# 1NC

### 1

#### India’s COVID crisis has killed Modi’s appetite for international adventurism, but increasing vaccine production reverses the trend.

Singh ’21 (Sushant; senior fellow with the Centre for Policy Research in India; 5-3-2021; “The End of Modi’s Global Dreams”; Foreign Policy; https://foreignpolicy.com/2021/05/03/india-vishwaguru-modi-second-wave-soft-power-self-sufficiency/; Accessed: 8-27-2021)

India’s prime minister advanced a **muscular foreign policy**, but his mishandling of the pandemic is an **embarrassing step back**. In December 2004, when an earthquake and tsunami struck Asia, then-Indian Prime Minister Manmohan Singh decided it was high time for India to stop accepting aid from other countries to deal with disasters and rely on itself instead. “We feel that we can cope with the situation on our own,” he said, “and we will take their help if needed.” It was a pointed political statement about India’s growing economic heft, and it wasn’t the last. Singh’s government offered aid to the United States in the wake of Hurricane Katrina in 2005 and to China after the 2008 Sichuan earthquake. Seen as a matter of national pride, an indicator of self-sufficiency, and a snub to nosy aid givers, the practice continued under Indian Prime Minister Narendra Modi despite pressure to change course during floods in the southern state of Kerala in 2018. Modi, who has consistently campaigned on **virulent nationalism** captured by the slogan “Atmanirbhar Bharat” (or self-reliant India), has been forced to abruptly change policy. Last week, with images of people dying on roads without oxygen and crematoriums for pet dogs being used for humans’ last rites as the second wave of the COVID-19 pandemic overwhelmed the country, his government accepted offers of help from nearly 40 other nations. Its diplomats have lobbied with foreign governments for oxygen plants and tankers, the arrival of medicines, and other supplies hailed on social media. “We have given assistance; we are getting assistance,” said Harsh Vardhan Shringla, the country’s top diplomat, to justify the embarrassing U-turn. “It shows an interdependent world. It shows a world that is working with each other.” The world may be working with each other, but it is not working for Modi in the **realm of foreign policy**. Rather, this is a moment of reckoning, triggered by the rampaging coronavirus. After seven years as prime minister, Modi’s **hyper-nationalistic** domestic agenda—including his ambition of making the country a “Vishwaguru” (or **master to the world**)—now lies in tatters. India, which has been envisaged since former U.S. President Donald Trump’s administration became the Quadrilateral Security Dialogue’s lynchpin and focused other efforts in the Indo-Pacific strategy to counter China, will have to work harder to justify that role. Meanwhile, China has redoubled its efforts in India’s neighborhood since the second wave began, strengthening its existing ties with South Asian countries and contrasting its strength and reliability with India’s limitations. No doubt, New Delhi will be able to regain a certain sense of normalcy in a few months, but the **mishandling of the pandemic** has dealt it a weaker hand in **ongoing backchannel talks with Islamabad** and border negotiations with Beijing. But even **longer-lasting damage** has been done to India’s soft power, which was already dented under Modi’s authoritarian regime. This is a big problem for the government as it was soft power that allowed New Delhi to assert itself for a seat at the global high table to begin with. Front page images and video clips of constantly burning pyres and dying patients may recede from the foreground with time, but rebuilding India’s diplomatic heft and geopolitical prominence will need more than the passage of months and years. It will take a concerted effort, and S. Jaishankar, Modi’s chosen man to be India’s foreign minister, has so far appeared unequal to the task. In March, when the second wave of the pandemic started unfolding in India, Jaishankar’s ministry was busy issuing official statements and organizing social media storms against popstar Rihanna and climate change activist Greta Thunberg. On Thursday, at the peak of the health crisis, Jaishankar’s focus in a meeting with all the Indian ambassadors to various global capitals was on countering the so-called “one-sided” narrative in international media, which said Modi’s government had failed the country by its “incompetent” handling of the second pandemic wave. Until recently, Jaishankar was also the most enthusiastic promoter of the government’s Vaccine Maitri (or “Vaccine Friendship”) program, under which New Delhi supplied around 66.4 million doses of the India-made AstraZeneca vaccine to 95 countries in packing boxes marked prominently with large pictures of Modi. These vaccines were either commercially contracted, given as bilateral grants, or transferred under the World Health Organization’s COVID-19 Vaccines Global Access (COVAX) scheme for poorer countries. Meanwhile, India’s own vaccination rollout has been **dismal**. Around 2 percent of Indians have been fully vaccinated, despite the country being the world’s biggest vaccine manufacturer—a misstep that has emerged as one of the key culprits for India’s uncontrolled second wave. Having exported doses in a quest for personal glory, Modi is now awaiting 20 million doses of AstraZeneca vaccines from the United States after abruptly reversing 16 years of policy, as indicated in its disaster management documents, against **accepting bilateral aid**. It is bad enough that India is getting help from traditional partners like the United States and Russia, but it is also accepting supplies coming from China, with which India’s relationship has been increasingly strained under Modi. And it must have been particularly galling to the prime minister that **even Pakistan** made an offer to help with medical supplies and equipment. So woeful is India’s situation that it has started importing 88,000 pounds of medical oxygen daily from the tiny Himalayan kingdom of Bhutan. Most Indians acknowledge their country was in an economic recession last year, and accepting bilateral aid is more of a compulsion than a choice. But how will they reconcile that with the fact that work on a $2 billion project to reconstruct a government office complex in the national capital, including building a new residence for Modi, continues unabated as an “essential service” during the pandemic? Modi boasted of having made India a **Vishwaguru** and personally enhancing national prestige through his numerous global trips. His ultranationalist supporters had started assuming India was already a **global power** in the same league as the United States and China. This feeling tied in with his domestic political positioning. Hindutva, or homogenized Hindu nationalism, was offered as the ideology that had made this supremacy possible. But now Modi’s supporters find their dreams of a **global power shattered.** They must instead confront the harsh reality of being citizens of a so-called “third world country,” which is dependent once again on the largesse of others. As the Indian economy continues to be hammered by the pandemic, there is little Modi can offer economically to his base. The edifice of **nationalist** pride, prestige, and **global respect** built by Modi on his so-called foreign-policy prowess has been demolished by the pandemic. The pandemic has hurt India in other ways too. Australia, a member of the Quadrilateral Security Dialogue (or Quad), has imposed a ban on its citizens from returning home, threatening five-year prison sentences, if they have spent time in India. In its first leaders’ summit in March, the grouping decided to provide a billion doses of the COVID-19 vaccine to the Indo-Pacific region by 2022. The vaccines were to be produced in India, funded by the United States and Japan, and distributed by Australia, in what was seen as the showpiece initiative to move the Quad away from its security-centric approach and soften its reputation as an anti-China grouping. With India struggling to produce vaccines for its own citizens hit by the pandemic, it is unlikely the Quad will be able to keep its scheme on schedule. In the bargain, New Delhi’s position as the lynchpin of the Quad stands considerably diminished. If India stumbles, the American dream of the Quad can never become a reality. Beijing has already moved in to take advantage of India’s misfortune to strengthen its ties with other South Asian countries. Last Tuesday, the Chinese foreign minister held a meeting with his counterparts from Afghanistan, Bangladesh, Nepal, Pakistan, and Sri Lanka for cooperation against COVID-19. India was absent from the meeting. And although Afghanistan, Bangladesh, Nepal, and Sri Lanka have received some vaccine supplies from India and expect more, these countries are now looking toward Beijing for doses after New Delhi failed to keep up its commercial and COVAX commitments. In the race between the two Asian giants to be an attractive and reliable partner in South Asia, India seems to have finished behind China. China has also pressed its advantage along its restive border with India. After an initial disengagement in Ladakh, India, China refused to pull back any further from other Indian-held territories it had moved into last summer. It stonewalled Indian attempts to discuss these areas in the last round of talks between the two sides, and it has constructed permanent military infrastructure and deployed troops close to the disputed border. If there were ever a time for India to demonstrate its strength, it would be now. But the second wave of COVID-19 has forced **the opposite**. A similar impact will be felt during New Delhi’s ongoing backchannel talks with Islamabad, where Pakistan will likely try to take **full advantage** of any **chinks in India’s armor**. India cannot afford to walk away from those talks as it has already been forced to engage with Islamabad due to its own inability to handle a two-front threat from China and Pakistan. An economy and a country ravaged by the pandemic makes the dual threat an even more **challenging proposition** for India—and hands Pakistan an unexpected advantage in the talks.

#### Modi’s domestic support sets the course for his international policies – trust in his administration directly translates into Indian adventurism.

Mishra et al. ’16 (Atul; contributor to the Norwegian Peacebuilding Resource Centre; January 2016; “The evolving domestic drivers of Indian foregin policy”; Norwegian Peacebuilding Resource Centre; https://www.files.ethz.ch/isn/195766/f9f6e4b3e8a2c703364e7fb102dbf413.pdf; Accessed: 8-28-2021)

To inform answers to these questions, five broad categories of **domestic influence** that currently **influence** evolving **Indian foreign policy** decision-making processes are explored below: simple majority politics, the symbolism of Indian aspirations, the factor of Modi’s personality, regional states’ influence and business interests. Firstly and most simplistically, the BJP’s simple **majority** means a government that in theory is less constrained by regional political forces or alliance partners that can bring coalition politics to a grinding halt. Policy is then by definition allowed to be more rational and predictable in both the domestic and international environments. A related factor is that few in the BJP are seen to be able to **challenge** either **Modi** or BJP president Amit Shah. Like a other party in India, the BJP has disgruntled elements, but they are unlikely to cause serious foreign policy disruptions in the short term.8 As a result, the party’s projection of **corporate unity** and its marginalising of rebellious leaders can be expected to continue, especially given India’s need for sustained economic growth and social development. This basic current political reality has **set the stage** for confronting the issues that the Modi government was elected to deal with. Secondly, the **symbolism of aspiration** has acquired great substance through Modi. There has been a long-standing practice of paying **occasional lip service** to traditional Indian principles of foreign policy such as non-alignment, morality and human rights. But under Modi the **hesitancy** about India projecting itself as an **aspirational and even aggressive** international power is **disappearing**. For example, the BJP has sought to replace the five traditional international principles of panchsheel (a term associated with Buddhism) with the five new pillars of panchamrit or “five nectars” (a term unambiguously associated with Hinduism). These are: dignity, dialogue, security, shared prosperity and culture.9 While panchsheel sought to combine and balance the values of India and those of the West, panchamrit calls to mind the emphasis on non-West- ern, “Asian values” that do not necessarily fit well with the values of open, searching and public criticism, social equality, and radical dissent in politics. Further, Modi **promises** that India will now be guided by the “Three Cs” in its international relations: culture, commerce and connec- tivity (Economic Times, 2014). This is typified by the govern- ment’s unapologetic use of its religious and cultural resources – primarily Hinduism – as elements of soft power on the international stage.10 The declaration that June 21st would be International Yoga Day and Modi’s numerous religious/cultural gestures during his overseas visits support this perspective. Thirdly, the personality factor has returned to the centre of Indian diplomacy. Modi has recast Indian foreign policy in a **vigorous and purposive** – and above all personal – light. His image is that of a simple and hardworking man who is clearheaded, decisive, and incorruptible. Like neoliberal leaders of China (primarily the late Deng Xiaoping) and Singapore (the late Lee Kuan Yew), he has been described as a pragmatist. Although the term is ephemeral and something of a misfit (principally because Modi is economi- cally and politically ideological), it has been used to positively describe his business-like attitude to foreign affairs. He lends a personal touch to relations with powers greater than India, as was evident in the way India hosted U.S. president Barack Obama and Chinese president Xi Jinping,11 giving the impression that all the parties involved are at the same level and thus hiding power disparities. Modi **breaks protocol**, becomes informal when the occasion demands, and ably sells India as an investment and cultural destination. Although previous Indian leaders have historically promoted business with “strong” leaders whose democratic credentials are suspected by the international community, Modi has **prioritised** economic interests rather than **democratic** ideals and is at ease with such leaders. Finally, unlike other Indian leaders who conducted themselves in deference to established Indian traditions on international conduct built over decades, Modi comes across as **unburdened** by this legacy. He is neither understated nor regards himself as the leader of a post- colonial country who is conscious of his country’s lack of international clout. He has positioned himself as the leader of a young, aspiring country that has much to offer in terms of culture and human potential.

#### Revitalized risk-taking risks Indo-Pak confrontations – those go nuclear.

Roblin ‘20 [Sebastien; university instructor for the Peace Corps in China, master’s degree in conflict resolution from Georgetown University; 3-16-2020; "Yes a Pakistani-Indian Nuclear War Would Kill People All Over the Planet"; National Interest; https://nationalinterest.org/blog/buzz/yes-pakistani-indian-nuclear-war-would-kill-people-all-over-planet-133642; accessed 3-17-2020]

Such assessments are not only shockingly callous but shortsighted. In fact, several studies have modeled the global impact of a “limited” ten-day nuclear war in which India and Pakistan each exchange fifty 15-kiloton nuclear bombs equivalent in yield to the Little Boy uranium bomb dropped on Hiroshima. Their findings concluded that spillover would in no way be “limited,” directly impacting people across the globe that would struggle to locate Kashmir on a map. And those results are merely a conservative baseline, as India and Pakistan are estimated to possess over 260 warheads. Some likely have yields exceeding 15-kilotons, which is relatively small compared to modern strategic warheads. Casualties Recurring terrorist attacks by Pakistan-sponsored militant groups over the status of India’s Muslim-majority Jammu and Kashmir state have repeatedly led to threats of a conventional military retaliation by New Delhi. Pakistan, in turn, maintains it may use nuclear weapons as a first-strike weapon to counter-balance India’s superior conventional forces. Triggers could involve the destruction of a large part of Pakistan’s military or penetration by Indian forces deep into Pakistani territory. Islamabad also claims it might authorize a strike in event of a damaging Indian blockade or political destabilization instigated by India. India’s official policy is that it will never be first to strike with nuclear weapons—but that once any nukes are used against it, New Dehli will unleash an all-out retaliation. The Little Boy bomb alone killed around 100,000 Japanese—between 30 to 40 percent of Hiroshima’s population—and destroyed 69 percent of the buildings in the city. But Pakistan and India host some of the most populous and densely populated cities on the planet, with population densities of Calcutta, Karachi and Mumbai at or exceeding 65,000 people per square mile. Thus, even low-yield bombs could cause tremendous casualties. A 2014 study estimates that the immediate effects of the bombs—the fireball, over-pressure wave, radiation burns etc.—would kill twenty million people. An earlier study estimated a hundred 15-kiloton nuclear detonations could kill twenty-six million in India and eighteen million in Pakistan—and concluded that escalating to using 100-kiloton warheads, which have greater blast radius and overpressure waves that can shatter hardened structures, would multiply death tolls four-fold. Moreover, these projected body counts omit the secondary effects of nuclear blasts. Many survivors of the initial explosion would suffer slow, lingering deaths due to radiation exposure. The collapse of healthcare, transport, sanitation, water and economic infrastructure would also claim many more lives. A nuclear blast could also trigger a deadly firestorm. For instance, a firestorm caused by the U.S. napalm bombing of Tokyo in March 1945 killed more people than the Fat Man bomb killed in Nagasaki. Refugee Outflows The civil war in Syria caused over 5.6 million refugees to flee abroad out of a population of 22 million prior to the conflict. Despite relative stability and prosperity of the European nations to which refugees fled, this outflow triggered political backlashes that have rocked virtually every major Western government. Now consider likely population movements in event of a nuclear war between India-Pakistan, which together total over 1.5 billion people. Nuclear bombings—or their even their mere potential—would likely cause many city-dwellers to flee to the countryside to lower their odds of being caught in a nuclear strike. Wealthier citizens, numbering in tens of millions, would use their resources to flee abroad. Should bombs beginning dropping, poorer citizens many begin pouring over land borders such as those with Afghanistan and Iran for Pakistan, and Nepal and Bangladesh for India. These poor states would struggle to supports tens of millions of refugees. China also borders India and Pakistan—but historically Beijing has not welcomed refugees. Some citizens may undertake risky voyages at sea on overloaded boats, setting their sights on South East Asia and the Arabian Peninsula. Thousands would surely drown. Many regional governments would turn them back, as they have refugees of conflicts in Vietnam, Cambodia and Myanmar in the past. Fallout Radioactive fallout would also be disseminated across the globe. The fallout from the Chernobyl explosion, for example, wounds its way westward from Ukraine into Western Europe, exposing 650,000 persons and contaminating 77,000 square miles. The long-term health effects of the exposure could last decades. India and Pakistan’s neighbors would be especially exposed, and most lack healthcare and infrastructure to deal with such a crisis. Nuclear Winter Studies in 2008 and 2014 found that of one hundred bombs that were fifteen-kilotons were used, it would blast five million tons of fine, sooty particles into the stratosphere, where they would spread across the globe, warping global weather patterns for the next twenty-five years. The particles would block out light from the sun, causing surface temperatures to decrease an average of 2.7 degrees Fahrenheit across the globe, or 4.5 degrees in North American and Europe. Growing seasons would be shortened by ten to forty days, and certain crops such as Canadian wheat would simply become unviable. Global agricultural yields would fall, leading to rising prices and famine. The particles may also deplete between 30 to 50 percent of the ozone layer, allowing more of the sun’s radiation to penetrate the atmosphere, causing increased sunburns and rates of cancer and killing off sensitive plant-life and marine plankton, with the spillover effect of decimating fishing yields.

### 2

#### The US is concerned about Saudi IPR but trade relations are fine now

US Gov 21 [United States Government, Office of the US Trade Representative “2021 Special 301 Report” Published: 2021] [https://ustr.gov/sites/default/files/files/reports/2021/2021%20Special%20301%20Report%20(final).pdf] || SM

Saudi Arabia remains on the Priority Watch List in 2021.

Ongoing Challenges and Concerns

Saudi Arabia was placed on the Priority Watch List in 2019 for failing to take action against the rampant satellite and online piracy made available by illicit pirate service beoutQ, continued lack of effective protection of intellectual property (IP) for pharmaceutical products, and long-standing concerns regarding enforcement against counterfeit and pirated goods within the country. BeoutQ ceased operations in August 2019. The Saudi Authority for Intellectual Property (SAIP) continued to take steps to improve IP protection, enforcement, and awareness throughout Saudi Arabia in 2020. However, concerns remain over actions by the Saudi Arabia Food and Drug Authority (SFDA), which the Minister of Health oversees, that are contrary to Saudi Arabia’s public statements in paragraph 261 of the Report of the Working Party on the Accession of the Kingdom of Saudi Arabia to the World Trade Organization. Starting in 2016, SFDA has been granting marketing approval to domestic companies for subsequent versions of registered products, without requiring the submission of data that meets the same requirements applied to the initial applicant, despite the period of protection provided to the initial applicant by Saudi regulations. SFDA’s continued actions and the lack of redress for affected companies have intensified concerns. Furthermore, the National Unified Procurement Company for Medical Supplies, also overseen by the Minister of Health, reportedly awarded national tenders to some of these domestic companies for the affected products.

#### Wavering Saudi IPR sends investors scrambling and guts US-Saudi coop. Recent missteps in pharma IPR prove it’s uniquely key to perception.

Stevens 17 [Philip Stevens “Saudi missteps on intellectual property will hold back its economy” Published: The Hill, September 17, 2017] [https://thehill.com/opinion/international/351074-saudis-missteps-on-intellectual-property-will-hold-back-its-economy] [Stevens: Director of Geneva Network, a UK-based research organization focusing on trade and innovation issues.] || SM

Saudi Arabian policymakers know that increasing knowledge-based sectors is the key to sustainable growth as their economy transitions away from oil.

“You cannot be depending on oil in a world where the knowledge economy is the driver of economic development — manufacturing is 20th century,” Fahd Al-Rasheed, CEO of King Abdullah Economic City, said in June.

Vision 2030, the plan to diversify the Saudi economy, also sees a big role for knowledge-based industries.

This makes sense. In the U.S., knowledge-intensive goods and services from sectors including biotech, chemicals, entertainment and information technology now make up over half of all U.S. exports, reversing the situation of only 40 years ago when manufacturing dominated. Advanced Asian economies — Japan, the Republic of Korea,

Advanced Asian economies — Japan, the Republic of Korea, Singapore and Taiwan — have also taken this path, moving over recent decades from agriculture to manufacturing to knowledge-based economies.

Few countries have developed thriving knowledge-based industries purely from domestic resources. Scientific knowledge, technological know-how and the required research and development capital are dispersed globally.

Gone are the days when one R&D company, for example, the industrial behemoth General Electric or the biopharmaceutical major Merck, created products in-house from start to finish.

Today, innovation is a result of collaboration between multinational companies, small companies, start-ups, academia and the public sector at all stages of the R&D cycle, often across borders.

Saudi Arabia’s challenge is to become a meaningful participant in this new world of networked innovation. It must attract innovative companies to its shores, bringing with them the capital, skills and technological know-how the Kingdom may be missing.

The potential prize is enormous: China now captures more Foreign Direct Investment in R&D than the U.S. the pharmaceuticals sector leads the way with investments, totaling $1.6bn between 2010 and 2015, according to FDI Markets.

The Kingdom has some advantages that could direct it down the R&D path. It has a young population, a growing base of science graduates and relatively high investment in health care, internet and other forms of infrastructure.

Tax incentives, and investment in education and information technology will only go so far, though. Above all, foreign investors need certainty over their intellectual property rights, including clearly defined and easily enforceable patent rights.

If this protection is strong, companies will be more likely to invest in local R&D facilities, or enter into partnerships with local companies. New products will be launched early into Saudi Arabia, as innovators will have no fear of their valuable IP rights being compromised.

Saudi Arabia has the intellectual property basics in place, in line with its World Trade Organization commitments. In fact, the U.S. Chamber of Commerce’s 2017 International IP index noted Saudi Arabia has a “strong patenting environment.”

Yet, recent developments risk derailing this progress. Just months after granting a patent for a new medicine to a company based in the United States, the Saudi Food and Drug Administration (SFDA) reneged on the deal.

The Saudi patent for Hepatitis drug Daclatasvir was granted by the Patent Office of the Gulf Cooperation council (which encompasses Saudi Arabia) to BMS in Dec 2016. Nevertheless, the SFDA granted marketing approval to a generic version manufactured Saudi company in May 2017, despite the BMS patent still being in force. Granting marketing approval to generic copies of the product in this way is arguably a breach of patent rights.

Likewise, the SDFA has also rececoontly allowed local companies to manufacture generic versions of another medicine developed by another U.S. biotech company — potentially contrary to World Trade Organization rules surrounding the protection of clinical test data, itself an important intellectual property right.

Saudi IP law allows for 5-year period in which generic companies may not use the clinical trial data submitted to regulatory authorities by originator drug manufacturers to gain marketing approval ("data exclusivity"). Gilead Sciences was granted marketing approval by the SFDA in 2014 for its product Sofosbuvir. The SFDA has subsequently granted marketing approval for generic versions of this product made by a Saudi and Egyptian company — within the 5-year data exclusivity window. This could be a breach of Saudi data exclusivity regulations.

Taken together, such actions send a hostile message to foreign investors that their valuable IP rights are not safe in Saudi Arabia. Such hostility will undermine Saudi’s economic ambition by scaring off valuable investment and skills.

They also act as an irritant to U.S.-Saudi relations, with the Trump administration indicating a higher prioritization of IP enforcement amongst its trading partners.

#### US Saudi Coop key to prevent nuclear proliferation

Emily B. Landau and Shimon Stein 18 [Landau is senior research associate at the Institute for National Security Studies, where she is also director of the Arms Control and Regional Security Project. Stein was Israel's ambassador to Germany from 2001 to 2007. Previously, he participated in the Arms Control and Regional Security working group, as well as negotiations of the Comprehensive Nuclear Test Ban Treaty, and served as head of the Regional Security, Arms Control, and Nonproliferation Department at the Israel Ministry of Foreign Affairs.], 12-4-2018, "Can the United States Prevent Saudi Arabia from Getting Nuclear Weapons?," National Interest, <https://nationalinterest.org/feature/can-united-states-prevent-saudi-arabia-getting-nuclear-weapons-37812> {OS}

The United States has always been very concerned about the proliferation risks involved in nuclear cooperation, and in 2008 it was able to achieve a memorandum of understanding with Saudi Arabia on nuclear energy cooperation whereby the latter pledged to acquire nuclear fuel from international markets, rather than producing it indigenously. But ten years later, it seems that Saudi Arabia no longer views itself as bound by that understanding. The current challenge for the United States is how to insist on what is known as a 123 agreement with Saudi Arabia, meaning that the agreement explicitly denies Saudi Arabia the right to work on sensitive nuclear technologies (enrichment capabilities and plutonium reprocessing), without driving it into the hands of other nuclear suppliers, such as Russia, China and South Korea, that may be less worried about ensuring these restrictions.¶ There are concerns that the Trump administration might be willing to concede to Saudi Arabia sensitive capabilities, and the fact that it is not willing to divulge information regarding the status of the negotiations does not bode well in this regard. The administration is keenly aware of the link to Iran’s nuclear posture, and that the Joint Comprehensive Plan of Action (JCPOA) set a very negative precedent for nuclear cooperation with other states when it legitimized Iran’s enrichment capabilities. While Iran must cap its stockpile of enriched uranium for the duration of the deal, it is allowed—under the explicit terms of the deal—to work on R&D into an entire range of advanced centrifuges. Iran has plans to install and operate these centrifuges eleven years into the deal. There is a real question of how these capabilities can be denied to states like Saudi Arabia who are in good standing with the NPT, whereas Iran—who blatantly violated the nonproliferation treaty—was granted the right to continue with these dangerous enrichment-related activities.

#### Saudi prolif draws in India and Pakistan – goes nuclear

Edelman 11—Fellow at the Center for Strategic and Budgetary Assessments. Former Undersecretary for Defense—AND—Andrew Krepinevich—President of the Center for Strategic and Budgetary Assessments—AND—Evan Montgomery—Research Fellow at the Center for Strategic and Budgetary Assessments (Eric, The dangers of a nuclear Iran, FA 90;1, http://www.csbaonline.org/wp-content/uploads/2010/12/2010.12.27-The-Dangers-of-a-Nuclear-Iran.pdf)

There is, however, at least one state that could receive significant outside support: Saudi Arabia. And if it did, proliferation could accelerate throughout the region. Iran and Saudi Arabia have long been geopolitical and ideological rivals. Riyadh would face tremendous pressure to respond in some form to a nuclear-armed Iran, not only to deter Iranian coercion and subversion but also to preserve its sense that Saudi Arabia is the leading nation in the Muslim world. The Saudi government is already pursuing a nuclear power capability, which could be the first step along a slow road to nuclear weapons development. And concerns persist that it might be able to accelerate its progress by exploiting its close ties to Pakistan. During the 1980s, in response to the use of missiles during the Iran-Iraq War and their growing proliferation throughout the region, Saudi Arabia acquired several dozen css-2 intermediate-range ballistic missiles from China. The Pakistani government reportedly brokered the deal, and it may have also oªered to sell Saudi Arabia nuclear warheads for the css-2s, which are not accurate enough to deliver conventional warheads eªectively. There are still rumors that Riyadh and Islamabad have had discussions involving nuclear weapons, nuclear technology, or security guarantees. This “Islamabad option” could develop in one of several different ways. Pakistan could sell operational nuclear weapons and delivery systems to Saudi Arabia, or it could provide the Saudis with the infrastructure, material, and technical support they need to produce nuclear weapons themselves within a matter of years, as opposed to a decade or longer. Not only has Pakistan provided such support in the past, but it is currently building two more heavy-water reactors for plutonium production and a second chemical reprocessing facility to extract plutonium from spent nuclear fuel. In other words, it might accumulate more fissile material than it needs to maintain even a substantially expanded arsenal of its own. Alternatively, Pakistan might oªer an extended deterrent guarantee to Saudi Arabia and deploy nuclear weapons, delivery systems, and troops on Saudi territory, a practice that the United States has employed for decades with its allies. This arrangement could be particularly appealing to both Saudi Arabia and Pakistan. It would allow the Saudis to argue that they are not violating the npt since they would not be acquiring their own nuclear weapons. And an extended deterrent from Pakistan might be preferable to one from the United States because stationing foreign Muslim forces on Saudi territory would not trigger the kind of popular opposition that would accompany the deployment of U.S. troops. Pakistan, for its part, would gain financial benefits and international clout by deploying nuclear weapons in Saudi Arabia, as well as strategic depth against its chief rival, India. The Islamabad option raises a host of difficult issues, perhaps the most worrisome being **how India would respond**. Would it **target Pakistan**’s weapons in Saudi Arabia with its own conventional or nuclear weapons? How would this expanded nuclear competition influence **stability** during a crisis in either the Middle East or South Asia? Regardless of India’s reaction, any decision by the Saudi government to seek out nuclear weapons, by whatever means, would be **highly destabilizing**. It would increase the incentives of other nations in the Middle East to pursue nuclear weapons of their own. And it could increase their ability to do so by eroding the remaining barriers to nuclear proliferation: each additional state that acquires nuclear weapons **weakens the nonprolif**eration **regime**, even if its particular method of acquisition only circumvents, rather than violates, the npt. Were Saudi Arabia to acquire nuclear weapons, the Middle East would count three nuclear-armed states, and perhaps more before long. It is unclear how such an n-player competition would unfold because most analyses of nuclear deterrence are based on the U.S.- Soviet rivalry during the Cold War. It seems likely, however, that the interaction among three or more nuclear-armed powers would be more prone to **miscalc**ulation and **escalation** than a bipolar competition. During the Cold War, the United States and the Soviet Union only needed to concern themselves with an attack from the other.Multipolar systems are generally considered to be less stable than bipolar systems because coalitions can shift quickly, upsetting the balance of power and creating incentives for an attack. More important, emerging nuclear powers in the Middle East might not take the costly steps necessary to preserve regional stability and avoid a nuclear exchange. For nuclear-armed states, **the bedrock of deterrence** is the knowledge that each side has a secure second-strike capability, so that no state can launch an attack with the expectation that it can wipe out its opponents’ forces and avoid a devastating retaliation. However, **emerging nuclear powers might not invest in** expensive but **survivable capabilities** such as hardened missile silos or submarinebased nuclear forces. Given this likely vulnerability, the close proximity of states in the Middle East, and the very short flight times of ballistic missiles in the region, any new nuclear powers might be compelled to “launch on warning” of an attack or even, during a crisis, to use their nuclear forces preemptively. Their governments might also delegate launch authority to lower-level commanders, heightening the possibility of miscalculation and escalation. Moreover, if early warning systems were not integrated into robust command-and-control systems, the risk of an unauthorized or accidental launch would increase further still. And without sophisticated early warning systems, a nuclear attack might be unattributable or attributed incorrectly. That is, assuming that the leadership of a targeted state survived a first strike, it might not be able to accurately determine which nation was responsible. And this uncertainty, when combined with the pressure to respond quickly, would create a significant risk that it would retaliate against the wrong party, potentially triggering **a regional nuclear war.** Most existing nuclear powers have taken steps to protect their nuclear weapons from unauthorized use: from closely screening key personnel to developing technical safety measures, such as permissive action links, which require special codes before the weapons can be armed. Yet there is no guarantee that emerging nuclear powers would be willing or able to implement these measures, creating a significant risk that their governments might lose control over the weapons or nuclear material and that nonstate actors could gain access to these items. Some states might seek to mitigate threats to their nuclear arsenals; for instance, they might hide their weapons. In that case, however, a single intelligence compromise could leave their weapons vulnerable to attack or theft.

#### Extinction – nuke war fallout creates Ice Age and mass starvation

Steven Starr 15. “Nuclear War: An Unrecognized Mass Extinction Event Waiting To Happen.” Ratical. March 2015. <https://ratical.org/radiation/NuclearExtinction/StevenStarr022815.html> TG

A war fought with 21st century strategic nuclear weapons would be more than just a great catastrophe in human history. If we allow it to happen, such a war would be a mass extinction event that [ends human history](https://ratical.org/radiation/NuclearExtinction/StarrNuclearWinterOct09.pdf). There is a profound difference between extinction and “an unprecedented disaster,” or even “the end of civilization,” because even after such an immense catastrophe, human life would go on.

But extinction, by definition, is an event of utter finality, and a nuclear war that could cause human extinction should really be considered as the ultimate criminal act. It certainly would be the crime to end all crimes.

The world’s leading climatologists now tell us that nuclear war threatens our continued existence as a species. Their studies predict that a large nuclear war, especially one fought with strategic nuclear weapons, would create a post-war environment in which for many years it would be too cold and dark to even grow food. Their findings make it clear that not only humans, but most large animals and many other forms of complex life would likely vanish forever in a nuclear darkness of our own making.

The environmental consequences of nuclear war would attack the ecological support systems of life at every level. Radioactive fallout produced not only by nuclear bombs, but also by the destruction of nuclear power plants and their spent fuel pools, would poison the biosphere. Millions of tons of smoke would act to [destroy Earth’s protective ozone layer](https://www2.ucar.edu/atmosnews/just-published/3995/nuclear-war-and-ultraviolet-radiation) and block most sunlight from reaching Earth’s surface, creating Ice Age weather conditions that would last for decades.

Yet the political and military leaders who control nuclear weapons strictly avoid any direct public discussion of the consequences of nuclear war. They do so by arguing that nuclear weapons are not intended to be used, but only to deter.

Remarkably, the leaders of the Nuclear Weapon States have chosen to ignore the authoritative, long-standing scientific research done by the climatologists, research that predicts virtually any nuclear war, fought with even a fraction of the operational and deployed nuclear arsenals, will leave the Earth essentially uninhabitable.

### 3

#### Despite growing rivalry, US-China economic interdependence strong now. Exchange of tech know-how, collaboration science research, and massive US-China STEM pipeline improving relations – but it can easily collapse.

Hass 8/12 [Ryan Hass (Senior Fellow - Foreign Policy, Center for East Asia Policy Studies, John L. Thornton China Center The Michael H. Armacost Chair Chen-Fu and Cecilia Yen Koo Chair in Taiwan Studies Nonresident Fellow, Paul Tsai China Center, Yale Law School), 8-12-2021, "The “new normal” in US-China relations: Hardening competition and deep interdependence," Brookings, <https://www.brookings.edu/blog/order-from-chaos/2021/08/12/the-new-normal-in-us-china-relations-hardening-competition-and-deep-interdependence/> // belle]

The intensification of U.S.-China competition has captured significant attention in recent years. American attitudes toward China have become more negative during this period, as anger has built over disruptions resulting from the COVID-19 pandemic, Beijing’s trampling of Hong Kong’s autonomy, human rights violations in Xinjiang, and job losses to China.

Amidst this focus on great power competition, two broader trends in the U.S.-China relationship have commanded relatively less attention. The first has been the widening gap in America’s and China’s overall national power relative to every other country in the world. The second has been the continuing thick interdependence between the United States and China, even amidst their growing rivalry. Even on economic issues, where rhetoric and actions around decoupling command the most attention, trade and investment data continue to point stubbornly in the direction of deep interdependence. These trends will impact how competition is conducted between the U.S. and China in the coming years.

SEPARATING FROM THE PACK

As America’s unipolarity in the international system has waned, there has been renewed focus on the role of major powers in the international system, including the European Union, Russia, India, and Japan. Each of these powers has a major population and substantial economic weight or military heft, but as my Brookings colleague Bruce Jones has observed, none have all. Only the United States and China possess all these attributes.

The U.S. and China are likely to continue amassing disproportionate weight in the international system going forward. Their growing role in the global economy is fueled largely by both countries’ technology sectors. These two countries have unique traits. These include world-class research expertise, deep capital pools, data abundance, and highly competitive innovation ecosystems. Both are benefitting disproportionately from a clustering effect around technology hubs. For example, of the roughly 4,500 artificial intelligence-involved companies in the world, about half operate in the U.S. and one-third operate in China. According to a widely cited study by PricewaterhouseCoopers, the U.S. and China are set to capture 70% of the $15.7 trillion windfall that AI is expected to add to the global economy by 2030.

The United States and China have been reinvesting their economic gains to varying degrees into research and development for new and emerging technologies that will continue to propel them forward. While it is not foregone that the U.S. and China will remain at the frontier of innovation indefinitely, it also is not clear which other countries might displace them or on what timeline. Overall, China’s economy likely will cool in the coming years relative to its blistering pace of growth in recent decades, but it is not likely to collapse.

DEEP INTERDEPENDENCE

At the same time, bilateral competition between the United States and China also is intensifying. Even so, rising bilateral friction has not – at least not yet – undone the deep interdependencies that have built up between the two powers over decades.

In the economic realm, trade and investment ties remain significant, even as both countries continue to take steps to limit vulnerabilities from the other. For example, Chinese regulators have been asserting greater control over when and where Chinese companies raise capital; Beijing’s recent probe of ride-hailing app Didi Chuxing provides but the latest example. China’s top leaders have been emphasizing the need for greater technology “self-sufficiency” and have been pouring billions of dollars of state capital into this drive. Meanwhile, U.S. officials have been seeking to limit American investments from going to Chinese companies linked to the military or surveillance sectors. The Security and Exchange Commission’s scrutiny of initial public offerings for Chinese companies and its focus on ensuring Chinese companies meet American accounting standards could result in some currently listed Chinese companies being removed from U.S. exchanges. Both countries have sought to disentangle supply chains around sensitive technologies with national security, and in the American case, human rights dimensions. U.S. officials have sought to raise awareness of the risks for American firms of doing business in Hong Kong and Xinjiang.

Even so, U.S.-China trade and investment ties remain robust. In 2020, China was America’s largest goods trading partner, third largest export market, and largest source of imports. Exports to China supported an estimated 1.2 million jobs in the United States in 2019. Most U.S. companies operating in China report being committed to the China market for the long term.

U.S. investment firms have been increasing their positions in China, following a global trend. BlackRock, J.P. Morgan Chase, Goldman Sachs, and Morgan Stanley have all increased their exposure in China, matching similar efforts by UBS, Nomura Holdings, Credit Suisse, and AXA. The Rhodium Group estimates that U.S. investors held $1.1 trillion in equities issued by Chinese companies, and that there was as much as $3.3 trillion in U.S.-China two-way equity and bond holdings at the end of 2020.

One leg of the U.S.-China economic relationship that has atrophied in recent years has been China’s flow of investment into the United States. This has largely been a product of tightened capital controls in China, growing Chinese government scrutiny of its companies’ offshore investments, and enhanced U.S. screening of Chinese investments for national security concerns.

Another area of U.S.-China interdependence has been knowledge production. As U.S.-China technology expert Matt Sheehan has observed, “With the rise of Chinese talent and capital, the exchange of technological know-how between the United States and China now takes place among private businesses and between individuals.” Leading technology companies in both countries have been building research centers in the other. Alibaba, Baidu, and Tencent have all opened research centers in the United States, just as Apple, Microsoft, Tesla, and other major American technology companies rely upon engineering talent in China.

In science collaboration, The Nature Index ranks the joint research between the two countries as the world’s most academically fertile. U.S.-China scientific collaboration grew by more than 10% each year on average between 2015 and 2019. Even following the global spread of COVID-19, American and Chinese experts collaborated more during the past year than over the previous five years combined. This has led to over 100 co-authored articles in leading scientific journals and frequent joint appearances in science-focused workshops and webinars.

China also is the largest source of international students in the United States. In the 2019-20 year, there were over 370,000 Chinese students in the U.S., representing 34% of international students in colleges and universities. Up until now, many of the top Chinese students have stayed in the United States following graduation and contributed to America’s scientific, technological, and economic development. It remains to be seen whether this trend will continue.

#### Plan hurts US-China relations – means China goes back on it’s promise to regulate IP violations and draws in U.S. crackdown.

Shape 2/19 [Steven M. Shape; registered patent attorney and electrical engineer who has represented preeminent technology companies in complex, high-stakes Intellectual Property litigation; 2-19-2021, "IP Law Looms Large Over U.S.-China Relations," No Publication, [https://www.mondaq.com/trademark/1038030/ip-law-looms-large-over-us-china-relations //](https://www.mondaq.com/trademark/1038030/ip-law-looms-large-over-us-china-relations%20//) belle]

The U.S. and China were indisputably the two largest parties in the global trade war that consumed much of the last several years. Particularly between early 2018 and late 2019, it seemed as if one could hardly go a week, if that, without hearing something about tariffs, exports, imports, steel, soybeans, then-President Donald Trump, President Xi Jinping and the like. Accusations regarding violations of Intellectual Property law were among the biggest flashpoints, and ultimately, China announced new regulations concerning IP protection in November 2019 as a conciliatory move. Nearly 14 months later, newly inaugurated President Joe Biden has yet to fully clarify his administration's stance toward China. However, it is inevitable that IP rights and their preservation will factor into negotiations between the two economic giants. A look back at the proposed reforms (and their effects) Reports from CNN at the time claimed that China's prospective IP law reforms focused on making the penalties for IP infringement more strict. It would also put the government's increasingly modernized tech infrastructure to use in the discovery and prosecution of such crimes. Beyond that, the proposal carried few specifics. Although it is unclear whether Beijing's gambit worked as the deciding factor for Washington, it certainly did not fail. The two nations agreed in principle on "Phase One" of a new trade agreement December 12, 2019, per The Washington Post, and formalized the deal about a month later. The U.S. pledged not to impose further tariffs and roll back existing import taxes in return for China's IP reforms and agreement to buy American goods. In the 14 months that followed, so much changed. COVID-19's devastating impact on human life and the global economy made it difficult to gauge the positive effects of the tariff relief or IP reform. A report by the South China Morning Post found that China did not meet its import goal for 2020, with some analysts concluding the Phase One target was unrealistic. On the IP front, a Hong Kong news provider noted that Beijing had drafted some specific guidance to protect pharmaceutical patents, trade secrets and copyrights, but it was unclear how well they were being implemented. Additionally, a January 2021 report by the U.S. Patent and Trademark Office (USPTO) found that Chinese policies which offered subsidies for certain trademark and patent applications helped motivate a glut of fraudulent and bad-faith filings in the last few years. The bigger picture of China's IP law A casual observer or someone just learning of this issue might assume that until recently, China had little or no IP laws on the books. Of course, that is not true. However, there are many factors at play complicating the matter of Chinese IP protection policies. As noted in Harvard Business Review, China is quite strict in certain aspects of IP protection: Beijing allows (and encourages) all businesses to impose non-compete agreements to help protect trade secrets and other IP assets. In addition, according to the National Law Review, two new measures were passed in 2020 specifically to combat bad-faith trademark applications, in addition to the other new guidelines being imposed by the China National Intellectual Property Administration (CNIPA) in accordance with the Phase One agreement. All that said, it would be inaccurate to describe Chinese IP law as thoroughly protective for either domestic or foreign innovators. Along with the aforementioned trademark and patent subsidies, considerable controversy stems from "forced technology transfer" policies. According to the University of Oxford's Business Law Blog, foreign companies looking to do business in China must turn over their technology to local firms or be denied the right to operate within China. This effectively means turning over the blueprints (literal or otherwise) to such technology - which is all but equivalent to surrendering the IP. It creates considerable opportunities for infringement, fraud and corruption. Also, in disputes with foreign firms, some local IP courts still markedly favor domestic organizations. Chinese government representatives often resent such accusations of bias or corruption. In their view, the deals represent friendly agreements between businesses, and courts' decisions are not politically motivated. While Oxford noted that FTT guidelines are not as pervasive now as they were a few years ago, they have yet to disappear altogether. The Biden approach: Not dissimilar, but multilateral If the new U.S. Secretary of the Treasury, Janet Yellen, is to be believed, the Biden administration will not tolerate any signs of lapses in China's IP protections. "We need to take on China's abusive, unfair and illegal practices," Yellen said to the Senate Finance Committee at her confirmation hearings. As reported by Bloomberg, she added, "[China has] been stealing intellectual property and engaging practices that give it an unfair technological advantage, including forced technology transfers. And these . are practices that we're prepared to use the full array of tools to address." Biden had expressed similar sentiments during a December interview with The New York Times. However, he also said that they would work with ally nations to "develop a coherent strategy" for addressing cases of IP infringement and other issues - a stance Yellen echoed before the Senate - instead of taking China on in a unilateral and bellicose manner. This more nuanced approach could yield greater cooperation from Beijing and help repair U.S.-China trade relations, but we will likely not know one way or the other for some time. As we saw with the trade war, conflicts between the U.S. and China can quickly escalate and have ripple effects throughout the world. It would thus be wise for all organizations doing business in China to keep themselves abreast of the country's evolving IP regulations and work with a reliable IP services provider to help establish strong protection for their intangible assets.

#### AI destabilizing but dialogues key to peaceful AI – anything else risks escalation to nuclear war.

Haotian ’21 [Qi Haotian (assistant professor in the School of International Studies at Peking University, where he teaches courses on international security, military science, international public policy, and game theory. He is also secretary general of the Institute for Global Cooperation and Understanding at Peking University. His research interests include technological transitions and world politics, international security and conflict management, and methodology and philosophy of social science) April 2021, " US AND CHINESE ARTIFICIAL INTELLIGENCE CAPABILITIES," United States Institute of Peace, <https://www.usip.org/sites/default/files/2021-04/pw_172-enhancing_us-china_strategic_stability_in_an_era_of_strategic_competition_us_and_chinese_perspectives.pdf> // belle]

The rapid decision-making features of AI can be yet another destabilizing factor. AI’s advantage in speed can be detrimental if it unnecessarily accelerates the escalation of conflicts from crisis to war, or even from conventional war to nuclear confrontation. Furthermore, improvements in ISR capabilities can narrow the window for diplomatic mediation and reduce the time available for crisis management. AI, however, can also have a stabilizing effect through the enhancement of crisis and battlefield simulations. AI-enabled war games now involve more complex multirole interactions with variables and parameters that can be adjusted to explore how dynamic interactions of various factors such as weapons and allies can influence the development of a complex strategic environment. This employment of evolutionary learning can help stabilize strategic relations and mutual deterrence by demonstrating to decision-makers the consequences of certain behaviors and actions. CONCRETE STEPS TO TAKE IN THE NEAR TERM As the United States and China pursue the incorporation of AI into their military forces, they have a shared interest in avoiding both intended and unintended escalations caused by AI-enabled systems. The two countries should establish systematic confidence-building measures and develop a shared understanding of what a future AI-enabled military transformation might entail as well as its strategic impacts. While it may be difficult for the United States and China to agree on certain questions—such as how to tailor defense tools for AI systems that span multiple military domains—the two sides can still work together to find common ground and jointly explore applications for AI to strengthen strategic stability. Although dialogue exists between industry experts, academics, and think tanks in both countries, more direct exchanges among diplomats, military leaders, AI researchers, and multidisciplinary scholars is crucial for fostering mutual understanding and opening avenues for cooperation. Such dialogue can occur in parallel with existing multilateral efforts, such as the Group of Governmental Experts on lethal autonomous weapon systems, held through the United Nations Convention on Certain Conventional Weapons. The two countries should hold dialogues examining how existing international law can constrain the use of AI for military purposes and the implications of private sector development of dual-use technology. They should also address the risks that the weaponization of technology poses to nuclear stability and develop practical measures for technological management. Moreover, the two sides should establish a systematic dialogue mechanism to exchange views on emerging concerns, such as fail-safe mechanisms and how to reduce the risk of crises and conflict escalation due to AI-driven cyberattacks, especially on strategic assets. In addition to the above near-term measures, there are also some long-term steps that, although not feasible at present, would be beneficial and should be taken when circumstances allow. For example, China and the United States should increase transparency and enhance mutual understanding by sharing their respective AI strategies, doctrines, and other related documents. The two should also set limitations on the deployment of AI weapon systems in sensitive areas and exercise restraint in employing AI in strategic command and control systems, particularly with respect to nuclear weapons. Furthermore, they should formulate bilateral or multilateral agreements that prohibit attacks on nuclear C4ISR systems. Finally, they should work to prevent the use of autonomous weapons against other countries’ strategic assets, including missile submarines, intercontinental ballistic missiles, and second-strike countermeasure systems.

#### SCS conflict draws in NATO and goes nuclear

Polina **Tikhonova 15**. Writer, journalist and a certified translator. Over the past 7 years, she has worked for a wide variety of top European, American, Russian, and Ukrainian media outlets. Polina holds a Master's Degree in English Philology from the University of Oxford and a Bachelor's Degree in Journalism from the Saint Petersburg State University, 11-28-2015, "US Faces Nuclear War Threat Over South China Sea," ValueWalk, http://www.valuewalk.com/2015/11/us-nuclear-war-south-china-sea/

China is willing to start a nuclear war with the United States over the South China Sea, according to a Chinese professor. Beijing’s rhetoric after an incident with a U.S. warship sailed to the South China Sea suggests that Chinese decision-makers could resort to more “concrete and forceful measures” to counter the U.S. Navy, according to Zhang Baohui, Professor of Political Science and Director of the Centre for Asian Pacific Studies at Lingnan University in Hong Kong. “If so, a face-off between the two navies becomes inevitable. Even worse, the face-off may trigger an escalation towards military conflicts,” the professor wrote in a piece for RSIS Commentary. But, according to Baohui, the U.S. military is “oblivious” to this scenario, since Washington decision-makers think America’s conventional military superiority discourages China from responding to such “provocations” in the South China Sea militarily. However, this “U.S. expectation is flawed, as China is a major nuclear power,” the professor wrote. “When cornered, nuclear-armed states can threaten asymmetric escalation to deter an adversary from harming its key interests,” he added. Baohui then refers to the military parade in Beijing that took place on Sept. 3 and revealed that China’s new generation of tactical missiles – such as the DF-26 – are capable of being armed with nuclear warheads. Moreover, according to the latest reports, China’s air-launched long-range cruise missiles can also carry tactical nuclear warheads. U.S. could provoke nuclear war with China And while the U.S. does not have its core interests in the South China Sea, the disputed islands present China’s strategic interests, which is why this kind of asymmetry in stakes would certainly give Beijing an advantage in “the balance of resolve” over Washington, according to the professor. And if the South China Sea situation escalates and starts spiraling into a nuclear confrontation between the U.S. and China, Washington will face a choice of either backing down first or fighting a nuclear-armed power and the world’s largest military force with a strength of approximately 2.285 million personnel. “Neither option is attractive and both exact high costs, either in reputation or human lives, for the U.S.,” Baohui wrote. So it would be unwise for the U.S. to further provoke China in the disputed area, since China’s willingness to defend its interests, reputation and deterrence credibility could easily escalate the conflict into a military confrontation that would ultimately harm U.S. interests, according to the professor. China will join Russia in nuclear war with NATO With NATO member state Turkey downing a Russian jet in its airspace, there is already a high risk of military confrontation in the world. And with China being so close and allied with Russia, Beijing decision-makers could see the incident with the Russian warplane as an opportunity to avenge the West for the South China Sea provocations. The Turkish military said it had shot down a Russian jet on Tuesday, triggering a furious response from Moscow and escalating the already hot tensions in the Syrian conflict. With Russian President Vladimir Putin warning the West of “serious consequences,” analysts believe the Kremlin is willing to unleash a nuclear war over the incident. Despite the fact that Turkey is backed by NATO’s 5th Article, which states that an attack on one Ally shall be considered an attack on all NATO members, the chances that Putin will start a nuclear war over the incident with the Russian jet are very “likely,” according to Pavel Felgengauer, Russia’s most respected military analyst. Felgengauer said Turkey wants to protect a zone in northern Syria controlled by the Turkmens, Ankara’s allies, while the downing of the Russian warplane in the region must prompt the Kremlin to either accept the zone or “start a war with Turkey,” which means starting an all-out war with NATO. And the only way Russia could win a war against NATO is by going nuclear, Felgengauer said. “It is most likely that it will be war,” said Felgenhauer, as reported by Mirror. “In other words, more fights will follow when Russian planes attack Turkish aircraft in order to protect our [Russia’s] bombers. It is possible that there will be fights between the Russian and Turkish navies at sea.” U.S. provokes China to respond militarily The U.S. recently asserted its freedom of navigation in the disputed South China Sea. On Oct. 27, the USS Lassen traveled inside the 12-mile nautical zone around Subi Reef in the Spratly Islands archipelago. This reef is one of seven reefs China has artificially built in order to claim its sovereignty over the Spratly Islands and the sea around it. Even though Beijing did not take immediate action to counter the U.S. vessel, such further “provocations” could seriously destabilize the peace and stability of the whole region, according to Baohui. “They could touch off an unintended escalation and push the two countries towards military conflict. The logic is quite obvious,” the professor wrote. The U.S. Navy’s further operations in the South China Sea could thus corner Beijing and force China to respond militarily. After all, China cannot risk its national interests and power reputation, according to the Chinese professor. Shortly after the incident, Vice-Admiral Yi Xiaoguang, the Chinese People’s Liberation Army’s (PLA) deputy chief of staff, warned that China “will use all means necessary to defend its sovereignty” if the U.S. conducts similar provocations. China: we can seize more islands in the South China Sea China recently said it can use military force to kick out nations illegally to seize more islands in the disputed South China Sea, but China is now showing restraint, as reported by ValueWalk last week. “The Chinese government has the right and the ability to recover the islands and reefs illegally occupied by neighboring countries,” Vice Foreign Minister Liu Zhenmin said, speaking about the disputed artificial islands but not naming any particular country. China, Vietnam, the Philippines, Malaysia, Taiwan and Brunei all have sovereignty claims in the South China Sea. All but Brunei have military fortifications in the disputed area, which raises concerns about a high risk of military confrontation in the region. “But we haven’t done this [seized the islands]. We have maintained great restraint with the aim to preserve peace and stability in the South China Sea,” Liu said. If China gains complete control over the Spratly Islands, it gets the key to controlling waters through which $5 trillion in trade passes every year, mostly to and from China. The professor concluded that reckless actions by one or both parties may well turn mistrust into “bloody military conflicts.” But nobody, especially countries in the region, are interested in such a scenario. “If the US claims to be the defender of world peace and regional stability, it must do everything to avoid this scenario through unintended escalations,” Baohui wrote

#### Nuke war causes extinction – Ice Age, famines, and war won’t stay limited

Edwards 17 [Paul N. Edwards, CISAC’s William J. Perry Fellow in International Security at Stanford’s Freeman Spogli Institute for International Studies. Being interviewed by EarthSky. How nuclear war would affect Earth’s climate. September 8, 2017. earthsky.org/human-world/how-nuclear-war-would-affect-earths-climate] Note, we are only reading parts of the interview that are directly from Paul Edwards -- MMG

In the nuclear conversation, what are we not talking about that we should be?

We are not talking enough about the climatic effects of nuclear war. The “nuclear winter” theory of the mid-1980s played a significant role in the arms reductions of that period. But with the collapse of the Soviet Union and the reduction of U.S. and Russian nuclear arsenals, this aspect of nuclear war has faded from view. That’s not good. In the mid-2000s, climate scientists such as Alan Robock (Rutgers) took another look at nuclear winter theory. This time around, they used much-improved and much more detailed climate models than those available 20 years earlier. They also tested the potential effects of smaller nuclear exchanges. The result: an exchange involving just 50 nuclear weapons — the kind of thing we might see in an India-Pakistan war, for example — could loft 5 billion kilograms of smoke, soot and dust high into the stratosphere. That’s enough to cool the entire planet by about 2 degrees Fahrenheit (1.25 degrees Celsius) — about where we were during the Little Ice Age of the 17th century. Growing seasons could be shortened enough to create really significant food shortages. So the climatic effects of even a relatively small nuclear war would be planet-wide. What about a larger-scale conflict? A U.S.-Russia war currently seems unlikely, but if it were to occur, hundreds or even thousands of nuclear weapons might be launched. The climatic consequences would be catastrophic: global average temperatures would drop as much as 12 degrees Fahrenheit (7 degrees Celsius) for up to several years — temperatures last seen during the great ice ages. Meanwhile, smoke and dust circulating in the stratosphere would darken the atmosphere enough to inhibit photosynthesis, causing disastrous crop failures, widespread famine and massive ecological disruption. The effect would be similar to that of the giant meteor believed to be responsible for the extinction of the dinosaurs. This time, we would be the dinosaurs. Many people are concerned about North Korea’s advancing missile capabilities. Is nuclear war likely in your opinion? At this writing, I think we are closer to a nuclear war than we have been since the early 1960s. In the North Korea case, both Kim Jong-un and President Trump are bullies inclined to escalate confrontations. President Trump lacks impulse control, and there are precious few checks on his ability to initiate a nuclear strike. We have to hope that our generals, both inside and outside the White House, can rein him in. North Korea would most certainly “lose” a nuclear war with the United States. But many millions would die, including hundreds of thousands of Americans currently living in South Korea and Japan (probable North Korean targets). Such vast damage would be wrought in Korea, Japan and Pacific island territories (such as Guam) that any “victory” wouldn’t deserve the name. Not only would that region be left with horrible suffering amongst the survivors; it would also immediately face famine and rampant disease. Radioactive fallout from such a war would spread around the world, including to the U.S. It has been more than 70 years since the last time a nuclear bomb was used in warfare. What would be the effects on the environment and on human health today? To my knowledge, most of the changes in nuclear weapons technology since the 1950s have focused on making them smaller and lighter, and making delivery systems more accurate, rather than on changing their effects on the environment or on human health. So-called “battlefield” weapons with lower explosive yields are part of some arsenals now — but it’s quite unlikely that any exchange between two nuclear powers would stay limited to these smaller, less destructive bombs.

### 4

#### The member nations of the World Trade Organization except for the People’s Republic of China ought to reduce intellectual property protections for medicines.

Solves 99% of case – other countries can do innovating esp cuz the majority of their impact evidence is contextual to the US

#### China is geared up to become Biotech lead.

CAS 7/20 [(CAS, a division of the American Chemical Society, partners with R&D organizations globally to provide actionable scientific insights that help them plan, innovate, protect their innovations, and predict how new markets and opportunities will evolve. Leverage our unparalleled content, specialized technology, and unmatched human expertise to customize solutions that will give your organization an information advantage.), “3 reasons biotech is booming in China: How can you capitalize on the growth?”, <https://www.cas.org/resources/blog/3-reasons-biotech-booming-china-how-can-you-capitalize-growth>, July 20, 2021] TDI

3 reasons biotech is booming in China: How can you capitalize on the growth?

This year marks the 40th anniversary of China's Reform and Opening Up policy, which was established in 1978. China’s embrace of economic reform and free-market principles has propelled unprecedented business and industry growth since that time, firmly securing its position as the world's second largest economy.

In light of the rise of China's economy, a number of global biotech companies—such as Denmark's Novo Nordisk—began to build an early presence there. Building on this foundation, within the past few years biotech has started to grow at an explosive rate in China. In fact, China's biotech industry is anticipated to exceed four percent of GDP by 2020.

Why is biotech betting big on China? Here, we explore three factors driving the country's recent biotech boom and what it means for those looking to capitalize on this growth

National innovation strategy attracting top talent

Ten years ago, a biotech specialist from China may have needed to look for international career opportunities. But today, thriving government programs and a surge of entrepreneurial investments have created more incentive than ever for top talent to establish careers in China.

The Chinese government has made it a priority to transform the country from a manufacturing to an innovation-driven economy by developing five-year national strategic plans that set economic and growth goals. The most recent plan, which put special focus on the biotech industry, outlines the development of 10 to 20 biomedicine life-science parks with an output surpassing $1.5 billion by 2020. This is in addition to the 100 life-science parks already established throughout the country, as well as $100 billion of government investments dedicated to innovation.

The government's Thousand Talents Plan—which encourages Chinese scientists, academics and entrepreneurs living abroad to return to China—has recruited 7,000 experts since 2008, with 1,400 of them recruited specifically by the life sciences committee for biotech.

The government has also heavily invested to enhance the intellectual property environment in China. The State Intellectual Property Office (SIPO), China's patent office, has received additional resources to address the growing volume of patent applications and has implemented an expedited examination process. In 2007, SIPO had 2,672 examiners dedicated to examining patents; by 2017, that number had grown to more than 11,500 (SIPO Annual Reports, 2007 and 2017). SIPO also offers attractive benefits to high-demand patent applications, such as covering filing fees and providing tax incentives and monetary rewards.

Beyond the government, Chinese venture capital and private equity funds raised $45 billion for life sciences in two and a half years, which contributed to the development of China's flourishing biotech start-up culture.

As a result of all of these factors driving innovation, patent applications have soared—more than 50,000 biotech patents were submitted in 2017, up from less than 20,000 in 2010. Some fields leading this growth are natural products, biologics and bioinformatics.

Chinese biotech patent applications

Chart, histogram

Description automatically generated

Growth in Chinese biotech patent application volume since 2000

Demand for new treatments creating an attractive market

According to the United Nations, China's population is ageing more rapidly than that of any other country. This fact, along with changing lifestyles and environmental concerns, is driving increasing rates of critical and chronic illness. For example, 36 percent of the world's lung cancer diagnoses come from China, yet the five-year lung cancer survival rate is currently 17 percent lower than the global average.

This market landscape creates surging demand for pioneering medical treatments, and investors are turning to Chinese scientists to develop solutions that could not only be sold in China, but enhance treatment worldwide.

Major pharmaceutical companies in the west are taking note as well and considering ways to bolster their presence in China as domestic investors gain market share, with many global leaders opening research centers in China and others coordinating research cooperation pacts with Chinese institutions.

Globalized approach to regulations easing market entry

In March 2018, the China Food and Drug Administration (CFDA) announced it will merge with other administrative bodies to form a national market supervision administration. As part of the restructuring, a new entity is being created that will focus primarily on medical technologies. This is expected to bring increased efficiency and consistency to regulation of pharmaceuticals and medical devices in China.

Further, in April 2018, the government launched initiatives to support generic drug research and development as a means to foster innovation and provide more accessible treatment options to Chinese patients. They include providing research grants, as well as expediting the review and approval process of generic drugs based on name-brand drugs with compulsory licenses.

These efforts are the latest in a series of reforms aimed at streamlining China's regulatory process to align with international standards. Last August, for example, the CFDA announced it had joined ICH, a global federation of medicines regulators that seeks to harmonize health technology regulations. It also announced it would allow data from clinical trials conducted outside of China to be admitted as part of regulatory filings, a move that fast-tracks new treatments from the lab to the clinic. Overall, these efforts to streamline China's regulatory processes and align them more closely with those outside of China eases entry into the Chinese market for domestic as well as foreign investors and also make it easier for Chinese firms to market their innovations internationally.

These developments, along with the impressive growth rate, clearly demonstrate that China is quickly establishing itself as the eastern hub for biotechnology innovation. Organizations looking for growth opportunities in biotech should certainly have China on their radar. However, a successful strategy for growth within any industry sector in China requires a deep understanding of the market and intellectual property landscape, as well as governmental and cultural factors.

#### **US biotech stocks down now.**

Gatlin 4/9 [(Allison, Author at Investor's Business Daily “Biotech Stocks Hit A Snag — Why Experts Say The Heyday Isn't Over“, Investor's Business Daily, ), 4-9-2021, https://www.investors.com/news/technology/biotech-stocks-why-they-have-skidded-why-experts-are-not-worried/)] TDI

Regulatory and drug-pricing worries have knocked biotech stocks off their Covid pedestal. After seeing massive gains in 2020 amid the Covid-19 vaccine heyday and hitting a high point in early February, biotech stocks have collectively pulled back 21%. Investors are uneasy after the Federal Trade Commission formed a working group to more deeply scrutinize pharmaceutical mergers. Meanwhile, the Food and Drug Administration has delayed a number of drug approvals, and Sen. Bernie Sanders, I-Vt., introduced sweeping drug-pricing legislation. All of this comes amid a backdrop of rising interest rates.

#### CP solves innovation in every other country BUT reversing Chinese lead is key. They can’t get out of this otherwise the aff has zero solvency.

#### Chinese tech leadership leads to nuclear war

Kroenig 18 (Matthew, Deputy Director for Strategy, Scowcroft Center for Strategy and Security Associate Professor of Government and Foreign Service, Georgetown University) “Will disruptive technology cause nuclear war?” *BAS*, Nov 12, 2018, <https://thebulletin.org/2018/11/will-disruptive-technology-cause-nuclear-war>

Recently, analysts have argued that emerging technologies with military applications may undermine nuclear stability (see here, here, and here), but the logic of these arguments is debatable and overlooks a more straightforward reason why new technology might cause nuclear conflict: by upending the existing balance of power among nuclear-armed states. This latter concern is more probable and dangerous and demands an immediate policy response. For more than 70 years, the world has avoided major power conflict, and many attribute this era of peace to nuclear weapons. In situations of mutually assured destruction (MAD), neither side has an incentive to start a conflict because doing so will only result in its own annihilation. The key to this model of deterrence is the maintenance of secure second-strike capabilities—the ability to absorb an enemy nuclear attack and respond with a devastating counterattack. Recently analysts have begun to worry, however, that new strategic military technologies may make it possible for a state to conduct a successful first strike on an enemy. For example, Chinese colleagues have complained to me in Track II dialogues that the United States may decide to launch a sophisticated cyberattack against Chinese nuclear command and control, essentially turning off China’s nuclear forces. Then, Washington will follow up with a massive strike with conventional cruise and hypersonic missiles to destroy China’s nuclear weapons. Finally, if any Chinese forces happen to survive, the United States can simply mop up China’s ragged retaliatory strike with advanced missile defenses. China will be disarmed and US nuclear weapons will still be sitting on the shelf, untouched. If the United States, or any other state acquires such a first-strike capability, then the logic of MAD would be undermined. Washington may be tempted to launch a nuclear first strike. Or China may choose instead to use its nuclear weapons early in a conflict before they can be wiped out—the so-called “use ‘em or lose ‘em” problem. According to this logic, therefore, the appropriate policy response would be to ban outright or control any new weapon systems that might threaten second-strike capabilities. This way of thinking about new technology and stability, however, is open to question. Would any US president truly decide to launch a massive, bolt-out-of-the-blue nuclear attack because he or she thought s/he could get away with it? And why does it make sense for the country in the inferior position, in this case China, to intentionally start a nuclear war that it will almost certainly lose? More important, this conceptualization of how new technology affects stability is too narrow, focused exclusively on how new military technologies might be used against nuclear forces directly. Rather, we should think more broadly about how new technology might affect global politics, and, for this, it is helpful to turn to scholarly international relations theory. The dominant theory of the causes of war in the academy is the “bargaining model of war.” This theory identifies rapid shifts in the balance of power as a primary cause of conflict. International politics often presents states with conflicts that they can settle through peaceful bargaining, but when bargaining breaks down, war results. Shifts in the balance of power are problematic because they undermine effective bargaining. After all, why agree to a deal today if your bargaining position will be stronger tomorrow? And, a clear understanding of the military balance of power can contribute to peace. (Why start a war you are likely to lose?) But shifts in the balance of power muddy understandings of which states have the advantage. You may see where this is going. New technologies threaten to create potentially destabilizing shifts in the balance of power. For decades, stability in Europe and Asia has been supported by US military power. In recent years, however, the balance of power in Asia has begun to shift, as China has increased its military capabilities. Already, Beijing has become more assertive in the region, claiming contested territory in the South China Sea. And the results of Russia’s military modernization have been on full display in its ongoing intervention in Ukraine. Moreover, China may have the lead over the United States in emerging technologies that could be decisive for the future of military acquisitions and warfare, including 3D printing, hypersonic missiles, quantum computing, 5G wireless connectivity, and artificial intelligence (AI). And Russian President Vladimir Putin is building new unmanned vehicles while ominously declaring, “Whoever leads in AI will rule the world.” If China or Russia are able to incorporate new technologies into their militaries before the United States, then this could lead to the kind of rapid shift in the balance of power that often causes war. If Beijing believes emerging technologies provide it with a newfound, local military advantage over the United States, for example, it may be more willing than previously to initiate conflict over Taiwan. And if Putin thinks new tech has strengthened his hand, he may be more tempted to launch a Ukraine-style invasion of a NATO member. Either scenario could bring these nuclear powers into direct conflict with the United States, and once nuclear armed states are at war, there is an inherent risk of nuclear conflict through limited nuclear war strategies, nuclear brinkmanship, or simple accident or inadvertent escalation. This framing of the problem leads to a different set of policy implications. The concern is not simply technologies that threaten to undermine nuclear second-strike capabilities directly, but, rather, any technologies that can result in a meaningful shift in the broader balance of power. And the solution is not to preserve second-strike capabilities, but to preserve prevailing power balances more broadly. When it comes to new technology, this means that the United States should seek to maintain an innovation edge. Washington should also work with other states, including its nuclear-armed rivals, to develop a new set of arms control and nonproliferation agreements and export controls to deny these newer and potentially destabilizing technologies to potentially hostile states. These are no easy tasks, but the consequences of Washington losing the race for technological superiority to its autocratic challengers just might mean nuclear Armageddon.

## Case

### U/V

#### 1AR theory is skewed towards the aff – a) the 2NR must cover substance and over-cover theory, since they get the collapse and persuasive spin advantage of the 3min 2AR, b) their responses to my counter interp will be new, which means 1AR theory necessitates intervention. Implications – a) reject 1AR theory since it can’t be a legitimate check for abuse, b) drop the arg to minimize the chance the round is decided unfairly, c) use reasonability with a bar of defense or the aff always wins since the 2AR can line by line the whole 2NR without winning real abuse

Lbl

### 1NC – Adv

#### No disease extinction – their card pre dates COVID which should have triggered their impacts, also it doesn’t get to extinction

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

#### Their food insecurity impact is in the context of a nuclear winter not normal food insecurity and the countries that matter for their impact are resilient and institutional responses prevent escalation

Sarah **Cliffe 16**, Director of the Center on International Cooperation at New York University, 3/29/16, “Food Security, Nutrition, and Peace,” http://cic.nyu.edu/news\_commentary/food-security-nutrition-and-peace

However, current research **does not** yet indicate a clear link between climate change, food insecurity and conflict, except perhaps where rapidly deteriorating water availability cuts across existing tensions and weak institutions. But a series of interlinked problems – changing global patterns of consumption of energy and scarce resources, increasing demands for food imports (which draw on land, water, and energy inputs) can create pressure on fragile situations.

Food security – and food prices – are a highly political issue, being a very immediate and visible source of popular welfare or popular uncertainty. But their **link to conflict** (and the wider links between climate change and conflict) is indirect rather than direct.

What makes some countries more resilient than others?

**Many** countries face food price or natural resource shocks **without falling into conflict**. Essentially, the two important factors in determining their resilience are: First, whether food insecurity is combined with **other stresses** – issues such as unemployment, but most fundamentally issues such as political exclusion or human rights abuses. We sometimes read nowadays that the 2006-2009 drought was a factor in the Syrian conflict, by driving rural-urban migration that caused societal stresses. It may of course have been one factor amongst many but it would be **too simplistic** to suggest that it was the primary driver of the Syrian conflict. Second, whether countries have strong enough institutions to fulfill a social compact with their citizens, providing help quickly to citizens affected by food insecurity, with or without international assistance. During the 2007-2008 food crisis, developing countries with low institutional strength experienced more food price protests than those with higher institutional strengths, and more than half these protests turned violent. This for example, is the difference in the events in Haiti versus those in **Mexico or the Philippines** where far greater institutional strength existed to deal with the food price shocks and **protests did not spur deteriorating national security** or widespread violence.

**No impact to food insecurity – best models.**

**Buhaug et al, PhDs, ’15** (Halvard, PoliSci@NTNU, Tor A Benjaminsen, HumanGeo@Roskilde, Espen Sjaastad, ResourceEcon@NMBU, and Ole Magnus Theisen, PoliSci@NTNU, “Climate variability, food production shocks, and violent conflict in Sub-Saharan Africa,” Environmental Research Letters, Volume 10, Number 12) BW

**Across all models,** we find relatively **weak and insignificant effects** for domestic food production and we also note that the sign of the coefficients shifts between outcome types. In this sense, table 1 implicitly contrasts both claims that political violence is more prevalent when basic needs are met (Salehyan and Hendrix 2014) and claims that agricultural income shocks increase civil conflict risk (von Uexkull 2014). The results are consistent with Koubi et al (2012) and van Weezel (2015), however, who conclude that rainfall—a significant determinant of yields in SSA—has little impact on conflict either directly or through economic performance. The covariate that best and most consistently explains temporal variation in political violence is the time-lagged conflict incidence indicator. Models 1–2 show that a new civil conflict is unlikely to break out if another one is already ongoing in the same country whereas Models 3–6, which capture the occurrence of less organized conflict, demonstrate that violence begets violence. Coups d’état (Models 7–8) exhibit a comparatively weak temporal correlation pattern in our data and are generally regarded as a highly unpredictable phenomenon (Luttwak 1979). Next, we estimate the same set of models on a subsample of 14 countries in SSA where rainfall has a large and significant positive effect on food production (figure 2(b); see supplementary information, section B for details). To better capture the influence of climate variability and reduce concerns with endogeneity, we further replace the standard OLS model with twostage instrumental variable regression. The first stage in this model estimates the joint influence of annual rainfall (linear and squared terms) and temperature (linear) on contemporaneous food production. This effect then constitutes the exogenous instrument for food production in the second stage. The results are reported in table 2. Mirroring the results presented above, we fail to uncover a robust signal for agricultural performance, although the sign of the coefficient for food production now remains negative in seven of the eight specifications. Food production shocks may have different consequences depending on the socioeconomic context, so next we consider a series of interactive relationships. Specifically, we investigate the joint effect of food production and (i) low level of development, (ii) extent of discriminatory political system, and (iii) economic dependence on agriculture; three conditions whereby loss of income from agriculture might constitute a particular challenge to society. To model these interactions, we include time-varying regressors instead of country-fixed effects where (i) is represented by infant mortality rate (IMR; World Bank 2014), (ii) is captured using the Ethnic Power Relations v.1.1 data (Cederman et al 2010), while (iii) uses an index of agricultural contribution to GDP (World Bank 2014). Moreover, to preserve focus on temporal dynamics, food production is now operationalized as yearly deviation from the country mean, 1961–2009. We use additive inverse deviation values to ensure theoretical consistency among the components in the interaction terms. All models control for (ln) population size, conflict history, and a common time trend, and models without IMR and agricultural dependence additionally control for (ln) GDP per capita. The results are presented in table 3. Again, **we are unsuccessful in establishing a consistent covariation pattern between agricultural performance and political violence.** Interpreting the combined effect of interaction terms with continuous parameters is inherently difficult but figure 4 shows that food production is insignificantly related to all conflict outcomes across levels of socioeconomic development for all three interaction terms. The sole exception is the result in Model 24, where lower food production in highly discriminatory societies is negatively associated with non-state conflict. This result would seem to **contradict the standard scarcity thesis** (Homer-Dixon 1999) although it is consistent with observations that conflict is more prevalent during surplus years (Witsenburg and Adano 2009, Salehyan and Hendrix 2014). Mirroring earlier research, ethnopolitical exclusion is strongly related to higher civil conflict risk, but not necessarily to other forms of political violence. Infant mortality rate and economic dependence on agriculture appear largely irrelevant. While this may come as a surprise, recall that most countries in SSA are characterized by underdevelopment and a large agricultural sector, implying that the variation in values on these indicators is modest. Large parameter uncertainties and p-values above the conventional significance threshold (5%) may disguise substantively important effects (Ward et al 2010). Accordingly, as a final assessment, we conduct a set of out-of-sample simulations and compare predictions for models with and without food production. The models are estimated on a subset of the full sample, in this case all years before 2000, and the estimated effects are then used to predict conflict outcomes out of sample, i.e., the 2000–09 period. Figure 5 shows the predicted values from four pairs of models that are specified similarly to Models 17, 20, 23, and 26, except for the shorter time period and the fact that one model in each pair drops the food production deviation variable. For civil conflict and social unrest, the models generate very similar predictions, signaling that **agricultural performance adds little to the models’ predictive power.** There is more spread in the predictions for the remaining two outcome categories. Puzzlingly, **the model without food production performs better** in both cases—i.e., the Receiver Operating Characteristics curves have higher ‘Area Under the Curve’ scores. We hesitate to put too much emphasis on the ROC tests, given the rareness of the outcomes(notably Models 17 and 26) and the relatively small training samples (Models 20 and 23), but nonetheless the patterns observed in the out-of-sample simulations substantiate the regression results reported above; fluctuations in agricultural output **explain little** of the observed variation in political violence in post-colonial Sub-Saharan Africa. 5. Concluding remarks Emerging evidence suggests that food price shocks are associated with an increase in social unrest (Smith 2014, Bellemare 2015, Hendrix and Haggard 2015, Weinberg and Bakker 2015). Yet, the robust ‘non-finding’ presented here implies that so-called ‘food riots’ play out **largely isolated** from climate-sensitive production dynamics in the affected countries. Likewise, claims that adverse weather and harvest failure drive contemporary violence in Africa (e.g., Hsiang et al 2013, IFPRI 2015) are **not supported** by our analysis. Instead, social protest and rebellion during times of food price spikes may be better understood as reactions to poor and unjust government policies, corruption, repression, and market failure (e.g., Bush 2010, Buhaug and Urdal 2013, Sneyd et al 2013, Chenoweth and Ulfelder 2015).

#### We’ll concede biotech collapses the economy but economic decline increases cooperation.

Christina L. **Davis &** Krzysztof J. **Pelc 17**, Christina L. Davis is a Professor of Politics and International Affairs at Princeton; Krzysztof J. Pelc is an Associate Professor of Political Science at McGill University, “Cooperation in Hard Times: Self-restraint of Trade Protection,” Journal of Conflict Resolution, 61(2): 398-429

Conclusion Political economy theory would lead us to expect rising trade protection during hard times. Yet empirical evidence on this count has been mixed. Some studies find a correlation between poor macroeconomic conditions and protection, but the worst recession since the Great Depression has generated surprisingly moderate levels of protection. We explain this apparent contradiction. Our statistical findings show that under conditions of pervasive economic crisis at the international level, states exercise more restraint than they would when facing crisis alone. These results throw light on behavior not only during the crisis, but throughout the WTO period, from 1995 to the present. One concern may be that the restraint we observe during widespread crises is actually the result of a decrease in aggregate demand and that domestic pressure for import relief is lessened by the decline of world trade. By controlling for product-level imports, we show that the restraint on remedy use is not a byproduct of declining imports. We also take into account the ability of some countries to manipulate their currency and demonstrate that the relationship between crisis and trade protection holds independent of exchange rate policies. Government decisions to impose costs on their trade partners by taking advantage of their legal right to use flexibility measures are driven not only by the domestic situation but also by circumstances abroad. This can give rise to an individual incentive for strategic self-restraint toward trade partners in similar economic trouble. Under conditions of widespread crisis, government leaders fear the repercussions that their own use of trade protection may have on the behavior of trade partners at a time when they cannot afford the economic cost of a trade war. Institutions provide monitoring and a venue for leader interaction that facilitates coordination among states. Here the key function is to reinforce expectations that any move to protect industries will trigger similar moves in other countries. Such coordination often draws on shared historical analogies, such as the Smoot–Hawley lesson, which form a focal point to shape beliefs about appropriate state behavior. Much of the literature has focused on the more visible action of legal enforcement through dispute settlement, but this only captures part of the story. Our research suggests that tools of informal governance such as leader pledges, guidance from the Director General, trade policy reviews, and plenary meetings play a real role within the trade regime. In the absence of sufficiently stringent rules over flexibility measures, compliance alone is insufficient during a global economic crisis. These circumstances trigger informal mechanisms that complement legal rules to support cooperation. During widespread crisis, legal enforcement would be inadequate, and informal governance helps to bolster the system. Informal coordination is by nature difficult to observe, and we are unable to directly measure this process. Instead, we examine the variation in responses across crises of varying severity, within the context of the same formal setting of the WTO. Yet by focusing on discretionary tools of protection—trade remedies and tariff hikes within the bound rate—we can offer conclusions about how systemic crises shape country restraint independent of formal institutional constraints. Insofar as institutions are generating such restraint, we offer that it is by facilitating informal coordination, since all these instruments of trade protection fall within the letter of the law. Future research should explore trade policy at the micro level to identify which pathway is the most important for coordination. Research at a more macro-historical scope could compare how countries respond to crises under fundamentally different institutional contexts. In sum, the determinants of protection include economic downturns not only at home but also abroad. Rather than reinforcing pressure for protection, pervasive crisis in the global economy is shown to generate countervailing pressure for restraint in response to domestic crisis. In some cases, hard times bring more, not less, international cooperation.

#### Growth is unsustainable AND innovation can’t solve---shifting away from productivism is key to avoid extinction.

Milena **Büchs &** Max **Koch 17**. Milena Büchs is Associate Professor in Sustainability, Economics and Low Carbon Transitions at the University of Leeds, UK. Max Koch is Professor of Social Policy at Lund University (School of Social Work), Sweden. 2017. Postgrowth and Wellbeing. Springer International Publishing. CrossRef, doi:10.1007/978-3-319-59903-8.

As the previous chapters have shown, economic growth is regarded as a prime policy aim by policy makers and economists because it is thought to be essential for reducing poverty and generating rising living standards and stable levels of employment (Ben-Ami 2010: 19–20). More generally, support for economic growth is usually intertwined with advocating social progress based on scientific rationality and reason and hence with an optimistic view of humans’ ingenuity to solve problems (ibid.: 17, 20, Chap. 5). Growth criticism thus tends to be portrayed as anti-progress and inherently conservative (ibid.: Chap. 8). While it is important to acknowledge and discuss this view, it needs to be emphasised that growth criticism is formulated with long-term human welfare in mind which advocates alternative types of social progress (Barry 1998). This chapter first outlines ecological and social strands of growth critiques and then introduces relevant concepts of and positions within the postgrowth debate. Ecological Critiques of G rowth Generally speaking, two types of growth criticism can be distinguished: the first focuses on limitations of GDP as a measure of economic performance; the second goes beyond this by highlighting the inappropriateness of growth as the ultimate goal of economic activity and its negative implications for environment and society. Since GDP measures the monetary value of all final goods and services in an economy, it excludes the environmental costs generated by production. For instance, as long as there is no cost associated with emitting greenhouse gases , the cost for the environmental and social damage following from this is not reflected in GDP figures. Worse even, GDP increases as a consequence of some types of environmental damage: if deforestation and timber trade increase or if natural disasters or industrial accidents require expenditures for clean-up and reconstruction, GDP figures will rise (Douthwaite 1999: 18; Leipert 1986). Several critics of GDP as a measure of progress have proposed alternative indicators of welfare such as the Genuine Progress Indicator, Green GDPs or other approaches which factor in environmental costs (see Chap. 5 for more details), but they do not necessarily object to economic growth being the primary goal of economic activity (van den Bergh 2011). In contrast, the idea of ecological limits to growth goes beyond the critique of GDP as a measure of economic performance. Instead, it maintains that economic growth should not, and probably cannot, be the main goal of economic activity because it requires increasing resource inputs, some of which are non-renewable, and generates wastes, including greenhouse gases, that disturb various ecosystems, severely threatening human and planetary functioning in the short and long term. 4 CRITIQUES OF GROWTH 41 Resources are regarded as non-renewable if they cannot be naturally replaced at the rate of consumption (Daly and Farley 2011: 75–76). Examples include fossil fuels, earth minerals and metals, and some nuclear materials like uranium (Daly and Farley 2011: 77; Meadows et al. 2004: 87–107). Based on work by Georgescu-Roegen (1971), many ecological economists also assume that non-renewable resources cannot be fully recycled because they become degraded in the process of economic activity. Historically speaking, economic growth is a fairly recent phenomenon (Fig. 2.1). Since its onset in the late seventeenth century in Europe and mid-eighteenth century in the US (Gordon 2012), it has gone hand in hand with an exponentially increasing use of non-renewable resources such as fossil fuels (Fig. 4.1). While we are not yet close to running out of non-renewable resources, over time they will become more difficult and hence more expensive to recover. This idea is captured by the concept of “energy returned on energy invested” (EROEI). In relation to oil for instance, it has been shown that the easily recoverable fields have been targeted first and that therefore greater energy (and hence financial) inputs will be required to produce more oil. Over time, the ratio of energy returned on energy invested will decrease, reducing the financial incentive to invest further in the recovery of these non-renewable resources (Dale et al. 2011; Brandt et al. 2015: 2). Relevant to this is also the debate about peak oil—a concept coined by Shell Oil geologist Marion King Hubbert in the 1950s—the point at which the rate of global conventional oil production reaches its maximum which is expected to take place roughly once half of global oil reserves have been produced. There is still controversy about whether global peak oil will occur, and if so when, as it is difficult to predict, or get reliable data on, the rate at which alternative types of energy will replace oil (if this was to happen fast enough, peak oil might not be reached, if it has not yet occurred), the size of remaining oil reserves and the future efficiency of oil extraction technologies (Chapman 2014). However, it is plausible to assume that oil prices will rise in the long term if conventional oil availability diminishes, while global demand for oil increases with continuing economic and population growth. Since economic growth in the second half of the twentieth century required increasing inputs of conventional oil, higher oil prices would have a negative impact on growth unless alternative technologies are developed that can generate equivalent liquid fuels at lower prices (Murphy and Hall 2011). Some scholars have criticised the focus on physical/energy resource limitations as initially highlighted in the “limits to growth” debate (Meadows et al. 1972) and state that instead catastrophic climate change is likely to be a more serious and immanent threat to humanity (Schwartzman 2012). The main arguments here are first that much uncertainty remains about the potential and timing of peak oil, future availability of other fossil fuels and development of alternative low energy resources, while the impacts of climate change are already immanent and may accelerate within the very near future. Second, even if peaks in fossil fuel production occurred in the near future, remaining resources could still be exploited to their maximum. However, this would be devastating from a climate change perspective as, according to the latest IPCC scenarios, greenhouse gas emissions need to turn net-zero by the second half of this century for there to be a good chance to limit global warming to 2° Celsius (and ideally, below that) (Anderson and Peters 2016). It is telling that some of the more recent debates about ecological limits to growth put much more emphasis on environmental impacts of growth, rather than on peak oil or other resource limitations (Dietz and O’Neill 2013). Differently put, limits of sinks, especially to absorb greenhouse gases, and to the regeneration of vital ecosystems are now attracting greater concern, compared to limits of resources. Growing economic production generates increasing pressures on the environment due to pollution of air, water and soil, the destruction of natural habitats and landscapes, for instance, through deforestation and the extraction of natural resources. Therefore, growth often also threatens the regeneration of renewable resources such as healthy soil, freshwater and forests, as well as the functioning of vital ecosystems and ecosystems services such as the purification of air and water, water absorption and storage and the related mitigation of droughts and floods, decomposition and detoxification and absorption of wastes, pollination and pest control (Meadows et al. 2004: 83–84). Recent research on planetary boundaries has started to identify thresholds of environmental pollution or disturbance of a range of ecosystems services beyond which the functioning of human life on earth will be put at risk. Rockström and colleagues have identified nine such “planetary boundaries”—“climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading” (Rockström et al. 2009: 472). They also present evidence according to which three of these boundaries—climate change, rate of biodiversity loss and the nitrogen cycle—have already reached their limits (Rockström et al. 2009). Of those three thresholds, climate change has received most attention. The 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2014) concluded that global temperatures have risen by an average of 0.85° since the 1880s (while local temperature increases can be much higher than that) and that the concentration of greenhouse gases in the atmosphere has reached unprecedented levels over the last 800,000 years—that of CO2 has now reached 405.6 parts per million (NASA, January 2017, Fig. 4.2), far surpassing the level of 350 ppm which is considered safe by many scientists (Rockström et al. 2009). The IPCC report also maintained that humans very likely contributed to at least 50% of global warming that occurred since the 1950s (IPCC 2014: 5). A range of climate change impacts can already be observed, including a 26% increase of ocean acidification since industrialisation; shrinking of glaciers, Greenland and Antarctic ice sheets, as well as arctic sea ice; and the rise of sea levels of 19 cm since 1901. This is projected to increase by an additional 82 cm by the end of this century at current levels of greenhouse gas emissions (ibid.: 13). Climate change impacts are already felt with increased occurrences of heat waves, heavy rain fall, increased risk of flooding and impacts on food and water security in a number of regions around the world. It is projected that with a rise of 2° of global temperatures, 280 million people worldwide (with greatest numbers in China, India and Bangladesh) would be affected by sea level rise, escalating to a projected 627 million people under a 4° scenario (Strauss et al. 2015: 10). At the 21st Conference of Parties of the United Nations Framework Convention on Climate Change in Paris in 2015, representatives agreed that action should be taken to limit rise of global temperatures to 2° and Fig. 4.2 Concentration of CO2 in the atmosphere. Source NASA, available from https://climate.nasa.gov/vital-signs/carbon-dioxide/. The CO2 levels have been reconstructed from measures of trapped air in polar cap ice cores 4 CRITIQUES OF GROWTH 45 to “pursue efforts” to limit it to 1.5°. This has been adopted by 196 countries, but immense efforts and very radical reductions of greenhouse gas emissions will be required to comply with the agreement. Even if net greenhouse gas emissions were reduced to zero, surface temperatures would remain constant at their increased levels for hundreds of years to come and climate change impacts such as ocean acidification and rising sea levels would continue for hundreds or even thousands of years once global temperatures are stabilised; moreover, a range of climate change impacts are deemed irreversible (IPCC 2014: 16). One controversial question in the debate about economic growth and environmental impacts has been whether growth can be decoupled from the damage it causes. Important to this debate is the theory of the Environmental Kuznets Curve which applies Simon Kuznets’ hypothesised inverted u-shaped relationship between economic development and income inequality to the relationship between economic development and environmental degradation. According to this theory, environmental degradation is low in the early phases of economic development, then rises with increasing development up to a certain point, beyond which it falls again with advancing development because more resources can be invested to render production and consumption more efficient and less polluting. Therefore, this theory suggests that it is possible to decouple economic growth (measured in GDP) from its environmental implications. The counter-argument to this theory is that it does not take into account the difference between relative and absolute decoupling. Relative decoupling refers to the environmental impacts generated over time per unit of economic output, for instance CO2 emissions per million of US$. In contrast, absolute decoupling would examine aggregate environmental impact, compared to total economic output over time. Here it has been argued that while relative decoupling may be possible as the environmental impact per unit of economic output decreases over time due to efficiency gains, absolute decoupling is much harder to achieve while growth continues. Indeed, there is no evidence for absolute decoupling as total environmental impacts, for instance total global CO2 emissions, are still rising with rising global GDP (Jackson 2011: 67–86). This is partly due to rebound effects which we discussed in Chap. 2: rising consumption because the increase in efficiency has made it cheaper to produce/consume (Jackson 2011: 67–86; see also Czech 2013: Chap. 8 criticising “green growth”). Furthermore, if decoupling is examined at the country level, one would need to take consumptionbased resource use/emissions into account rather than productionbased impacts. Substantial environmental impacts related to everything that is consumed in rich countries occur in developing countries from which goods are imported. A focus on production-based environmental impacts would hence be misleading as it ignores the [and] environmental impacts that relate to a country’s living standards and that occur outside of that country. Social Critiques of Growth Economic growth has not only been criticised from an ecological perspective, but also from an individual and social wellbeing point of view. Here, we can again distinguish a critique of GDP as a measure of wellbeing and a wider critique which highlights potential negative consequences of economic growth for human wellbeing. Several scholars have argued that GDP is an inadequate measure of prosperity or wellbeing because it only includes market transactions and ignores activities of the informal economy in households and the volunteering sector which make an important contribution to individual and social wellbeing (Stiglitz et al. 2011; van den Bergh 2009; Jackson 2011). It also excludes the contribution of certain government services that are provided for free (Douthwaite 1999: 14; Stiglitz et al. 2011: 23), and the roles of capital stocks and of leisure in generating welfare (Costanza et al. 2015: 137). Furthermore, all market transactions make a positive contribution to GDP, regardless of whether expenditures increase or decrease welfare. Similar to the way in which environmental costs of growth are either excluded from GDP or even increase it, expenditures that arise from road accidents, divorces, crime, etc., contribute positively to GDP (ibid.: 133). The focus on market transactions also means that an increasing marketisation (or “commodification”) of an economy will be reflected in a rise of GDP, which may or may not be related to actual “welfare” outcomes (Stiglitz et al. 2011: 49). It also implies that GDP is an insufficient cross-national comparator for the quality of life, as it does not take into account the different sizes of the informal economy across countries (ibid.: 15). Furthermore, GDP does not indicate how income and consumption are distributed in society (Stiglitz et al. 2011: 44). This implies that a rise of GDP can be consistent with a rise of inequality of income and wealth. 4 CRITIQUES OF GROWTH 47 However, if greater inequality has negative impacts on social wellbeing (Wilkinson and Pickett 2009), this would be masked by rising GDP figures (Douthwaite 1999: 17). An even more fundamental criticism of GDP as a measure of wellbeing is that it focuses on the accumulation of money or wealth and thus on the material aspects of wellbeing. Such a narrow conception of the goals of economic activity and wellbeing has been criticised early on in the history of economic thought, e.g. by Aristotle’s distinction between oikonomia and chrematistics. The latter refers to the accumulation of wealth and was regarded by him as an “unnatural” activity which did not contribute to the generation of use value and wellbeing (Cruz et al. 2009: 2021). The argument that wider conceptions of wellbeing and prosperity are required has also become relevant for contemporary critiques of economic growth (Jackson 2011; Paech 2013; Schneider et al. 2010) as we will discuss this in more detail in Chap. 5. Arguments About the Psychological and S ocial Costs of G rowth The broader social critique of economic growth highlights potential “social limits” to or even negative consequences of economic growth for individual and collective wellbeing. The term “social limits to growth” was coined by Fred Hirsch (1976). He argued that the benefits of growth are initially exclusive to small elites and that these benefits disappear as soon as they spread more widely through mass consumption. For instance, only few people can own a Rembrandt painting; holiday destinations are more enjoyable when they are not overrun by hordes of other tourists; there are only few leadership positions, etc. From this perspective, there are “social limits” to the extent to which the benefits of growth can be socially expanded and equally shared. Other scholars have expressed concern about individual and collective social costs of economic growth. First, there is the argument that the need to keep up with ever-rising living standards and new consumer habits, “keeping up with the Joneses”—a lot of which is seen to be driven by advertisement and social pressure rather than real needs, for instance fashionable clothing or gadgets—can generate stress and increase the occurrence of mental disorders (James 2007; Offer 2006; Kasser 2002). 48 M. BÜCHS AND M. KOCH Second, it has been argued that economic growth can imply wider social costs. For instance, with its emphasis on individual gain, market relations and competition, and the need that it generates for spatial mobility (e.g. for successful participation in education and labour markets), it is feared to undermine moral and social capital and put a strain on family and community relations, potentially even leading to increasing divorce and crime rates (Douthwaite 1999; Daly and Cobb 1989: 50–51; Hirsch 1976). Social costs of technological development and industrialisation also include industrial workplace and traffic accidents and time lost in traffic jams and for commuting (Czech 2013: Chap. 2; Stiglitz et al. 2011: 24). Technological innovation which arises from growth can also act as a factor for job losses and increasing job insecurity (Douthwaite 1999), especially if growth rates are not sufficiently high to compensate gains in productivity. It is often assumed that growth will benefit the many because of assumed “trickle-down” effects which promise to improve the lot of the poor simply because the “cake” of available wealth is growing. While progress has been made in reducing extreme global poverty and inequality (Sala-i-Martin 2006; Rougoor and van Marrewijk 2015), the number of people living in poverty across the globe remains high.1 At the same time, income inequality in a range of countries has been rising and the situation of many of the people living in extreme poverty is not improving which means the fruits of economic growth remain to be unequally distributed (Collier 2007; Piketty and Saez 2014). The post-development debate goes even further than that in arguing that not only may growth not have reached the global poor to the extent that had been predicted by neoclassical economists, but that it can also have negative impacts on indigenous communities in developing countries, especially those who rely on local natural resources for their livelihoods which often suffer exploitation, pollution or even destruction through the inclusion of local economies into global value chains (Rahnema and Bawtree 1997). While the distinction between critiques of growth that focus on its problematic ecological and social consequences is useful for analytic purposes, the two dimensions are of course closely linked. Ecological consequences of growth have the potential to severely impact or even undermine human wellbeing. Local livelihoods are already affected by current climate change impacts such as ocean acidification and its impact on marine organisms, draughts, floods and severe weather events, the 4 CRITIQUES OF GROWTH 49 frequency of which has been rising. Accordingly, it is estimated that crop and fish yields are already diminishing in several regions (Stern 2015; IPCC 2014) and that millions of people are already being displaced and forced to migrate due to climate change and other environmental impacts (Black et al. 2011). While the overall long-term impacts of climate change and the surpassing of other planetary boundaries are difficult to predict, they clearly have the potential to substantially undermine human wellbeing. Since greenhouse gas emissions are driven by economic growth, the development of alternative economic models that do not depend on growth is urgent since continued growth “threatens to alter the ability of the Earth to support life” (Daly and Farley 2011: 12).

**Collapse by 2050 is inevitable---**

**rebound effects, lack of decoupling, large environmental footprints from renewables, and a lack of viable sequestration technology make growth unsustainable**

Giorgos **Kallis 18**, 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, et al., 5/31/18, “Annual Review of Environment and Resources: Research On Degrowth,” Annual Review of Environment and Resources, Vol. 43, p. 296-298

3. ECOLOGICAL ECONOMICS: THE LIMITS OF GREEN GROWTH¶ 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 **U**nited **S**tates’ 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 f

oreseen 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-after-year 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. ¶ Advancing a position of “a-growth,” van den Bergh (54) proposes ignoring GDP and implementing a global carbon price, indifferent to what its effect on growth turns out to be. Ignoring GDP is a normative position—but at the end, the economy will either grow or not, and if it does not, then there should be plans for managing without growth. Given how entrenched GDP growth is in existing institutional and political structures, a-growth approaches must be advanced as part of broader systemic change (55).¶ Is it possible to secure a decent standard of living for all while throughput and output degrow? Substantive evidence indicates that **prosperity does not depend on high levels of production** and consumption. Kubiszewski et al. (56) find that the Genuine Progress Indicator, an indicator that includes environmental and social costs alongside output, peaked in 1978, despite subsequent global growth. A similar indicator, the Index of Sustainable Economic Welfare, has stayed at the same levels in the United States since 1950, despite a threefold growth of GDP (57). ¶ Wealthier countries on average have higher levels of life expectancy and education than poorer ones, but above a certain level of GDP, income does not make a difference in wellbeing—**equality** does. Satisfactory levels of wellbeing are achieved by countries such as Vietnam or Costa Rica at a fraction (one-third or less) of the output, energy, or resource use of countries such as the **U**nited **S**tates. Even the lower levels of resource use of mid-income countries, however, would not be sustainable if they were to be generalized to the planet as a whole. No country currently satisfies social wellbeing standards while staying within its share of planetary boundaries, suggesting that radical changes in provisioning systems are necessary (58). ¶ Wealthier people within a country are on average happier than others, but in the long run, overall happiness does not increase as a country’s income rises (59). Nuances of this income-happiness paradox depend on the sample of countries included and how one defines and asks about happiness. Within societies, individuals with higher incomes evaluate their lives as better than others, but do not enjoy better emotional wellbeing (60). Income determines social rank, and rank affects individuals’ assessments of their lives. Growth does not change relative rank or relative access to positional goods (those signifying position) but it does inflate expectations and prices of material goods, **increasing frustration** (61). Relative comparisons matter for personal wellbeing in low-income and high-income countries; for both, the more equally income is distributed, the happier people are (62). **Pro-environmental behaviors** and sharing are also strongly associated with personal wellbeing (63). This suggests that an economic contraction may not impact wellbeing negatively if accompanied by redistribution, sharing, and value shifts (34).