination, and antimicrobial therapies. Only in the modern era, in which many infectious diseases have been tamed in the industrial world, do people have the luxury of death from cancer, heart disease, or stroke in the 8th decade of life. Childhoods are free from watching siblings and friends die from outbreaks of typhoid, scarlet fever, smallpox, measles, and the like.

**Intervening actors check**

**Zakaria 9—**Editor of Newsweek, BA from Yale, PhD in pol sci, Harvard. He serves on the board of Yale University, The Council on Foreign Relations, The Trilateral Commission, and Shakespeare and Company. Named "one of the 21 most important people of the 21st Century" (Fareed, “The Capitalist Manifesto: Greed Is Good,” 13 June 2009, http://www.newsweek.com/id/201935)

Note—Laurie Garrett=science and health writer, winner of the Pulitzer, Polk, and Peabody Prize

It certainly looks like another example of crying wolf. **After bracing ourselves for a global pandemic, we've suffered** something more like **the usual seasonal influenza**. Three weeks ago the World Health Organization declared a health emergency, warning countries to "prepare for a pandemic" and said that the only question was the extent of worldwide damage. **Senior officials prophesied that millions could be infected** by the disease. **But as of last week, the WHO had confirmed only 4,800 cases** of swine flu, with 61 people having died of it. Obviously, these low numbers are a pleasant surprise, but it does make one wonder, what did we get wrong? **Why did** the **predictions of a pandemic turn out to be so exaggerated**? Some people blame an overheated media, but it would have been difficult to ignore major international health organizations and governments when they were warning of catastrophe. I think **there is a** broader **mistake in the way we look at the world.** Once we see a problem, we can describe it in great detail, extrapolating all its possible consequences. But **we** can **rarely anticipate the human response to that crisis. Take** **swine flu. The virus** **had crucial characteristics** **that led researchers to worry that it could spread far and fast**. They described—and the media reported—what would happen if it went unchecked. **But it did not go unchecked**. **In fact, swine flu was met by an extremely vigorous response at its epicenter**, **Mexico. The Mexican government reacted quickly** and massively, quarantining the infected population, testing others, providing medication to those who needed it. **The noted expert on this subject,** Laurie **Garrett, says, "**We should all stand up and scream, **'Gracias, Mexico**!' because the Mexican people and the Mexican government have sacrificed on a level that I'm not sure as Americans we would be prepared to do in the exact same circumstances. They shut down their schools. They shut down businesses, restaurants, churches, sporting events. **They** basically paralyzed their own economy. They've suffered billions of dollars in financial losses still being tallied up, and thereby **really brought transmission to a halt." Every time one of these viruses is detected**, writers and **officials bring up the Spanish influenza** epidemic **of 1918** in which millions of people died. Indeed, during the last pandemic scare, in 2005, President George W. Bush claimed that he had been reading a history of the Spanish flu to help him understand how to respond. **But the world we live in today looks nothing like 1918. Public health-care systems are far better** and more widespread than anything that existed during the First World War. **Even Mexico, a developing country, has a first-rate public-health system**—far better than anything Britain or France had in the early 20th century.

#### 1] They don't solve their advantage—CRISPR tech is so much more than medicine – it can also be used for cosmetic gene editing or warfare. Only reducing patents on genomic medicine can't stop fights over other uses of genomics or threats of lawsuits that trigger all their internal links – read their ev – it doesn’t even reference genomic medicine specifically, which means non-medicinal genomics are a huge alt cause they can’t solve.

#### 2] CRISPR fails.

CUMC 17, Columbia University Medical Center, 5-30-2017, "CRISPR Gene Editing Can Cause Hundreds of Unintended Mutations," http://newsroom.cumc.columbia.edu/blog/2017/05/30/crispr-gene-editing-can-cause-hundreds-of-unintended-mutations/

As CRISPR-Cas9 starts to move into clinical trials, a new study published in Nature Methods has found that the gene-editing technology can introduce hundreds of unintended mutations into the genome. “We feel it’s critical that the scientific community consider the potential hazards of all off-target mutations caused by CRISPR, including single nucleotide mutations and mutations in non-coding regions of the genome,” says co-author Stephen Tsang, MD, PhD, the Laszlo T. Bito Associate Professor of Ophthalmology and associate professor of pathology & cell biology in the Institute of Genomic Medicine and the Institute of Human Nutrition at Columbia University Medical Center. CRISPR-Cas9 editing technology—by virtue of its speed and unprecedented precision—has been a boon for scientists trying to understand the role of genes in disease. The technique also has raised hope for more powerful gene therapies that can delete or repair flawed genes, not just add new genes. The first clinical trial to deploy CRISPR is now underway in China, and a U.S. trial is slated to start next year. But even though CRISPR can precisely target specific stretches of DNA, it sometimes hits other parts of the genome. Most studies that search for these off-target mutations use computer algorithms to identify areas most likely to be affected and then examine those areas for deletions and insertions. “These predictive algorithms seem to do a good job when CRISPR is performed in cells or tissues in a dish, but whole genome sequencing has not been employed to look for all off-target effects in living animals,” says co-author Alexander Bassuk, MD, PhD, professor of pediatrics at the University of Iowa. In the new study, the researchers sequenced the entire genome of mice that had undergone CRISPR gene editing in the team’s previous study and looked for all mutations, including those that only altered a single nucleotide. The researchers determined that CRISPR had successfully corrected a gene that causes blindness, but Kellie Schaefer, a PhD student in the lab of Vinit Mahajan, MD, PhD, associate professor of ophthalmology at Stanford University, and co-author of the study, found that the genomes of two independent gene therapy recipients had sustained more than 1,500 single-nucleotide mutations and more than 100 larger deletions and insertions. None of these DNA mutations were predicted by computer algorithms that are widely used by researchers to look for off-target effects. “Researchers who aren’t using whole genome sequencing to find off-target effects may be missing potentially important mutations,” Dr. Tsang says. “Even a single nucleotide change can have a huge impact.”