### Prolif good

#### Prolif solves bioweapon shift

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[Michael, and Neil Narang, UC Santa Barbara political science, "Poor Man’s Atomic Bomb? Exploring the Relationship between ‘Weapons of Mass Destruction’," Journal of Conflict Resolution, 58.3, 2013, accessed 12-13-19]

The causes and consequences of nuclear proliferation have received a great deal of academic attention. However, nuclear weapons are rarely discussed in isolation in policy circles. Instead, nuclear weapons are relevant as part of a category of weapons of mass destruction (WMDs) that includes chemical and biological weapons (CBWs). Are the factors that drive CBWs proliferation similar to those that drive nuclear proliferation? What is the relationship between these weapons types? In this article, we explore whether nuclear weapons and CBWs serve as complements or substitutes. Using newly collected data on both CBWs pursuit and possession over time, we find that nuclear, biological, and chemical weapons generally function as complements at the pursuit stage. In addition, countries that acquire nuclear weapons become less interested in pursuing other types of WMDs and are even willing to give them up in some cases. What motivates countries to pursue weapons of mass destruction (WMDs)?1 Despite a wave of research over the last several years on the spread of nuclear weapons and the consequences for international security, the spread of chemical and biological weapons (CBWs) remains relatively underexplored. In some ways, this makes sense—the West’s concern with Iran’s WMD development program is not driven by Iran’s chemical or biological weapons programs. Instead, it is Iran’s pursuit of nuclear weapons that propels international concern about the Iranian regime. On the other hand, policy makers worried a great deal about Saddam Hussein’s CBWs arsenal before the Gulf War—especially after evidence surfaced of Saddam’s usage of chemical weapons against the Kurdish population in Northern Iraq. As the “poor man’s atomic bomb,” CBWs seem to be viewed by many countries as the best chance they have, short of nuclear weapons, at developing deadly weapons to protect themselves against their neighbors—or increase their ability to threaten them. In this article, we present the first rigorous tests measuring the spread of CBWs, focusing on both the pursuit of these systems and their implications. More important, we focus on the interaction between biological, chemical, and nuclear weapons proliferation, evaluating the extent to which the pursuit or possession of one type of WMD influences the pursuit of another type of WMD. Do policy makers and military leaders treat nuclear, CBWs as substitutes or complements in their overall weapons arsenal? What is the actual relationship between nuclear, biological, and chemical weapons possession empirically? Does possessing a nuclear weapons program or capability increase or decrease the probability that a state will pursue biological or chemical weapons and vice versa? Finally, are the same factors known to be correlated with nuclear weapons proliferation also correlated with CBWs proliferation? The answers to these questions are important for academics and policy makers. For example, if the evidence suggests that leaders treat nuclear, biological, and chemical weapons capabilities as substitutes in their strategic arsenal (perhaps because each one is perceived to increase national security in a similar way), then analysts should adjust their assessments of proliferation risk downward for one capability conditional on observing another. Conversely, if evidence suggests that leaders treat these weapons technologies as complements, then analysts should adjust their assessments of proliferation risk upward for any one technology upon observing another. Finally, if the evidence suggests that leaders treat the three weapons capabilities as substitutes, then efforts to create a more robust nuclear nonproliferation regime could have the inadvertent consequence of increasing demand for CBWs capabilities, thus shifting proliferation risk. Our results demonstrate three critical facets of the relationship between nuclear, biological, and chemical weapons proliferation. First, we find that many of the same security and economic factors that drive nuclear weapons proliferation also influence CBWs proliferation. Second, while we lack causal evidence, our statistical models support our argument that nuclear, biological, and chemical weapons generally function as complements at the pursuit stage. That is, countries that seek one of these weapons generally seek all three simultaneously. Third, there is some tentative evidence that WMDs do function as substitutes in one important fashion; once countries acquire nuclear weapons, they become less interested in initiating pursuit of other types of WMDs and they are more likely to abandon other types of WMDs. This key finding provides an empirical basis for the notion that CBWs function as a “poor man’s nuclear bomb,” since possession of nuclear weapons appears to be systematically associated with a reduction in the demand for less powerful CBWs.

#### Extinction

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[Anders, PhD in computation neuroscience, and Milan Cirkovic, senior research associate at the Astronomical Observatory of Belgrade, "How can we reduce the risk of human extinction?" Bulletin of the Atomic Scientists, 9-9-2008, thebulletin.org/how-can-we-reduce-risk-human-extinction, accessed 8-13-14]

The risks from anthropogenic hazards appear at present larger than those from natural ones. Although great progress has been made in reducing the number of nuclear weapons in the world, humanity is still threatened by the possibility of a global thermonuclear war and a resulting nuclear winter. We may face even greater risks from emerging technologies. Advances in synthetic biology might makeit possible to engineerpathogens capable ofextinction-levelpandemics. The knowledge, equipment, and materials needed to engineer pathogens are more accessible than those needed to build nuclear weapons. And unlike other weapons, pathogens are self-replicating, allowing a small arsenal to become exponentially destructive. Pathogens have been implicated in the extinctions of many wild species. Although most pandemics "fade out" by reducing the density of susceptible populations, pathogens with wide host ranges in multiple species can reach even isolated individuals. The intentional or unintentional release of engineered pathogens with high transmissibility, latency, and lethality might be capable of causing **human extinction**. While such an event seems unlikely today, the likelihood may increase as biotechnologies continue to improve at a rate rivaling Moore's Law.

### Terror

#### No nuke terror – people like Allison are hacks

* Two decades of threats haven’t panned out
* Too many things can go wrong:

Getting trusted collaborators

Stealing and transporting guarded material

Getting the top technicians in the world

No ability to test

Skilled detonation crew

All that while attracting zero attention

* Weapons have safety devices, are stored in pieces in different places
* Terrorists are like Bond villains that scheme instead of accomplishing anything
* Most attacks are bombs which don’t even work

Mueller and Stewart 10/29/18 [John Mueller is Woody Hayes Senior Research Scientist, Mershon Center for International Security Studies, and adjunct professor of Political Science, at Ohio State University. He is also a Senior Fellow at the Cato Institute in Washington. Mark G. Stewart is Professor of Civil Engineering and Director of the Centre for Infrastructure Performance and Reliability at The University of Newcastle in Australia. Terrorism and Bathtubs: Comparing and Assessing the Risks. October 29, 2018. https://www.tandfonline.com/doi/abs/10.1080/09546553.2018.1530662?journalCode=ftpv20]

However, there is of course no guarantee that things will remain that way, and the 9/11 attacks inspired the remarkable extrapolation that, because the terrorists were successful with box cutters, they might soon be able to turn out weapons of mass destruction— particularly nuclear ones—and then detonate them in an American city. For example, in his influential 2004 book, Nuclear Terrorism, Harvard’s Graham Allison relayed his “considered judgment” that “on the current path, a nuclear terrorist attack on America in the decade ahead is more likely than not.”11 Allison has had a great deal of company in his alarming pronouncements. In 2007, the distinguished physicist Richard Garwin put the likelihood of a nuclear explosion on an American or European city by terrorist or other means at 20 percent per year, which would work out to 91 percent over the eleven-year period to 2018.12

Allison’s time is up, and so is Garwin’s. These off-repeated warnings have proven to be empty. And it is important to point out that not only have terrorists failed to go nuclear, but as William Langewiesche, who has assessed the process in detail, put it in 2007, “The best information is that no one has gotten anywhere near this. I mean, if you look carefully and practically at this process, you see that it is an enormous undertaking full of risks for the would-be terrorists.”13 That process requires trusting corrupted foreign collaborators and other criminals, obtaining and transporting highly guarded material, setting up a machine shop staffed with top scientists and technicians, and rolling the heavy, cumbersome, and untested finished product into position to be detonated by a skilled crew, all the while attracting no attention from outsiders.

Nor have terrorist groups been able to steal existing nuclear weapons—characteristically burdened with multiple safety devices and often stored in pieces at separate secure locales—from existing arsenals as was once much feared. And they certainly have not been able to cajole leaders in nuclear states to palm one off to them—though a war inflicting more death than Hiroshima and Nagasaki combined was launched against Iraq in 2003 in major part under the spell of fantasies about such a handover.14

More generally, the actual terrorist “adversaries” in the West scarcely deserve accolades for either dedication or prowess. It is true, of course, that sometimes even incompetents can get lucky, but such instances, however tragic, are rare. For the most part, terrorists in the United States are a confused, inadequate, incompetent, blundering, and gullible bunch, only occasionally able to get their act together. Most seem to be far better at frenetic and often self-deluded scheming than at actual execution. A summary assessment by RAND’s Brian Jenkins is apt: “their numbers remain small, their determination limp, and their competence poor.”15 And much the same holds for Europe and the rest of the developed world.16 Also working against terrorist success in the West is the fact that almost all are amateurs: they have never before tried to do something like this. Unlike criminals they have not been able to develop street smarts.

Except perhaps for the use of vehicles to deliver mayhem (though this idea is by no means new in the history of terrorism), there has been remarkably little innovation in terrorist weaponry or methodology since 9/11.17 Like their predecessors, they have continued to rely on bombs (many of which fail to detonate or do much damage) and bullets.18

### Dedev

They can’t solve dedev – their ev says the transition away from growth is good but they don’t have a counterplan that does that and no reason the aff makes squo economic growth worse – especially since our ev is about

Ev says trade conflicts, not econ decline

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

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

Is economic growth environmentally sustainable? No, say a group of prominent ecological economists led by the Australian hydrologist James Ward. In a new PLoS ONE article—"Is Decoupling GDP Growth from Environmental Impact Possible?"—they offer an analysis inspired by the 1972 neo-Malthusian classic The Limits to Growth. They even suggest that The Limits to Growth's projections with regard to population, food production, pollution, and the depletion of nonrenewable resources are still on track. In other words, they think we're still heading for a collapse. I think **they're wrong**. But they're wrong in an instructive way. The authors describe two types of "decoupling," relative and absolute. Relative decoupling means that economic growth increases faster than rates of growth in material and energy **consumption** and **environmental impact**. Between 1990 and 2012, for example, China's **GDP rose 20-fold** while its energy use increased by a factor of four and its material use by a factor of five. Basically this entails increases in efficiency that result in using fewer resources to produce more value. Absolute decoupling is what happens when continued economic growth actually **lessens resource use** and impacts on the natural environment, that is, creating more value while using less stuff. Essentially humanity becomes richer while withdrawing from nature. To demonstrate that continued economic growth is unsustainable, the authors recycle the hoary I=PAT model devised in 1972 by the Stanford entomologist and population alarmist Paul Ehrlich and the Harvard environmental policy professor (and chief Obama science adviser) John Holdren. Human Impact on the environment is supposed to equal to Population x Affluence/consumption x Technology. All of these are presumed to intensify and worsen humanity's impact on the natural world. In Ward and company's updated version of I=PAT, the sustainability of economic growth largely depends on Technology trends. Absolute decoupling from resource consumption or pollutant emissions requires technological intensity of use and emissions to decrease by at least the same annual percentage as the economy is growing. For example, if the economy is growing at three percent per year, technological intensity must reduce 20-fold over 100 years to maintain steady levels of resource consumption or emissions. If technological intensity is faster then resource use and emissions will decline over time, which would result in greater wealth creation with ever lessening resource consumption and environmental spillovers. Once they've set up their I=PAT analysis, Ward and his colleagues assert that "for non-substitutable resources such as land, water, raw materials and energy, we argue that whilst efficiency gains may be possible, there are minimum requirements for these resources that are ultimately governed by physical realities." Among the "physical realities" they mention are limits on plant photosynthesis, the conversion efficiencies of plants into meat, the amount of water needed to grow crops, that all supposedly determine the amount of agricultural land required to feed humanity. They also cite "the upper limits to energy and material efficiencies govern minimum resource throughput required for economic production." To illustrate the operation of their version of the I=PAT equation, they apply it to a recent study that projected it would be possible for Australia's economy to grow 7-fold while simultaneously reducing resource and energy use and lowering environmental pressures through 2050. They **crank the notion** that there are nonsubstitutable physical limits on material and energy resources through their equations until 2100, and they find that eventually consumption of both rise at the same rate as economic growth. QED: Economic growth is unsustainable. Or as they report, "Permanent decoupling (absolute or relative) is impossible for essential, non-substitutable resources because the efficiency gains are ultimately governed by physical limits." **Malthus wins again!** Or does he? GDP growth—increases in the monetary value of all finished goods and services—is a crude measure for improvements in human well-being. Nevertheless, rising incomes (GDP per capita) correlate with lots of good things that nearly everybody wants, including access to more and better **food**, longer and **healthier lives**, more educational **opportunities**, and greater scope for life choices. Ward and his colleagues are clearly right that there is only so much physical stuff on the Earth, but even they know that wealth is not created simply by using more stuff. Where they go wrong (as so many Malthusians do) is by implicitly assuming that there are limits to human creativity. Interestingly, Ward and his colleagues, like Malthus before them, focus on the supposed limits to **agricultural productivity**. For example, they cite the limits to photosynthesis, which will limit the amount of food that humanity can produce. But as they acknowledge, human population may not continue to increase. In fact, **global fertility rates** have been **decelerating** for many decades now, and demographer Wolfgang Lutz calculates that world population will peak after the middle of this century and begin falling. Since the number of mouths to feed will stabilize and people can eat only so much, it is unlikely that the **biophysical limits** of agriculture on Earth will be exceeded. But it gets even better. Agricultural **productivity is improving**. Consider the biophysical limit on photosynthesis cited by the study. In fact, researchers are already making progress on installing more efficient C-4 photosynthesis into rice and wheat, which would **boost yields by** as much as **50 percent**. British researchers just announced that they had figured out how to boost photosynthetic efficiency to create a super-wheat would increase yields by 20 percent. In a 2015 article for the Breakthrough Journal, "The Return of Nature: How Technology Liberates the Environment," Jesse H. Ausubel of Rockefeller University reviews how humanity is **already decoupling** in many ways from the natural world. "A series of 'decouplings' is occurring, so that our economy no longer advances in tandem with exploitation of land, forests, water, and minerals," he writes. "American use of almost everything except information **seems to be peaking**." He notes that agricultural applications of fertilizer and water in the U.S. peaked in the 1980s while yields continued to increase. Thanks to increasing agricultural productivity, humanity is already at **"peak farmland"**; as a result, "an area the size of India or of the United States east of the Mississippi could be released globally from agriculture over the next 50 years or so." Ward is worried about biophysical limits on water use. But as Ausubel notes, U.S. **water use has peaked** and has declined **below the level of 1970**. What about meat? Ausubel notes the **greater efficiency** with which chickens and cultivated fish turn grains and plant matter into meat. In any event, the future of farming is not fields but factories. Innovators are already seeking to replace the entire dairy industry with milk, yogurt, and cheeses made by genetically modified bacteria grown in tanks. Others are figuring how to culture meat in vat. Ausubel also notes that many countries have already been through or are about to enter the "forest transition," in which forests begin to expand. Roger Sedjo, a forest economist at Resources of the Future, has projected that by the middle of this century most of world's **industrial wood** will be produced from planted forests covering a remarkably small land area, perhaps **only 5 to 10 percent** of the extent of today's global forest. Shrinking farms and ranches and expanding forests will do a lot toward turning around the alarming global reduction in wildlife. How about unsubstitutable stuff? Are we running out of that? Ausubel notes that the U.S. has apparently already achieved **absolute decoupling**

—call it peak stuff—for a lot of materials, including plastics, paper, timber, phosphate, aluminum, steel, and copper. And he reports relative decoupling for **53** other **commodities**, all of which are likely heading toward absolute decoupling. Additive manufacturing is also known as 3-D printing, in which machines build up new items one layer at a time. The Advanced Manufacturing Office suggested that additive manufacturing can reduce material needs and costs by up to **90 percent**. And instead of the replacement of worn-out items, their material can **simply be recycled** through a printer to return it to good-as-new condition using only 2 to 25 percent of the energy required to make new parts. 3-D printing on demand will also eliminate storage and inventory costs, and will significantly cut transportation costs. Nanomanufacturing—building atom-by-atom—will likely engender a **fourth industrial revolution** by spurring exponential economic growth while reducing human demands for material resources. Ward and company project that Australians will be using 250 percent more energy by 2100. Is there an upper limit to energy production that implies unsustainability? In their analysis, the ecological economists apparently assume that energy supplies are limited. Why this is not clear, unless their model **implicitly assumes** a growing **consumption** of fossil fuels (and even then, the world is not close to running out of those). But there is a source of energy that, for all practical purposes, is limitless and has few deleterious environmental effects: **nuclear power**. If demand for primary energy were to double by 2050, a back-of-the-envelope calculation finds that the **entire world's energy needs** could be supplied by 6,000 conventional nuclear power plants. The deployment of fast reactors would supply "renewable" energy for thousands of years. The development of thorium reactors could also supply **thousands of years** of energy. And both could do so without harming the environment. (Waste heat at that scale would not be much of a problem.) Such power sources are in any relevant sense "decoupled" from the natural world, since their fuel cycles produce **little pollution**. Recall that GDP measures the monetary value of all finished goods and services. Finished goods will become a shrinking part of the world's economy as more people gain access to food, clothing, housing, transportation, and so forth. Already, services account for 80 percent of U.S. GDP and 80 percent of civilian employment. Instead of stuff, people will want to spend time creating and enjoying themselves. As technological progress enables economic growth, people will consume more pixels and less petroleum, more massages and less mortar, more handicrafts and less hardwood. Ultimately, Ward and his colleagues make the **same mistake as Malthus** and the Limits to Growth folks: They **extrapolate trends** without taking adequate account of human **ingenuity**. Will it be possible to grow the economy 7-fold over this century while reducing resource consumption and restoring the natural world? Yes.