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RESEARCH REPORT

US-China relations: Policy pathways to reduce global catastrophic risk

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EXECUTIVE BRIEF

The trajectory of humanity in the 21st century is uncertain and precarious.

Two separate but interrelated factors will be heavily responsible.

The increasingly competitive dynamic between the United States and China will be critical to future global economic, security, technological, environmental, and political outcomes.

At the same time, all countries face increasing global catastrophic risk – arising from a combination of nuclear and biological weapons, climate and environmental disruptions, dangerous engineered and naturally occurring pathogens, emerging technologies like artificial intelligence, and food supply insecurity, among other potentially catastrophic threats.

These two factors – US-China competition and global catastrophic risk – are complex and challenging in their own right. Taken together, a new problem emerges.

US-China competition is increasing the risk of a global catastrophe. In turn, worsening global catastrophic risk feeds a more antagonistic dynamic between the two countries. Breaking this cycle and fostering strategic cooperation on shared interests will be among this century's greatest challenges.

The US and China need to lead the world on reducing global catastrophic risk. Indeed, this global challenge could be the rallying cry both countries need to bridge their differences and work together for a safer world.

Their common interest in reducing the risk of global catastrophe could then form the positive platform that is needed to improve all aspects of the US-China relationship.

If addressed, it would help set the world on a more peaceful and prosperous path.

EXECUTIVE SUMMARY

Perpetuating a vicious cycle

The world sits at a precipice of unacceptably high risk. A set of threats and hazards could severely impair global security and wellbeing. Nuclear weapons, pandemics, climate change, and space weather already threaten the global population. Artificial intelligence, biotechnology, geoengineering, and other advanced technologies pose additional risk vectors. Hundreds of millions, even billions of people, are at risk of death and suffering. In the worst case, modern civilization could collapse or humans could go extinct.

Just as global catastrophic risk heightens, the US-China relationship has entered a state of strategic competition. Beijing and Washington see each other increasingly as rivals. They are pulling on many levers of government and society to curtail the other's global influence and power. Off-ramps from a tense competitive dynamic are steepening. Their seemingly clashing security, economic and domestic interests indicate that the two superpowers will continue to compete across most domains. A military confrontation is not inconceivable and is perhaps becoming more likely.

Humanity faces a vicious cycle over the next few decades. The competitive rivalry between the US and China, and their worsening bilateral relationship, is only escalating global catastrophic risk. It comes at a time when the world needs them to work together to prevent and prepare for global catastrophe. A conflict between the two countries that escalates into nuclear war might seem the most direct route to global catastrophe. But US-China competition increases global catastrophic risk in a number of broader ways.

First, it distracts and potentially blinds the two countries from global threats regardless of their origin. When they perceive each other as an existential threat to national survival, they reduce their focus on other global threats that could become catastrophic.

Second, the competitive dynamic incentivizes a pursuit of advanced military and technological capabilities that further perpetuate catastrophic risk and reduce the capacity for developing the safety and security measures that reduce technological risk.

Third, it reduces the opportunity for productive government engagement at senior governmental levels to reduce global catastrophic risk, especially in the face of a crisis.

Finally, their competition is making multilateral forums increasingly tense and ineffective. This weakens the ability to constrain dangerous behaviors of all nations and hampers the international cooperation needed to tackle global challenges.

Fostering a virtuous cycle

Should humanity wish to be better positioned to avert global catastrophe, China and the US should chart a different path in their relationship. Entirely abandoning a competitive dynamic is not possible or even needed. For certain challenges, such as climate change, healthy competition around renewable and sustainable energy solutions could be helpful. However, given the breadth and scale of the challenges that form global catastrophic risk, the world needs strategic cooperation, not strategic competition.

The two major powers should develop a joint, concerted, and holistic effort to reduce global catastrophic risk. They must recognize that, as much as they might face threats from each other, they face a larger, mutual risk of global catastrophe. Once the two countries realize the unacceptable and increasing level of risk posed by these catastrophic threats, they might be able to collaborate on putting humanity on a less risky trajectory. Waiting for an imminent or actual catastrophe will be too late.

Four areas represent the most promising for joint leadership, cooperation and collaboration on reducing global catastrophic risk:

Focus area 1: Collaborate bilaterally on reducing global catastrophic threats and building global resilience

The US and China must work together to directly address global catastrophic risk, whether by preventing the threats or preparing for them. As two countries heavily responsible for these threats and potential global action, a coordinated effort is needed. With strategic competition so tense, engagement on fundamental bilateral security and economic issues is already a challenge, and issues that are directly tied to national power, such as nuclear weapons and artificial intelligence (AI), are highly sensitive. So finding opportunities where meaningful collaboration can occur is difficult. To start with, these opportunities will need to be low-pressure, non-politicized and discreet, so that collaboration can build a foundation for a more wide-ranging effort and will not become partisan or otherwise charged. Natural and space-based threats, such as supervolcanic eruptions and near-Earth objects, as well as food system resilience, provide promising opportunities for initial cooperation. Collaboration in these areas might not dramatically reduce overall risk, but they might be the arenas where joint efforts set a positive precedent and firm building block for more contested issues in the relationship.

Focus area 2: Increase and improve mechanisms that foster dialogue and reduce misperceptions of mutual threat

As strategic competition heats up, both countries are becoming increasingly entrenched in their rivalry. Constructive dialogue is becoming more challenging to initiate and maintain. As a result, each country perceives the other as the dominant threat. National rhetoric, instead of being neutral or even friendly, can be fiery and antagonistic. In times of emergency or crisis, off-ramps and lines of communication would be difficult to maximize. The US and China need to increase or improve the mechanisms that allow the two powers to communicate and address mutual threat perceptions. During times of diplomatic or military stand-off, these channels are critical to de-escalation and resolution. These mechanisms would also allow a platform to discuss and coordinate action for the global threats that need their combined attention and resources. Leader-level relationships, system-wide engagement, crisis management mechanisms, and shared assessments of global threats will help tamp down the perceived risk of the other player while sensitizing them to overall global risk.

Focus area 3: Build trust around technological risk

Global catastrophic risk, especially emerging from nuclear weapons, biotechnology, AI and geoengineering, is heavily a function of technological advancement. Overall, the risk is likely to grow as technological capabilities advance and as they intersect in more sophisticated ways with global military, political, environmental and infrastructure systems. Regardless of the tensions between China and the US, they can help build trust in their respective national technological progress. It would help reduce suspicion, foster areas of alignment, and avoid accidents and miscalculations. These domestic and collaborative efforts would include building safety, transparency, and accountability mechanisms for technological development and deployment. The US and China could also prioritize and incentivize the development of technologies that reduce global risk, including renewable energy, carbon capture and storage, natural disaster monitoring, alternative and resilient foods, ecosystem remediation and restoration, vaccine development platforms, space debris management, and verification and monitoring tools for nuclear and biological weapon. Although they compete on technological progress, they could collaborate on technological trust-building.

Focus area 4: Jointly lead multilateral efforts on global catastrophic risk

The US and China need to actively lead the world on reducing global catastrophic risk. Together, the US and China can bring global attention, prioritization, and resources toward a unified effort to manage individual threats and global catastrophic risk as a

whole. Across many groupings, nations look to the two major powers to lead. Various forums are available: the United Nations and its related bodies; regional organizations where the US and China share a stage, like the East Asia Summit; and exclusive groupings where they individually have greater influence, like the North Atlantic Treaty Organization (NATO) for the US or Group of 77 (G77) for China. They can help by building a shared understanding of global catastrophic risk around the world, increasing attention through agenda-setting, and strengthening capacity and mechanisms to deal with the threats.

As the next few decades unfold, decisions in the capitals of the two major powers will shape global catastrophic risk. This is not to dismiss the role of other countries, as well as companies and multilateral institutions. Global catastrophic risk is, after all, a global problem. However, the US and China must take global responsibility and action. Global catastrophic risk might be one of the most important issues the two countries need to navigate. Managed poorly, their relationship could lead to global turbulence, conflict and, perhaps, catastrophe. Managed well, their relationship could help protect humanity from the gravest threats it faces. It is up to them to choose the right path.

About this report

This report is the first publication the authors are aware of focused on how strategic competition between the US and China shapes global catastrophic risk. This report aims to provide a holistic overview of this topic, while providing a framework for improving US-China management of global catastrophic risk.

This scope is admittedly extremely large. The topics of US-China relations and global catastrophic risk are both subject to troves of research, analysis and discussion among experts and policymakers. US-China competition has also been well-studied for specific catastrophic threats, such as for nuclear weapons and climate change.

However, understanding US-China competition in the context of global catastrophic risk allows a more holistic view of the relationships. It helps analyze various aspects – like threat perceptions, domestic politics and leader-level dynamics – that shape a variety of threats. Ultimately, this report should be seen as a starting point for experts and policymakers in considering policy options.

The framework and the report's contents were developed based on review of media, academic, think tank and government reporting, engagement with experts in US-China relations and the various global catastrophic threats, and structured analytical techniques to identify the key drivers and policy areas.

CATASTROPHIC CULPRITS

Global catastrophic risk is caused by the threats and hazards that could severely impair global security and wellbeing. The COVID-19 pandemic revealed how a disease could wreak global havoc. But there are other threats that could cause even more damage. Hundreds of millions, if not billions, of people are at risk depending on the scale and mechanism of threat. At the most extreme scale, civilization could collapse and humanity could go extinct.

These threats are not only due to the US and China, though both countries contribute significantly to the risk. For the risk from nuclear weapons, climate change, and advanced technology, the US and China are leading drivers. So it is important to understand how their individual actions are exacerbating the risk before considering how the relationship between the two countries shapes the risk.

Nuclear weapons

The nuclear arsenals of each individual country is enough to cause catastrophic damage, and a limited nuclear exchange between nuclear armed states could lead to two billion deaths.[1] This is due to the combination of direct casualties and the resulting nuclear winter, which is a severe climatic cooling caused by the smoke and dust in the upper atmosphere. With nine nuclear states, tense relations between them, and a total of 9,000 operational nuclear weapons (thousands of which are on high alert) nuclear catastrophe is an ever-present threat.

The US's arsenal of 3,700 warheads alone is enough to cause such a scale of damage. Research shows that 2,000-4,000 nuclear warheads are needed to wipe out most land-based living creatures.[2] A portion of China's roughly 600 nuclear weapons would be enough to result in tens of millions of deaths. And, despite Beijing's official policy of maintaining a minimal nuclear deterrent, China is rapidly modernizing, diversifying and growing its nuclear arsenal. The US assessed that China would probably have over 1,000 operational nuclear warheads by 2030.[3] The People's Liberation Army is working to complete its own nuclear triad, including upgrading and developing new aircraft to field air-launched ballistic missiles, as well as improving its ground- and sea-based nuclear capabilities. There are also concerns among US observers that China is moving to field lower-yield nuclear weapons.[4]

Climate change

Under the Biden administration, climate change was a global challenge that both countries recognized. Indeed the Biden administration referred to climate change as an existential threat. However, their individual actions are not commensurate with catastrophic-level risk and President Trump has vowed to rewind many of the climate change actions that his predecessor undertook. The ambition of the Paris Agreement – which aims to keep temperature increases to below 1.5 degrees Celsius – will almost certainly be unmet. Global warming beyond this level could trigger catastrophic feedback loops and cascade effects in our climate.[5]



The US and China have significant responsibility, not only due to their great power status, but because they are the two biggest polluters. China released 11.4 billion metric tons of carbon dioxide emissions in 2022, making it the world's largest polluter at 26 percent of global emissions. In September 2020, President Xi Jinping announced China aimed to reach peak CO2 emissions before 2030 and achieve carbon neutrality before 2060.[6] This was reaffirmed in China's updated nationally determined contribution announcing China will lower CO2 emissions per unit of GDP by more than 65 percent from the 2005 level.[7] However, critics note that the revised document was vague and offered little additional action.[8] China plans to increase non-fossil fuels to 25 percent of primary energy consumption, increase forest stock volume by 6 billion cubic meters from the 2005 level, and increase wind and solar power to more than 1.2 billion kilowatts by 2030.[9]

The US emitted 4.9 billion tonnes of CO2 in 2020, representing about 11 percent of global emissions, but has declined from a peak in 2005.[10] The US withdrew from the Paris Agreement under the first Trump Administration, Although President Biden rejoined in January 2021, President Trump has directed his administration to withdraw again and revoked any financial support under the United Nations Framework Convention on Climate Change.

Under the Biden administration's plan, the US had a target of halving 2005 US greenhouse gas emission levels by 2030 and to eliminate carbon emissions from the electricity sector by 2035.[11] It outlined a number of ways it intended to transition to a decarbonized energy sector, including "cutting energy waste; shifting to carbon pollution-free electricity; electrifying and driving efficiency in vehicles, buildings, and parts of industry; and scaling up new energy sources."[12] These plans are unlikely to continue as the Trump administration has frozen funds for clean energy projects, stopped approvals for wind farms on federally owned land and water, cut scientific research, and removed employees from environmentally focused agencies.[13]

Geoengineering

Geoengineering is the aim to deliberately intervene in the Earth's natural systems. Potentially used as a means to counteract climate change or its impacts, it creates risk should it be used on a large-scale, global level.[14] If geoengineering technologies, such as through solar radiation management or weather modifications, are deployed poorly, they could disrupt delicate and complex systems. Neither the US or China have made any commitments around reducing geoengineering risk. If anything, their actions indicate quite the opposite.

China's geoengineering research program at Beijing Normal University's College of Global Change and Earth System Science is one of the world's largest state-funded projects and Beijing has the world's largest cloud seeding operation, which employs 35,000 people.[15] China plans to be able to modify the weather over half its territory by 2025, and reports surfaced in December 2021 that China modified the weather to reduce pollution and avoid rain during celebrations of the centenary of the CCP.[16]



There is no official US position on geoengineering. In 2023, the White House released a Congressionally-mandated report on geoengineering, mostly focused on the gaps in understanding and research that need addressing.[17] Geoengineering related activity is mostly in the private sector. Like China, the US has private companies engaged in cloud-seeding to provide water for hydropower projects.[18] Several drought-plagued states have also embraced cloud seeding and anticipate increased funding to offset climate change and hotter summers.[19] Harvard University's SCoPEx, financially backed by Bill Gates, is a world-leading solar geoengineering project, which aims to study the effects of releasing aerosols into the stratosphere in an attempt to reduce or eliminate ozone loss.[20]

Artificial intelligence

Artificial intelligence (AI) has the potential to massively disrupt economies, societies and their security. The World Economic Forum estimates that AI and automation will displace 85 million jobs across 26 countries by 2025 while also creating 97 million new jobs.[21] With such revolutionary technology comes revolutionary change and corresponding risk. As AI systems scale in intelligence and further integrate with critical infrastructure, the possibilities of failures or accidents scale as well. AI integrated within nuclear weapons systems could destabilize nuclear deterrence by deteriorating second-strike capability.[22] Malicious actors could also use these capabilities to target and attack, particularly when used in connection with cyber, weapons, biological and information systems. Those at the forefront of AI progress, whether governments, companies or academics, will shape the risk of advanced AI in the decades to come. The US and China are two of the most important players.

For China, AI is a key strategic priority.[23] Xi Jinping has declared his desire for Chinese AI supremacy by 2030. This plan was first articulated the country's strategy for developing AI, called 'New Generation Artificial Intelligence Development Plan' (新一代人工智能发展规划), released in 2017.[24] The strategy considers many aspects of AI progress, including laws and regulations, intellectual property system, AI safety regulation, talent and workforce management. By 2025, China intends to build an $60bn AI industry and be world-leading in some applications. The strategy is driven by the government, including sponsoring 'AI national champions' that drive progress in specific sectors and government support and subsidies to AI start-ups.

China has begun to recognize the risk arising from AI and enacted new laws and governance tools for AI tools.[25] The official readout of the Third Plenum of the Communist Party of China's Central Committee noted that the committee agreed to "establish an AI safety regulatory system".[26] China was also one of the 28 nations that signed on to the UK-led Bletchley Declaration on AI safety, which also included the US.[27] The light-touch approach by regulators and courts, however, could lead to "regulatory lags that could escalate into AI-induced accidents and even disasters."[28]

The US is looking to maintain its leadership in AI, especially given it is home to the largest



organizations at the frontier of advanced AI development.[29] In February 2019, President Donald Trump signed the 'American AI Initiative' directing federal agencies to prioritize investments in research and development of AI.[30] In March 2020, the National Artificial Intelligence Initiative Act authorized over $1.1 billion for AI over the next five years.[31] This strategic effort has continued during the Biden Administration.

Beyond funding, the Biden administration seemed eager to signal cooperation on an international scale on AI safety. In October 2023, almost a year after the release of ChatGPT,[32] the White House released the 'Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence'.[33] While the executive order outlines recommendations for a myriad of AI policies, including attracting talent and addressing ethical concerns, it also included language describing international cooperation on AI policies and regulations – including with competitors.[34] However, the new Trump administration repealed the Biden order and a new AI plan was released in July 2025.[35]

Pandemics

Naturally occurring pandemics are unlikely to reach a severity on the scale of nuclear war or extreme climate change. However, the COVID-19 pandemic, with a mortality rate of 1 percent, caused a confirmed 7 million deaths – and potentially around 20-40 million excess deaths – and trillions in economic damage.[36] It showed how a mild disease relative to other endemic diseases with pandemic potential ripples globally. The rapid and often unchecked spread of diseases can overwhelm healthcare systems, disrupt economies, and lead to social and political instability. Global interconnectivity through travel and trade facilitates the swift movement of pathogens across continents. Pandemic risk will continue to increase. Modern factors, such urbanization, overcrowding and climate change's effects on disease vectors like mosquitoes and habitat destruction are creating the conditions for greater disease transmission from animals and between people.[37]

The US has historically been a low risk for being the source of a disease with pandemic potential. However, as a massive population and a major hub for international travel and trade, the US can increase the spread of a global pandemic. The large network of private and government biosecurity labs also add another threat vector. For example, in 2015, a military site working on chemical and biological weapons accidentally released anthrax samples to 192 laboratories in eight countries.[38]

The pandemic risk emanating from the US is partly mitigated by the significant resources and technological capabilities that can be targeted at pandemic detection and response. The US policy towards infectious diseases is most comprehensively captured in the Pandemic and All-Hazards Preparedness Act, which was enacted in 2006 and reauthorized and amended several times. The response to COVID-19 demonstrated both the strengths and weaknesses of the US system. Operation Warp Speed, authorized primarily by using the Defence Production Act, was critical to vaccine development and distribution globally. However,



the US has suffered one of the highest mortality rates in the developed world.

China is a contributor to pandemic risk. Large swathes of China are still developing, cities are densely populated, and human-animal proximity in areas like wet markets and factory farms are prevalent and potentially unsafe. As a result, many major pandemics in the past century have originated from China: the 1957-1958 "Asian Flu", the 1968 "Hong Kong Flu", the 2002 severe acute respiratory syndrome (SARS); and, of course, COVID-19.[39] In terms of pandemic response, China's centralized structure can cause governance issues, while its autocratic system and surveillance capabilities allows it to monitor and limit disease transmission, enforce vaccinations and quarantines on a massive scale.

The COVID-19 pandemic has led to further enhancements in the country's preparedness and response capabilities, and in 2021, China identified biosecurity as an important issue.[40] However, reputational damage from the uncertain origins of COVID-19 might have limited a more full-throated fix to pandemic risk reduction and any global effort to increase laboratory safety and security.[41]

Bioengineering

Much like AI, synthetic biology – which allows biological systems to be designed and constructed through technological means – has the ability to transform society. By combining chemistry, biology, computer science, and engineering, individuals can develop biological systems and products faster, cheaper and with greater precision.[42] Bioengineering has applications across energy, agriculture, medicine and pharmaceuticals. However, it also democratizes the development of bioweapons.[43] According to global catastrophic risk researchers, engineered pandemics are one of the greatest threats this century.[44] As the technology advances, high-risk biological weapons could be within the reach of smaller states as well as non-state actors.

Biotechnology is growing in economic and strategic importance for both China and the US. China's synthetic biology industry is forecasted to reach $2.2 billion by 2026, representing 10 percent of the global industry, while the US already reached $3.2 billion in 2021 and continues to lead in this field.[45] The competition is only set to grow as the potential applications of biotechnology could have a direct economic impact of up to $4 trillion a year over the next 10-20 years, according to McKinsey.[46] China set aside $330 million for synthetic biology research as part of the 2018-2022 national 5-year plan.[47] Safety around biotechnology also became a focus in 2018 after two Chinese scientists were found to have edited the genome of embryos, two of which became living babies.[48] In response, the Ministry of Science and Technology drafted regulations to ensure the safe and responsible development of China's biotechnology.[49] In 2020, China passed the Biosafety Law of the People's Republic of China, focusing on the security management of biotechnology research and development, as well as laboratory standards.[50]

The US maintains a strong, though declining, edge on synthetic biology. Between 2003 and 2017, the US dominated both synthetic biology



patents and publications.[51] According to this same study, more than 60 percent of the 40 organizations with the most synthetic biology patents were based in the US. The US government is the single biggest funder of biotechnology efforts globally. Between 2008 and 2014, the US invested approximately $820 million dollars in synthetic biology research.[52] By 2014, the investment from the US Department of Defense's research projects arm, DARPA, had risen to $100 million, more than triple the amount spent by the National Science Foundation.[53] The importance of biotechnology led the White House to establish a "National Bioeconomy Board" and for Congress to establish a "National Security Commission on Emerging Biotechnology".[54]

Space weather

When on a collision course with Earth, asteroids and comets pose a massive risk. The impact of a large space object, about 1 km or larger, would be globally catastrophic – much like the events that led to the extinction of the dinosaurs.[55] Upon impact, parts of the Earth's crust would be pulverized and sent into the upper atmosphere. Mass wildfires would take place, and soot and smoke would stay in the upper atmosphere, causing long periods of severe cooling.

Asteroid risk reduction is likely to be the best policy effort both the US and Chinese governments have conducted on global catastrophic risk reduction. Since 1998, the US's Planetary Defense Program, under NASA, has led on asteroid detection and deflection. It estimates that it has managed to track almost all asteroids of extinction level and most of those that would wipe out a continent. On the other side of the world, China joined international mechanisms such as the International Asteroid Warning Network. Wu Yanhua, Deputy Director of the China National Space Administration (CNSA), claimed in April 2022 that China has begun building an asteroid monitoring and defense system, with the aim to conduct tests in 2025.[56]

Solar storms have not received as much a dedicated effort as asteroids. Solar storms, also known as geomagnetic storms, are caused by eruptions on the sun, such as solar flares and coronal mass ejections, releasing vast amounts of energy and charged particles into space. When directed towards Earth, these particles can interact with the Earth's magnetosphere, leading to potential disruptions in satellite operations, communication systems, and power grids. Although solar storms do not directly lead to mortality, the global economy's reliance on communications and electricity supply leaves countries highly vulnerable. A severe solar storm could cause trillions of dollars of economic damage and affect billions of people worldwide.

In October 2020, the US Congress passed the Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow Act, which aimed to improve forecasting and risk reduction for space weather events.[57] In 2023, the White House released the latest five-year National Space and Weather Strategy and Action Plan. Despite these efforts, significant gaps remain in policy efforts to reduce the impact of a solar storm.[58] Similarly, China is also conducting tracking and forecasting through



the Solar Activity Prediction Center (SAPC) and Space Environment Prediction Center (SEPC).[59] China's 2022 white paper on their space program expressed the intention to build "an integrated space-ground space climate monitoring system" and improving "relevant services to effectively respond to catastrophic space climate events."[60]

Food supply security

A collapse of the food system could happen as a result of extreme climate change, nuclear winter or biohazard. Global depletion of clean water, topsoil, and fish stocks will put continued pressure on production even without a global catastrophic risk. As major players in global food supply and with large populations, the US and China have important national interests in maintaining a functioning food system.

The US is one of the largest producers and exporters of food in the world, producing around $350 billion worth of agricultural products and exporting around $150 billion globally. China, meanwhile, is a massive food importer, despite domestic crop production increasing by 44 percent between 2000 and 2018.[61] In fact, China is one of the US's biggest export destinations. The US exported $26.5 billion worth of agricultural products to China in 2020, including soybeans, pork, cotton, corn and grain.[62] Soybean sales alone accounted for $14 billion, as it is an important part of animal feed for livestock, reflecting China's continued appetite for meat. The US also imports food from China, purchasing $3.8 billion worth of fruit, vegetables, pet food and other livestock products in 2020.

Food security is a goal of strategic importance to China.[63] Xi Jinping declared food security the foundation of national security, and grain security featured for the first time in China's 14th Five-Year Plan.[64] China's reliance on agricultural imports for both human and animal consumption is only set to increase as reportedly China only has enough food reserves to last 18 months.[65] In December 2020, China passed a law that required regional and local governments to release grain reserves in times of emergencies such as natural disasters.[66] China is aiming to strengthen its supply chain security given the rising tensions with the US.[67] China's National Food and Strategic Reserves Administration (NFSRA) announced in 2021 that they would build a sophisticated food reserve system.[68]

The governance of US food supply security was enhanced in 2022 by the Biden Administration's "National Security Memorandum on Strengthening the Security and Resilience of United States Food and Agriculture".[69] It directed a number of agencies to conduct risk assessment and management across the food and agricultural sector. Current legislation and policy settings are probably sufficient for typical disasters, but do little to reduce catastrophic risk for the food system. The Stafford Act covers mass emergency feeding, but the Federal Emergency Management Agency might struggle to deliver for a catastrophic incident. The National Food and Agriculture Incident Annex supports federal operational planning for response and recovery, but has not been upgraded since 2019.[70]



A VICIOUS CYCLE OF COMPETITION AND CATASTROPHE

In the 75 years since Mao Zedong established the People's Republic of China in 1949, the relationship between the US and China has been moved in roughly 20-year phases.[71] At the beginning, the relationship was marked by tension and hostility, with very limited direct contact. The US did not recognize the Chinese Communist Party (CCP) as the legitimate government of China and continued to back Taiwan. A year after the CCP took charge, the US and China were backing opposing forces on the Korean Peninsula, and again, later that decade, in Vietnam.

By the early 1970s, however, Chinese-Soviet ties became so strained that the US was no longer China's primary foe. President Nixon's visit to China in 1972 normalized relations, paving the way for formal recognition and ties in 1979. The US was now a strategic partner and de-facto ally.[72] The US provided China with economic, development, technological, intelligence and, until 1989, military assistance. The US saw China as a counterbalance to the Soviet Union and a potentially valuable source of trade and investment.[73]

The end of the Cold War and the Tiananmen Square protests and massacre brought another strategic shift in the relationship: political misalignment combined with greater economic interdependence. Deng Xiaoping's economic reforms had opened China up to the world, but most of all to the US. Economic ties grew rapidly: between 1980 and 2004, two-way trade rose from $5 billion to $231 billion.[74] The Sino-American relationship was mutually beneficial. China could expand its global trading relationships on the back of a US-led order, and China helped finance the US's debt-fuelled spending spree. This symbiosis was an economic chimera – or, as financial historian Niall Ferguson put it in 2007, 'Chimerica'.[75]

But during the 1990s, the US policy of "constructive engagement" was being severely tested.[76] The Third Taiwan Strait Crisis over 1995-1996, the accidental bombing of China's embassy in Belgrade in 1999, and the 2001 Hainan Island incident brought the two countries to loggerheads. The US support for China's accession to the World Trade Organization (WTO) in 2001 was a reprieve, but only highlighted the disconnect between political and economic interests. By this point, US politicians and foreign policy experts were already seeing the writing on the wall: China's geopolitical rise was inexorable and the US was not prepared.[77]

There is no single moment when the US–China relationship took on a new hue, but 2008 was a watershed year. China began to edge Japan out as the world's second largest economy in nominal GDP terms. Xi Jinping was appointed Vice President and, so, likely successor. And China showcased its national capabilities hosting the Summer Olympics. With the US mired in Iraq and Afghanistan, and the US-originated global financial crisis revealing the fragilities of an open economic system, Chinese perceptions of a US global power in decline were seemingly



validated. It was China's coming-out party. And it helped usher in a new phase of competition.[78]

Over the past 15 years, the two countries have separately faced their own respective sets of unresolved political, social, environmental, demographic, health and economic challenges, all while encountering generational leadership transitions. The unsteady domestic footing in both countries has itself fed into the testy relationship.[79] For now, it has mostly settled into an uneasy rhythm. "The new normal is one of continuing, long-term strategic and systemic competition," according to the 741-page report by the US-China Economic and Security Review Commission, released in November 2023.[80]

Various terms have been applied to this latest phase: new Cold War; enduring rivalry; Thucydides Trap; co-opetition; Era of entanglement.[81] However one wants to frame it, there is no denying that the US and China see each other as strategic competitors. And they are both deploying just about every arm of government, and even society, to curtail the other's power and position themselves as the preeminent global leader.

The problem for the world is that humanity faces a set of global catastrophic threats for which the US and China will be key players. Their actions are exacerbating the threats. And a healthy relationship will be needed to treat them. Strategic competition between the two superpowers is only making global catastrophic risk worse.

Neither country is making the global risk landscape better holistically. Adding the competitive dynamic and the various threads in the relationship, the outlook is even more concerning. The competition between the US and China is increasing the risk of global catastrophe.

A conflict between the two countries would be one of the most direct ways their relationship might cause a global catastrophe. But their combined impact on global catastrophic risk is broader than a conflict scenario.

Six interlinked elements of the US-China relationship are responsible for shaping global catastrophic risk and any efforts to reduce it:

- Threat perception of each other in comparison to threat perception of global catastrophic risk;
- Development of strategic capabilities, particularly in the domains of nuclear weapons, cyber, and space;
- Pursuit of global technological primacy, particularly in AI, quantum and clean energy;
- Personal relationship and dynamics between leaders and other senior officials;
- Broader bilateral links and tensions across trade, business, culture, and academia; and
- Competition and cooperation within multilateral institutions.



Box 1: How US-China competition drives global catastrophic risk

The following graphic represents the authors' assessments of how the various elements of US-China competition shaping global catastrophic risk are currently positioned and trending. This is an illustration based on a qualitative assessment and is not based on quantitative metrics. Regardless, it provides a strong indication that the current US-China relationship is increasing the risk of global catastrophe, and trending poorly.

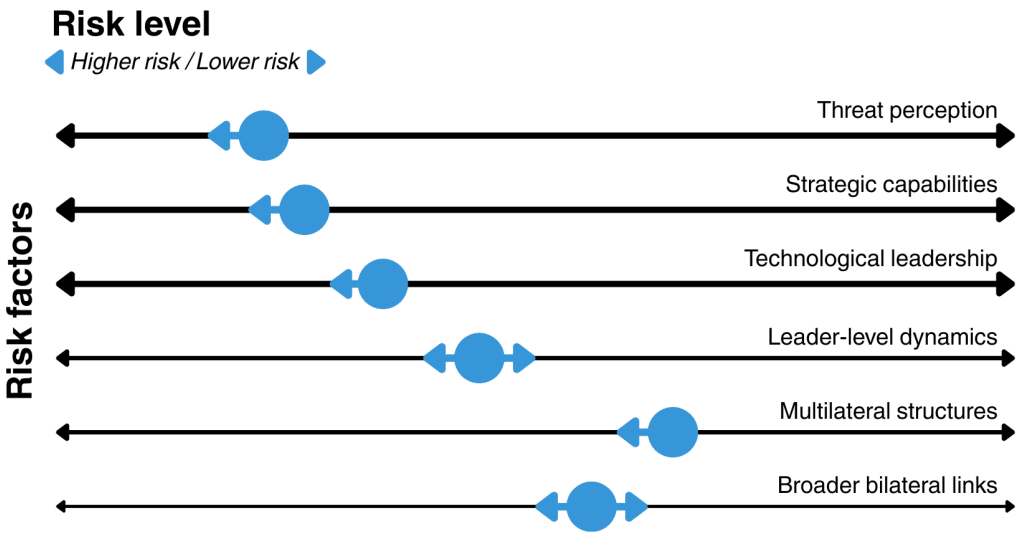

Figure 1. The weight of each line represents the strength of the force on global catastrophic risk. Risk decreases from left to right. Each dot represents the qualitative assessment of whether each factor is increasing or decreasing risk. An arrow pointing in one direction indicates a trend. Arrows pointing in both directions indicate relative stability.

The three strongest forces – threat perception, strategic capabilities, and technology leadership – are not only increasing the likelihood of risk, but they are trending in a direction that is making global catastrophic risk worse. Leader-level dynamics are slightly poor given the stilted and intermittent engagement between the presidents and their senior officials; it remains stable yet slightly tenuous. Broader bilateral links and multilateral structures are helping to reduce global catastrophic risk – or at least restraining American and Chinese actions that increase the risk – but only very slightly.

Taken together, these forces are pushing the two countries apart and reducing the opportunities to engage constructively on the threats the world faces.

Threat perception

Each power is highly sensitive to the threat posed from the other country. As a report from the United States Institute of Peace states, "there is mutual skepticism of strategic intentions and a profound lack of trust between the United States and China."[82] The notion that the other country poses an existential threat is partially informed, if not dominated, by their political systems being antithetical to each other.[83]

Threat perception plays an important role in global politics. How a country perceives the threat from another will shape its strategies, particularly in terms of offensive and defensive capabilities, espionage, bilateral diplomacy, alliance and partner relationships, and multilateral organizations. Traditional foreign policy schools mostly look to military power as the key source of threat.[84]

However, threat arises from any capability or effort that could significantly harm one country's interests, and the intent to use those capabilities. The perception of both intent and capability is formed from a variety of inputs: the assessments of the other actor's public statements, the development and application of hard and soft power, official dialogue between the states, and other forms of military and political signaling.

Given the natural tension in the core interests and strategic culture, the political, military and bureaucratic establishments in both countries see each other as the primary threat. In US policy, China is labeled as the only country rivaling US supremacy across all domains. In June 2020, FBI Director Christopher Wray stated that "the greatest long-term threat to our nation's information and intellectual property, and to our economic vitality, is the counterintelligence and economic espionage threat from China."[85] In December 2020, the then-Director of National Intelligence and current CIA Director John Ratcliffe warned that "the People's Republic of China poses the greatest threat to America today, and the greatest threat to democracy and freedom worldwide since World War II."[86] There was little change in perception of China between the Trump and Biden administrations.[87] In its 2023 annual threat assessment, the US intelligence community assessed that "China has the capability to directly attempt to alter the rules-based global order in every realm and across multiple regions, as a near-peer competitor that is increasingly pushing to change global norms and potentially threatening its neighbors."[88] This perception seems likely to harden in the US, as public favorability of China has plummeted to record lows.[89]

China's perception of the US is not dissimilar. It frames the relationship with the US in terms of rivalry, confrontation and a long-term struggle.[90] The Chinese system does not have a specific name for its approach to the US, and no official document that outlines its strategy towards the US is known to exist.[91] The approach is fundamentally realist, while resting on China's own historical and strategic traditions. China sees the US' strategic interests in Asia in direct opposition to its own, and perceives US actions as attempts to suppress China's power and rightful place in the world. The specter of the US shapes China's efforts to engage the world, including its strategic partnerships with Russia



and other neighbors, its Belt and Road Initiative, securing of its food supply, and recent laws on export controls and investment screening.[92]

In an early 2021 interview, China's Foreign Minister Wang Yi stated that "the US [has attempted] to suppress China and start a new Cold War."[93] Mostly through actions, and obliquely through words, China has made clear that it sees the US as a primary threat to security. The US intelligence community puts it succinctly: "China views Washington's competitive measures against Beijing as part of a broader U.S. diplomatic, economic, military, and technological effort to contain its rise, undermine CCP rule, and prevent the PRC from achieving its regional and global power ambitions."[94]

These perceptions, and misperceptions, are driving attitudes and actions towards each other.[95] Whether these threat perceptions are accurate or fair is beside the point. As each country squares up against the other, they take precious attention and resources away from managing the risk of global catastrophe. The US intelligence community did include a small comment about "existential risks" as part of its Global Trends 2040 report, released in 2021.[96] But the US leadership does not seem to be actively thinking about this issue. There is no evidence that Chinese leadership is either.

Climate change is a totemic example of where the two countries can collaborate, and can play a global leadership role, when they perceive a threat greater than each other. In 2023, the two countries reaffirmed their plans to work together to tackle climate change, building on the joint work ahead of the Paris Agreement and the Joint Statement Addressing the Climate Crisis in 2021. The bilateral efforts and engagement were also led by special envoys, who had, to the extent possible, carved out the issue from the broader relationship.

Strategic capabilities

Strategic competition is driving both major powers to increase their military capabilities across various domains – especially nuclear weapons, cyber and space. Ultimately, the US and China are heavily investing in these capabilities to deter attack and win in a conflict scenario.

Mutual deterrence and bipolarity can bring a sense of stability. These capabilities could help restrain each country should either one take unilateral measures that threaten global catastrophe. But, as the Cold War demonstrated, decades of accidents, near-misses and meaningful threats hardly qualifies as safe. The strategic imperative for these highly advanced capabilities will probably increase the risk of global catastrophe.

Nuclear

The nuclear weapons arsenals of both countries are enough to cause global catastrophe. As a strategic competition heats up and makes conflict increasingly plausible, their nuclear dynamic becomes one of the most direct ways the US and China could cause a global catastrophe (see Box 1). China's increasing and modernizing nuclear arsenal will also cause a



paradigm shift into a tripolar – and more unstable – nuclear system.[97]

The primary mechanism for bilateral dialogue on nuclear issues has been mostly informal channels.[98] From 2004 to 2019, American and Chinese experts held a series of biennial meetings in Beijing and Hawaii with former and current officials participating in personal capacities to discuss nuclear policy.[99] President Obama's nuclear security summits enabled engagement with China on the issues, but non-proliferation efforts around North Korea was the extent of the common ground. According to a former senior official who participated in every meeting between President Obama and China's head of state from 2009 to 2015, the topic of nuclear weapons was not raised once by either side.[100] When the relationship further soured under President Trump, even informal meetings were abandoned.

Lack of dialogue is concerning particularly because the two countries have starkly different approaches to nuclear strategy.[101] Washington's approach to nuclear risk is based on transparency and verification measures, but their lack of no-first-use policy makes Beijing uneasy.[102] Beijing's strategy revolves around secrecy, ambiguity, and uncertainty around nuclear capabilities. For example, China's official number of nuclear warheads remains undisclosed. The Federation of Atomic Scientists – which says "estimating China's nuclear forces is a challenging endeavor" – estimated that China has produced a stockpile of roughly 440 active nuclear warheads and another 60 more produced.[103] The US Department of Defense approximated a similar number.[104]

US defense officials also point to the rapid advancements of China's nuclear capabilities as evidence that core elements of its posture, such as policies restricting first use and launch-on-warning, will be reversed. Even terminology around the capabilities are interpreted differently. China sees the US concept of strategic stability as a euphemism for containment.[105] And the US's distinction between offense and defense is less clear in Chinese military strategy, 'weishe' (威慑), which means both deterrence and coercion.[106]

The US continues to increase its nuclear capabilities, at least partly in response to China, reinforcing the competitive dynamics between the powers. Global precision strike, hypersonic missiles, and missile defense concern Chinese military planners. And the US nuclear posture, which includes extended deterrence to allies in Europe and Asia, creates both consternation and urgency for a China that has no such alliance network.[107]

Cyber

Both countries' growing cyber capabilities expand their respective military might. By the early 2010s, China had become a cyber powerhouse. The Golden Shield Project, nicknamed the Great Firewall of China, was fully operational, becoming one of the most formidable systems of internet surveillance and censorship in the world. China began to shape global cyber norms and policies. And the scale, reach and recklessness of its offensive attacks



were having global repercussions. Since then, China's capabilities have become world-class. By the end of the decade, its cyber posture became more forward-leaning and sophisticated, its targeting became more purposeful and strategic, and its operations became more complex and better hidden.[108] Beijing sees its cyber arm as critical to national power, using it to maintain domestic stability, engage in espionage and intellectual property theft, conduct offensive attacks, enable critical infrastructure disruption during conflict periods and support other political, intelligence and military objectives.

The US still remains the world leader on cyber according to global estimates.[109] The US has significant civilian and military capability, extensive operational experience, the world's strongest digital-industrial base, world-class cyber-intelligence capability, highly advanced cryptographic techniques, and an alliance and partnership network with similarly advanced cyber nations. The US military's cyber capability is particularly advanced and coordinated. CYBERCOM was elevated to a fully unified command in 2018, with around 6,000 service members. Despite its cyber capabilities, the US is highly alert to the cyber threat from China. The set of official military and security reveal an alarmed, perhaps even overwhelmed, US security establishment.[110]

Space

Space has been at the forefront of increasing competition between the US and China.[111] For its military application, as well as a point of national pride and scientific prowess, space represents a critical domain for both countries to dominate. As a detailed report on strategic stability in space notes, "US-China competition in space is intensifying against a backdrop of rapid advances in technology, China's commitment to developing its already formidable space capabilities, and the increasingly confrontational nature of US-China relations."[112]

The US remains the undisputed leader in space capabilities and innovation. It boasts sophisticated reconnaissance satellites, the Global Positioning System (GPS), and secure communication satellites. The US conducts comprehensive space surveillance to monitor space objects and potential threats, and possesses direct ascent anti-satellite missiles and cyber-electronic warfare capabilities to disrupt satellites. Space-based capabilities are essential to its nuclear command, control and communications.

A more coordinated approach to space policy and force posture in the US has also demonstrated the increasing importance it places on space dominance. In 2017, the National Space Council was re-established in the Executive Office of the President, after being disbanded in 1993.[113] In 2019, the US Space Force was formalized as the sixth military branch, and USSPACECOM was activated to oversee all military space operations. A number of space-based policy directives were also announced during both the Trump and Biden administrations, including the Artemis Program for sending humans to the Moon.[114]

Just as in other domains, China wants to replace the US as the space powerhouse. The goal stated by a number of senior Chinese officials is for



China to surpass the US in various space-related activities by 2050.[115] In military strategy documents, China specifically references space as a domain for strategic competition and military conflict.[116]

The PRC tripled its satellite fleet between 2018 and 2024, to contain more than 350 systems. The PRC continues to quickly improve its other space-related capabilities, such as launch, including reusable rockets, monitoring US forces from space, and counter-space weapons.

In addition to nuclear weapons and cyber, space is a domain for increased competition, accidental crises and war-fighting. The US is increasingly concerned about China's military build-up in space.[117] According to RAND, the People's Liberation Army (PLA) is much more willing to accept risk in the space domain due to the broader strategic competition and President Xi's guidance to be more proactive in shaping the international environment.[118] It assessed that "the PLA's approach to deterrence – in the space domain and more broadly – appears to emphasize risk-accepting escalation to extract political victories rather than arresting escalation." There are no direct avenues to de-escalate an unintended crisis in space.



Box 2: Nuclear war between the US and China is a highly unlikely but plausible scenario

A military conflict between the US and China in the next 2-3 decades is possible. A conventional conflict would be disastrous for the world as allies might be drawn in, major trade and supply routes could close, millions of people could perish, and hope of responding to global challenges would be dashed. An additional concern looms: a conventional military conflict that turns into a nuclear war. Such an outcome would be globally catastrophic, potentially existential, for the world.

Neither country wants a conflict. But provocations, accidents, miscommunication and poor judgment could lead to a small conflict that quickly and inadvertently escalates. The two powers are already in a precarious stand-off over Taiwan, which China seems adamant on "reunifying". Should a conflict scenario occur, Taiwan seems the most likely flashpoint. There are also other potential hotspots, such as the South China Sea and Korean Peninsula. The domains of cyber and space further increase contest, complicate military doctrine, and increase the risk of accidents or incidents that spiral. War between great powers is caused by a range of complex issues, motives, and interests.[119]

A war between the US and China could involve nuclear weapons.[120] The argument for having nuclear weapons is to deter conflict in the first place and to reduce the risk of escalation should a small-scale confrontation occur. As a result, deliberate first use is extremely unlikely. The two powers would steer away from using nuclear weapons because of "the limited stakes of most US-China conflict scenarios, the fact that both have survivable nuclear retaliatory capabilities, and the uncertainty over whether limited nuclear exchanges could indeed remain limited."[121] Though such a scenario should not be ruled out. An Atlantic Council report assesses that "China might use its nuclear forces to support an invasion of Taiwan and deter a US response."[122]

Many arguments for having nuclear weapons fail to adequately consider the possibility of accidents and miscalculation. Keeping a war limited to a conventional conflict would be difficult and there are many plausible paths to inadvertent nuclear escalation.[123] For example, China might not know whether US bombers are nuclear capable due to a deliberate obfuscation by the US Air Force, risking a hasty nuclear reaction.[124] A devastating cyberattack against US military assets or civilian infrastructure, which would be a potential reaction by the Chinese, could be grounds for US nuclear use.[125] If the cyberattack restricted US nuclear command, control and communications (NC3), it would be even further impetus for a nuclear response. US strikes against ostensibly conventional targets might accidentally hit Chinese nuclear capabilities, and if political survival was at stake, Beijing might see nuclear escalation as the only rational response.[126] Artificial intelligence, once involved, could also increase uncertainty and reduce decision-making time and quality.



The likelihood of a nuclear war between the US and China is very difficult to estimate. In 2015, Dennis Blair, former US Director of National Intelligence and former Commander of US Pacific Command, put the odds at "somewhere between nil and zero," mostly based on the premise that the US would not attack the Chinese homeland and that US military and political leadership were aware of measures and need to reduce the risk of escalation.[127] A 2015 RAND report on how a US-China war would unfold estimated that the chance of a nuclear exchange was "very low."[128] But recent public and classified wargames indicate a nuclear response from China as possible even if not likely.[129]

The risk is real, both in terms of a non-negligible probability, extreme consequences and high levels of uncertainty. Much of the uncertainty might not be resolved until the conflict itself, based on various highly complex questions that will shape how a conflict progresses: How does the conflict arise? Where and how is it fought? How does it unfold? What military and political losses are incurred? What is the role of space, cyber and AI? What are conventional and nuclear assets and capabilities on both sides? Where and how are they deployed? What is nuclear doctrine and command and control on both sides? How does each power perceive the deterrence threat? Who are the national and military leaders? What diplomatic and military communication channels are available?[130]

A nuclear war between the US and China is probably what most people would consider the most direct path that the two countries bring about a global catastrophe. However, it should not necessarily warrant the most attention from the perspective of global catastrophic risk. Strategic competition drives global catastrophic risk in many ways, and a conflict scenario, including the potential for nuclear escalation, already receives significant attention from US-China experts and military planners. Those worried about global catastrophic risk should consider other mechanisms through which US-China relations bring the world closer to catastrophe.



Global technology primacy and leadership

Technology has become its own distinct area of competition between the US and China.[131] Both countries are vying for leadership in technology because it underpins efforts toward military and economic supremacy.[132] China has already displaced the US as the world's top high-tech manufacturer, and is moving up the complexity curve to focus on foundational and emerging technologies.[133] Dominating these areas, including civilian uses of AI, quantum information science, cyber and space, could provide enormous strategic benefits.

Technology has always played a crucial role in establishing national power. But the pace, scale and significance of technological disruption in the 21st century has made US-China technology competition especially sharp. Indeed, President Xi stated that "technological innovation has become the main battleground of global politics" while former President Biden's CIA Director Bill Burns called it the "main arena for competition and rivalry with China."[134]

This competition arises during a period in human history where advances in technology will likely bring about extreme consequences. As existential risk researcher Toby Ord has written, "fueled by technological progress, our power has grown so great that for the first time in humanity's long history, we have the capacity to destroy ourselves."[135]

Technology is the underpinning and unrelenting force behind many of the global catastrophic threats, such as advanced AI and engineered pandemics. As technology improves, it often makes dangerous capabilities cheaper, more accessible, and scalable. Whether by accident or intention, possible harms caused by these technologies could be global and irreversible. Furthermore, as society becomes increasingly reliant on technology-dependent critical infrastructure, it becomes far more vulnerable to technological attacks.

For example, an AI-enabled cyber attack targeting military systems, communications networks, or electricity grids could have cascading consequences on a national or global scale. The intersection of emerging technologies with nuclear weapons poses a new and complex problem. AI systems might be integrated into nuclear command and control arrangements, with the potential to impact the stability of nuclear deterrence between the US and China. Cyber espionage, interference and attacks against nuclear command, control and communications systems could be destabilizing and escalatory.[136] Mass cyber attacks against military and critical infrastructure could lead to nuclear responses, which the US has fed into its doctrine.[137] As military technology advances, non-nuclear capabilities could cause increasingly catastrophic damage.

Strategic competition between the two powers will exacerbate these issues.[138] The US and China are already incentivizing and supporting their own nation's companies to advance quickly and develop a technological edge. In normal circumstances, market forces drive technology companies to be more efficient, identify new



opportunities, build new products, and expand their customer base. But market forces can incentivize risky approaches to technological research, development, and diffusion. In this case, testing and safeguards are not adequately established. This push to excel may drive American and Chinese companies to even further de-prioritize or diminish the risk that arises from technological progress.

The rivalry will also push the governments to gain a technological edge in the military domain. Nuclear weapons – the first modern technology capable of leading to global catastrophe – was born out of great power conflict. Yet, advances in military and other strategic capabilities, particularly in cyber and space, could increase the risk by providing more vectors for global harm, create more opportunities for tension and miscalculation, and complicate military doctrine.

Both Beijing and Washington are investing huge financial sums and policy effort into the technology sector with a clear eye to the narrowing gap between the two powers. While the US innovation ecosystem is more dynamic, the US is still behind China when it comes to investment in technological research and development. In its 14th five-year plan, China committed to spending $1.4 trillion over five years for digital infrastructure, including 5G, smart cities, and Internet of Things applications for manufacturing.[139]

The race over technology leadership is only getting increasingly contentious, with the two governments using industrial policy to gain advantage and hamper their foe. For example, the US barred five Chinese companies, including Huawei and ZTE, from US 5G telecommunications procurement plans. And over 2022-2024, the Biden administration enacted the CHIPS and Science Act and introduced strict export controls under the Export Administration Regulations to limit China's access to advanced semiconductors. These measures restricted US companies and allies from selling high-performance chips and technology to Chinese entities, aiming to curb China's progress in AI, supercomputing, and defense technologies.

Competition over technological progress is typically a positive force for global good. It allows more people to access improved goods and services at cheaper prices. Indeed, in some areas of innovation, global challenges need more competitive dynamics. For example, competition over renewable energy could spur greater innovation and a quicker transition away from fossil fuels, such as around battery technology and electric vehicles.[140] Not all races are to the bottom. However, dual-use or strategically latent technologies – which characterize AI, cyber and synthetic biology – turn risk into afterthoughts when framed in a more competitive dynamic.[141]

Leader-level dynamics

The relationship between leaders could hamper or speed up the reduction of global catastrophic risk. The interpersonal relationship between the two presidents, along with their most senior staff, can be critical in breaking impasses or, alternatively, breaking trust. Some schools of international relations might dismiss the personalities of leaders and their relationships



as a major factor in strategic competition. This perspective would claim that power dynamics, rather than personal dynamics, drive the behaviors of nation states. The ability to project and employ power is, of course, important. But the connection between leaders can be vital at the most critical moments of great power rivalry.

During the Cold War, personal relationships between leaders shaped nuclear tensions. At the 1961 Vienna Summit, Soviet Premier Nikita Khrushchev dominated the newly minted US President John F. Kennedy, who "found the Soviet leader's ideological self-confidence thoroughly intimidating."[142] The mental upper hand gave Khrushchev greater confidence to deploy nuclear missiles to Cuba in 1962.[143] Twenty-five years later, increasingly warm relations between Ronald Reagan and Mikhail Gorbachev were critical to seeing a peaceful end to the Cold War. [144]

The rapport between leaders can bind their countries when different political imperatives could drive them apart. However, positive senior-level relations cannot overcome irreconcilable differences. And friendly leadership does not necessarily translate into positive outcomes if the broader relationship lacks substance. For example, President Trump made previously inconceivable leaps with North Korea by directly connecting with Kim Jong Un. Yet, after three summits between the two leaders, no bilateral agreements were reached and a positive path forward vanished.

With an increasingly powerful President Xi, a positive relationship at the leader level could help break the impasse on catastrophic risk. Ryan Haas, ahead of Biden's inauguration, wrote: "Given the Leninist, top-down structure of the Chinese government, it is necessary to develop a high-functioning leader-level relationship."[145] The recommendation is no different for a Trump administration. Unfortunately, the relationship between Presidents Biden and Xi did not yield promise. During Biden's term, the leaders had seven interactions, but only two of those were face-to-face.

The relationship between Cabinet-level officials could also shape the direction of the risk. The most hopeful example of US-China collaboration, around climate change, was made possible by the relationship between American and Chinese climate negotiators. John Kerry and Xie Zhenhua forged their relationship during negotiations for the Paris Agreement and allowed for continued discussion at senior levels while other bilateral issues remain highly contentious.[146] It is unclear if the same roles, and the broader dynamic, will remain under President Trump.

Broader bilateral links and tensions

The broader bilateral relationship is complex and multifaceted. It includes significant economic ties, strong people-to-people and cultural links, joint academic and scientific research, and cooperation on some transnational issues. These elements of the relationship have provided some ballast and areas of engagement even as, and especially when, tensions have heightened. They help build or reaffirm bridges between the two countries when the political rhetoric and policy planning provides little relief. Transnational



groups, such as major corporations and academic institutions, help shape domestic political thinking and help make clear that the relationship is not all bad or zero sum.

The broader bilateral links help encourage cooperation and high-level engagement. From the perspective of global catastrophic risk, any aspect of the relationship that helps bring the two countries together is positive, and specific elements of the bilateral relationship could be directly leveraged to help reduce global catastrophic risk. The links between academic institutions, for example, provide an avenue for shared research into and communication of shared threats. Track 2 dialogues on issues such as nuclear weapons, climate change, and more recently AI, have helped bolster official processes, which have waxed and waned.

Unfortunately, the competitive dynamic in the military, security, and technology domains dominates leadership views far beyond these softer bilateral factors. Areas of cooperation and engagement can themselves be used as domains to apply punishment and harsh statecraft. Trade and investment, for example, is crucial for both countries. They are a significant economic partner of each other, but trade became a particular point of conflict during the first Trump Administration, and has remained so.

Scientific cooperation seems to be destined to a similar fate. The US and China are leading partners in producing scientific research. However, the US fears that Chinese academics are not only leveraging academic and scientific partnership for military gains, but also stealing intellectual property and sensitive research, ultimately souring the scientific relationship.[147] The US-China Science and Technology Agreement (STA), the first accord they signed when formal diplomatic links were established in 1979, was close to failure, and ultimately extended late in President Biden's term and downgraded to only cover basic research.[148]

Even food has been weaponized.[149] When trade sanctions escalated under the Trump Administration, Beijing doubled down on its plans to fortify its own independence and self-sufficiency with regard to food security.[150] The US agricultural sector was hit by Chinese trade retaliation when China targeted $34 billion worth of US agricultural products. China was glad that sanctions hit the politically influential US farm states while boosting its own domestic industry, which seemed to be a domestic win-win. Chinese investments into American farmland, livestock, and agricultural infrastructure is also cause for consternation in some US political and security circles.[151]

Under the Obama and Biden Administrations, climate change had remained relatively above the fray. According to China's Foreign Minister Wang Yi, climate change was an oasis in the relationship. However, he starkly continued: "surrounding the oasis is a desert, and the oasis could be desertified very soon."[152]

The perennial challenge facing broader bilateral links and engagement is that the US and China are political foils. Domestic political incentives, systemic differences, and institutional mindsets set up the relationship in adversarial terms. China's one-party rule and restrictions on civil liberties clashes with American liberal ideals and



organized political chaos. Where the US promotes democracy and liberal freedoms, China emphasizes centralized governance and comprehensive state control.

This friction filters into their respective politics. Their competition and rivalry are increasingly featured in political rhetoric; nationalist and populist appeals are best framed with a clear foe. American politicians can appeal to voter concerns about national security and economic competitiveness by pointing to China as a looming global threat. And, Chinese politicians use the American specter to justify a strong hand, global expansion, and the centrality of the Party. It is no surprise that American views on China have plummeted, feeding back into the political need to cast China as foe, not friend. The same cycle is happening in China.

The fact that neither country's population desires conflict seems to be one point of alignment. Both countries' citizens prioritize domestic issues, such as economic conditions, health care, and education, over military spending.[153] And neither set of politicians see significant benefit for an overly tense relationship. After a draining two decades of the global war on terror, and growing controversy over supporting Ukraine and Israel in their respective conflicts, policymakers in the US will find little support from constituents on a conflict with China.[154] Chinese leaders probably assess that they are currently unlikely to win a conflict with the US, which would be tremendously costly both for domestic stability and long-term national rejuvenation.

Multilateral structures

Multilateral structures and forums could provide important ties as global catastrophic risk continues to grow. Such structures bound actions and set the stage for collaboration. Both the US and China share leadership roles in many important multilateral fora and generally take these roles seriously, even if their leadership generates controversy with other countries.

These structures provide an avenue to conduct dialogue and outreach, particularly when heated bilateral tensions call for low-risk and low-profile engagement. Leaders attending annual meetings are able to meet face-to-face in a neutral setting, avoiding the political and bureaucratic hurdles of hosting one another. American and Chinese leaders might find it hard to avoid one another in the corridors of summits and multilateral institutions. A run of multilateral summits late in the year where both leaders typically attend – such as the United Nations General Assembly (UNGA), East Asia Summit and Asia-Pacific Economic Cooperation (APEC) forum – is such an opportunity.

In the most extreme circumstance, these forums are one of the channels that countries can use to reach out and break an impasse. For example, North Korea's permanent mission to the United Nations (UN) in New York has been an important avenue for the US to start a dialogue or engage in discreet negotiations. This channel helped lay the groundwork for important negotiations such as the 1994 Agreed Framework.[155]

Multilateral forums could also help provide civil society and smaller nations a unified voice to



raise issues. Landmark weapons treaties, such as the Mine Ban Treaty, the Chemical Weapons Convention and the Arms Trade Treaty, were successfully pushed by middle powers in the face of veto-holding Security Council member states who produced and used such weapons.[156] In some cases, these middle power countries might have a better shot at pushing through constraints on major powers because they bring less political baggage.

Finally, multilateral forums might be a platform for the US and China to lead and drive efforts on global catastrophic risk reduction. In times of heightened competition, countries might take the lead from major powers when signing onto international treaties. One study showed that, between 1981 and 1990, countries were much more likely to ratify an environmental treaty if the US or the USSR had done so first.[157]

Indeed, the Paris Agreement would almost certainly not have happened had the US and China decided not to participate. The US also spearheaded efforts that led to the Montreal Protocol on Substances that Deplete the Ozone Layer.[158] Domestic US regulations that banned the non-essential use of chlorofluorocarbons as well as government-funded research and international advocacy were important precursors for global action. According to a study of 255 global environmental treaties, geopolitical factors – including the number of other countries that have already ratified a treaty – are more likely to influence remaining countries than domestic factors.[159]

The multilateral system is, however, under serious strain. Geopolitical competition, the rise of non-state actors, and pushback to globalization has made collective action on global challenges increasingly difficult over the past two decades. The growing number of regimes and expanding scope of institutions has also brought gridlock, inefficiency and bureaucracy to global decision-making. The US and China are more heavily competing in multilateral institutions. They seek greater influence in the rules, norms and decisions made by these groupings. From a global catastrophic risk perspective, organizations such as the International Atomic Energy Agency, the UN Office for Disarmament Affairs and the World Health Organization must work well to monitor, manage and treat global threats. However, China's efforts to take on an increasingly prominent role in these organizations, among others, will bump up against the US's long-standing leadership role.

As much as the two powers push against and test these structures, neither wants to see them disappear. China, despite dissatisfaction with American influence in these fora, does not seek to dismantle a structure from which it has also benefited. However, China might still look for ways to reshape these structures in its own national interests. According to RAND, "Xi Jinping has stated on numerous occasions that China intends to expand its role in global governance and has directed officials to 'inject Chinese voices' into organizations responsible for aspects of global governance, even as he insisted China upholds the international order."[160] The UN Security Council (UNSC), the G20, and the East Asia Summit, for example, are important security and economic cooperation mechanisms that



bring the two countries together. These forums, and new ones that might arise around specific global catastrophic threats, could provide one of the few bulwarks against a rising tide of strategic competition.



TOWARDS STRATEGIC COOPERATION

The strategic relationship between the US and China is a critical determinant of how global catastrophic risk will play out this century. Fundamentally, the two countries need to chart a new path in their relationship should humanity wish to avert global catastrophe. Abandoning a competitive dynamic between them might not be possible or even needed. But when it comes to global catastrophic risk, the world needs strategic cooperation, not strategic competition.

The following policy framework presents a strategic approach for how the two countries can work together to reduce the risk beyond their own domestic efforts. Even in the contested relationship, practical steps can be taken to reduce the risk of global catastrophe.

Four focus areas are outlined, with possible options within each. Not all these steps will be possible immediately or simultaneously, and some are more feasible and pragmatic than others. The purpose in developing this framework is to identify a range of efforts across the different focus areas that could provide a platform for reducing global catastrophic risk and improving the relationship overall.

Focus area 1: Collaborate bilaterally on reducing global catastrophic threats and building global resilience

The US and China could work together to reduce potentially catastrophic threats and build global resilience. This element of the framework is essentially prescribed in US strategic thinking. In its 2022 National Security Strategy, the US recognized that "we will always be willing to work with the [People's Republic of China] where our interests align…That includes on climate, pandemic threats, nonproliferation, countering illicit and illegal narcotics, the global food crisis, and macroeconomic issues."[161]

Engagement on fundamental bilateral security and economic issues is already challenging, and issues that are directly tied to national power, such as nuclear weapons and AI, are sensitive topics. But even during the Cold War, the US and the Soviet Union cooperated when faced with a common threat. [162] [163] No matter how troubled a relationship, major powers can still work together when they perceive the risk to be high enough.[164]

China and the US could start on collaborations that are small and discreet, where initial efforts can develop a strong foundation for a more wide-ranging effort. The areas of collaboration would be more likely to succeed if they are non-partisan, both bilaterally and domestically, so that they do not become politicized or otherwise charged. Additionally, these collaborations could be in areas where the risk and reward are shared, rather than ones that are perceived to harm or benefit a single actor.

Address natural and space-based threats

Managing the risk from near-Earth objects, like asteroids, and supervolcanoes could be an area where the US and China could work together. Risk from both might be relatively low compared



to risk from anthropogenic sources, such as advanced AI, engineered pandemics, nuclear weapons and climate change. However, that they are highly unlikely natural hazards with a strong scientific component might make collaboration on them a less controversial starting point for US-China cooperation.

Space is an increasingly fraught area in the US-China relationship. It has become its own domain of competition. And a 2011 restriction placed on funding for NASA – the "Wolf Amendment" – bans NASA from engaging bilaterally with its counterpart in China without either an explicit authorization from Congress or an expansive certification from the FBI.[165] It effectively blocks any significant bilateral cooperation.[166] Collaboration between scientists in this area would represent a small but symbolically meaningful way of showing the world that the two powers can work together.[167]

On asteroid detection, the cooperation would start from a strong base.[168] NASA has had an asteroid detection program for over two decades and assesses that it has cataloged around 90 percent of the extinction-level asteroids in the solar system.[169] Still, tracking city-destroying asteroids and comets requires more work. NASA has also conducted its first tests of asteroid deflection, practicing for any future asteroids that should head toward Earth.[170] The respective space agencies also participate in multilateral efforts, such as the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and International Asteroid Warning Network (IAWN).

Solar storms could present an area for engagement, probably also involving NASA and the China National Space Administration. However, solar storms remain a poorly understood risk and efforts to monitor and prepare for solar storms are miniscule. The US and China are in ideal positions to use their extensive space capabilities to share insights and develop joint research and monitoring programs.

Supervolcanic eruptions, much like asteroids and solar storms, are unlikely. But they provide an opportunity for meaningful engagement and scientific collaboration. Unlike asteroids and solar storms, supervolcanoes do not fall under the remit of NASA and, therefore, could allow for more open exchange with China. The US Geological Survey has already conducted significant work in the area, given that the US is one of the most seismically active countries in the world.[171] The US's capability on earthquakes is also very strong due to the major risk to the US west coast.[172] The most recent comprehensive forecast of earthquakes in California, released in 2015 and called UCERF3, assessed a 7 percent chance of an earthquake of 8.0 magnitude or greater over a 30 year horizon.[173] The China Earthquake Association (CEA) annually assesses areas where a 5.0+ magnitude earthquake might occur and runs regional risk assessments more regularly.[174] Indeed, the CEA borrows practices from the US including UCERF3.[175] These issues present a low-risk way for the US to share scientific know-how that would be useful for China and the world.



Strengthen nuclear security

Both the US and China have an interest in maintaining the security of nuclear materials and facilities from being stolen, sabotaged or used by nefarious actors. Extremists and terrorists are a key vector for such a threat. Yet nuclear terrorism is an understated component of nuclear strategy, stability and risk. Terrorist organizations have indicated their interest in obtaining and using nuclear weapons, but their intent has far outmatched their capability. A 'dirty bomb' – where radioactive materials are dispersed through a conventional explosive device – have been the primary form of nuclear terrorist threat.

Forceful takeover of a nuclear power facility or targeting of nuclear power facilities are other concerning scenarios.[176] Most concerningly, increasing advanced cyber capabilities might dramatically change the nature of nuclear stability and security.[177] Rather than seeking to develop weapons themselves, malicious actors could use cyber means to access nuclear facilities or trigger miscalculations and false warnings between nuclear-armed states.[178] With the potential for increased nuclear risk between US and China and few pathways for dialogue, nuclear counter-terrorism could be a low-cost and high-reward starting point for meaningful discussion and action on nuclear issues. Jointly re-igniting the Obama-era Nuclear Security Summits, which focused heavily on nuclear terrorism, could be both a symbolic and practical step towards decreasing nuclear risk.

Build food system resilience

Both countries play a role in global food security, and food is a major political and economic factor for the respective leaderships. Recent bilateral tensions have driven the US and China apart on food issues, but weaponizing food trade could be self-defeating and food security could be an area of burgeoning collaboration.[179] Brazil is now China's largest agricultural supplier, overtaking the US as of 2021, potentially creating more impetus for collaboration and reducing area of tension.[180] The two countries could collaborate on food technologies and infrastructure, such as joint ventures and investments in agricultural technology startups, funding for research into sustainable farming practices, joint plans for food security in a crisis, and initiatives to improve production of alternative foods.[181]

Focus area 2: Increase and improve mechanisms that foster dialogue and reduce misperceptions of threat

As strategic competition heats up, both sides become increasingly entrenched in their positions and, as such, there are seemingly fewer opportunities for constructive dialogue. Peers seem more like opponents and threats can be easily overestimated. In times of crisis, off-ramps and lines of communication could seem difficult to maximize.[182] The US and China should increase or improve the mechanisms that allow the two powers to communicate and, either directly or indirectly, address threat perceptions. During diplomatic stand-offs or crises, these channels are critical to



de-escalation and resolution. It allows both countries to address global threats that need combined attention and resources.

Improve leader-level dialogue

The two countries could focus on improving leader-level dialogue. The two leaders should not only meet regularly, but they need to develop a personal, working relationship. Though both leaders are time-constrained and thousands of miles apart, meeting via video or in the company of dozens of officials, makes it more difficult to connect. Ideally, leaders should make time for more meaningful ways to bond.

Of course, in the current geopolitical environment, the prospect for meaningful leader-level dialogue is low. But the two presidents could take inspiration from American and Soviet leaders during the Cold War, who were able to build a connection even when tensions were highest. Private letters, one-on-one phone calls, and small-group meetings on the side of multilateral forums would prime the ground for a personal relationship. A deeper, more personal effort might also be required. Although far-fetched now, the leaders could eventually meet over a multi-day retreat at a location of strong symbolism for both countries to discuss the global challenges they share.

Ideally, such interactions would be done quite privately, allowing space for the relationship to grow and without domestic political pressure stonewalling adventurous outreach. Additionally, leader-level engagement must be driven by the leaders themselves rather than subordinated to ministers and senior officials. The design of both the US and Chinese systems puts a significant amount of decision-making power in the hands of the president. Direct engagement between them, therefore, allows both sides to get away from public talking points and focus on more practical ways forward.

Increase system-wide engagement

In addition to the leader-level dialogue, the US and China need more dialogue across the political system. These efforts would provide a foundation for personal leader-level engagement and also ensure that potential outcomes from these dialogues are executed.

As Richard Hass noted, "for leader-level interactions to be maximally productive, they will need to be advanced and informed by cabinet and sub-cabinet-level dialogues on specific priority issues in the relationship."[183] Hass suggests a number of issues that could see national-level dialogues, such as strategic stability, security, economics and trade, and climate and energy. Forums could also be devoted to other issues relating to global catastrophic risk, such as emerging technologies, food security, pandemics, and global health. These forums could initially be developed as track 1.5 or 2 dialogues, but must have support from governments, including funding and coordination.

Both countries could consider a Special Envoy for global risk issues. Much like the Special Envoy for Climate Change, this role would be a senior diplomatic official responsible for coordinating and advancing the nation's diplomatic efforts



related to global risk. They would be able to develop a relationship with their counterpart and help build bilateral bridges between systems.

Based on the concept of the G20 and G7 groupings, a "G2 Summit" has also been proposed by senior foreign policy figures for over a decade.[184][185] Each side has had their reservations with such a concept. For instance, China might see a G2 as a plot by the US to constrain it and apply pressure. Premier Wen Jiabao rejected the suggestion in 2009.[186] Then again, President Xi reportedly raised the idea with the US as recently as 2023, seemingly without success.[187] The US might see a G2 as elevating China to peer status. However, a G2 built exclusively around global risk would recognize that the US and China are two of the world's leading powers, provide them a platform to demonstrate global leadership, and would present a shared commitment to addressing the most pressing threats to humanity. A G2 designed in this context could enable them to address topics like climate change, pandemics, AI, and nuclear weapons as global issues rather than purely bilateral issues.[188]

The two countries could develop a joint statement on avoiding crisis and conflict, backed by a holistic bilateral engagement strategy.[189] They mostly frame each other as rivals or competitors and engagement is difficult when they view it from different strategic cultures. Where the US prizes formal engagement as a mechanism for a functioning bilateral relationship, China suspects that US engagement is a way to contain and restrain.[190] So, a more deliberate engagement effort might be needed, particularly by the US. For example, a jointly crafted and publicly available strategy document could detail goals for a positive, working relationship, the areas of shared interest and substance, and a plan for engagement more holistically. It might help reduce mistrust, bridge the differences between how the two countries approach engagement, and provide an impetus for the respective systems to take joint or mutually beneficial actions. Such a strategy document might also become a foundational document for a G2-like group centered on common goals for reducing global risk.

Foster crisis management

Crisis management, like crisis communications, must be fostered and reinvigorated.[191] The US was able to build effective crisis lines with the Soviet Union to deal with nuclear incidents and escalation, even extending into the 21st century in regard to cyber issues. However, with China, such mechanisms are poorly developed and almost defunct. In 1998, a 'hotline' between the presidents of US and China was developed. But it has seemingly not been utilized during periods of urgency. In 2008, the two militaries formed the 'Defense Telephone Link' at the secretaries level, but Chinese counterparts will not answer when the line is called unless for an approved and scheduled bilateral meeting.[192] In 2015, the two countries also established a 'space hotline' though it is unclear if it has ever been used.[193] An additional hotline for AI-specific crises might be necessary.[194]

Establishing hotlines is just one element. They need to be appropriately resilient, effective and empowered.[195] According to China expert Bonnie



Glaser, "the issue is a fundamental difference in the way China and the US view the value and purpose of military-to-military hotlines."[196] Additionally, it seems Chinese officials lack the authority to engage with their American counterparts, even at the senior level.[197]

To repair these communication mechanisms, a higher order agreement might be needed, one that would also set out the ground-rules for crisis arrangements. Indeed, in 2020, officials from the US Department of Defense and China's PLA met as part of a Crisis Communications Working Group.[198] However, this working group needs rejuvenation, and perhaps a slight re-focus to crisis management.[199] A more senior level grouping, such as the national security adviser-level, would empower officials on both sides to operationalize the arrangements.

Share assessments of global threat

Progress on reducing the risk of global catastrophe is unlikely if each country sees the other as its primary threat. If leaders in both the US and China better understand global catastrophic risk, and share that understanding, it could help balance threat perception. Mechanisms that allow the two countries to share their assessments and analysis on joint threats could align their thinking.

For example, the US is completing an assessment of existential and global catastrophic risk under the Global Catastrophic Risk Management Act of 2022.[200] The report, to be developed by the Department of Homeland Security, should be proactively shared with Chinese counterparts. Furthermore government scientists or national security officials working on global risk issues could meet to trade their views. Although a stretch for consideration at this point, joint research projects and government exchange programs on global risk issues would help cross-pollinate perspectives.

Even intelligence sharing arrangements could be viable options with enough thawing of the relationship. For example, Russia shared intelligence with the US ahead of the invasion of Afghanistan in 2001, and the US is reported to have shared intelligence on the 2024 terrorist attack on Crocus City Hall – in the midst of the Russian invasion of Ukraine – showing that rivals can coordinate when a mutual threat is deemed significant. A dedicated assessment on existential and global catastrophic risk by the US intelligence community could be developed and shared with Chinese counterparts.

Focus area 3: Build trust around technological risk

Global catastrophic risk – especially arising from nuclear weapons, biological weapons and AI – is heavily a function of technological advancement. Even more dangerous technologies might yet to be developed. Overall, global catastrophic risk is likely to increase as technological capabilities advance and as it intersects with weapons of mass destruction in more sophisticated ways.

The US-China dynamic is feeding this issue. Growing threat perceptions and increased strategic capabilities, along with the political, economic, and security imperatives of global technology leadership has put the two countries in a race for technological leadership. This race



increases the desire to develop even more sophisticated and powerful technologies while reducing or delaying the need for guardrails.

Regardless of these tensions, China and the US can take unilateral and bilateral actions that help build trust and safety mechanisms in their respective technological capabilities. This can relate to many technologies, but those that represent the greatest contribution to global risk should be prioritized.

Putting self-imposed restraints on technological development seems unlikely for both countries in the strategic climate. But the safety and security of potentially catastrophic technologies might be one of the few areas in the technological domain where both sides have an incentive to work together.

Increase safety and security mechanisms around key technologies

Whether unilaterally or bilaterally, it is in the direct self-interest of both countries to improve the safety and security around key technologies, especially nuclear and biological weapons, AI, biotechnology, and cyber capabilities. These mechanisms protect these systems from both sabotage or attack by nefarious actors as well as from accidents and potential miscalculation.

Each technology will have its own specific requirements for safety and security. In general, these measures could include: enhancing physical, cyber, and human security to prevent theft or unauthorized use; improving auditing and other accountability measures; increasing restrictions and oversight for the research, development and diffusion of high-risk technological applications; and establishing punitive measures for intentional or accidental harm caused by advanced technologies.

These efforts are not necessarily being dismissed by the US or China. Safety and security is justified on its own merit – for protecting critical infrastructure, fostering innovation, and reducing harms to impacted individuals and groups. However, the tense relationship between the two powers and the broader technological race give these safety and security measures a greater sense of urgency. Addressing technological safety concerns will help reduce suspicion between nations, foster areas of alignment, avoid accidents and miscalculations, and demonstrate that safety to the population is a greater priority than global technological supremacy.

Increase transparency and verification around technological applications, risk and harms

As with safety, transparency around research, development, applications, and regulations has its own domestic benefit. It helps set clear expectations around government actions and oversight while providing a clear signal and more even playing field for investors, research institutions, companies, government actors and broader society. Overall, a more transparent and verifiable technology ecosystem builds trust for all actors. Those who are not playing by established rules are more likely to be called out and held accountable, and are less likely to be engaged with by customers, suppliers and investors.



Transparency, therefore, has game-theoretic quality: a murky environment fuels suspicion and drives adversarial behavior, often leading to suboptimal outcomes for all involved, and the exploitation of more transparent actors. Therefore, it might require the government to set some degree of standard and expectation.

Much of the recent advances in technology come from the private sector, primarily from research labs. So requirements for greater research transparency could be implemented. Disclosure and public reporting requirements will help ensure that their activities are aligned with broader societal and economic benefits. Additionally, policies could be developed that promote transparency in supply chains and protect whistleblowers.

These domestic transparency measures can therefore set the stage for more bilateral or joint efforts. Eventually, China and the US could exchange information on technological developments, safety practices, and risk management strategies. In a best case future, they would be able to implement systems of mutual transparency, auditing, investigation, compliance and inspections – similar to agreements like Treaty on Open Skies or the Nuclear Non-Proliferation Treaty which allows for mutual surveillance and transparency.

Build accountability mechanisms for risk and harms

Advanced technology needs to be researched, developed, deployed, and used in ways that do not lead to accidental or intentional harm. A critical avenue to encourage this behavior would be established accountability mechanisms for potential risk. For those that are advancing technological capabilities, accountability mechanisms disincentive actions that might lead to harm, like risky research, unsafe deployment, and breaches of ethical or legal requirements. This might also be a means for establishing punitive measures for those seeking to cause harm using such technologies.

Countries also have a range of national-level measures to build accountability within their own borders, such as: supporting the development of ethical guidelines and frameworks, strengthening domestic regulations and legal framework, enabling private-market regulatory options, strengthening the capability of the judiciary in overseeing complex cases, improving insurance and liability mechanisms, and enforcing or encouraging compliance and auditing. These approaches have differing levels of practicality in China and the US.

Domestic accountability becomes the building block for bilateral and international accountability. Bilaterally, they could work towards mutual verification and auditing efforts, similar to arms controls treaties between the US and Russia. Because of their leadership on technology, the two countries could work together to develop international standards.

Incentivize and support efforts on risk-reducing technologies

In contrast to pure technological safety measures, technological advancements could be used to reduce global catastrophic risk. Technological solutions can help assess, monitor,



prevent, prepare for, and respond to global catastrophes. Research, development, and investment into risk-reducing technologies helps build trust and potential areas for collaboration between nations. The competitive dynamic between the US and China could benefit these efforts by speeding up progress and incentivizing resources, especially for funding of scientific research.

Risk-reducing technologies, however, might not naturally receive attention or investment due to the potential low rate of return or high failure rates. Prospective government programs, such as subsidies and funding incentives, prizes and competition, and advanced market commitments, can help drive innovation. Various technological solutions could greatly benefit from greater government prioritization and support: renewable energy, nuclear fusion, carbon capture and storage, climate modeling, monitoring and management of natural disasters, alternative and resilient foods, advanced agricultural practices, ecosystem remediation and restoration, vaccine development platforms, resilient infrastructure, space debris management, and advanced verification and monitoring tools for weapons of mass destruction.

These efforts could be solely unilateral. But they build a foundation for lower-pressure bilateral engagement and cooperation. Scientific and technological cooperation is seemingly not currently viable. The US implementation of sweeping technology restrictions and strict crack-downs on academic ties has dampened scientific engagement.[201] However, working together on research that potentially reduces risk would be a positive sum and additionally reduce the increasing risk of bifurcated or decoupled technology ecosystems.[202]

Focus area 4: Jointly lead multilateral efforts on global catastrophic risk

The US and China are two of the world's largest contributors to global catastrophic risk and are simultaneously vying for their place as global leaders on the world's stage. The US and China need to demonstrate they are capable of playing more active roles in leading the world on global catastrophic risk reduction.[203]

One such risk area, climate change, has already provided an example of how the two major powers can lead together, albeit somewhat imperfectly. A US-China agreement between President Obama and President Xi in 2014 gave much needed momentum ahead of the Paris Agreement in December 2015.[204] It marked deepening bilateral cooperation which was spearheaded by US Secretary of State John Kerry and Chinese Special Envoy on Climate Change Xie Zhenhua as the lead climate policy negotiators. This culminated in the November 2023 Sunnylands Statement, which reaffirmed the commitment of both nations to climate goals and bilateral action toward such goals, including a Working Group on Enhancing Climate Action in the 2020s.[205]

Building on unilateral and bilateral action, the US and China could jointly lead on the multilateral stage. Global catastrophic risk would not only be the subject of their joint efforts; it would be a call



to arms for the rest of the world. Together, the US and China can bring attention, prioritization, knowledge, and resources to a global effort to reduce the risk.

Build global understanding of global catastrophic risk

Just as the US and China can build shared assessment bilaterally, they can help build a globally shared understanding of global catastrophic risk. For example, the US Global Catastrophic Risk Management Act assessment should be promoted through its multilateral institutions, and, as such, the US mission to the UN could present the findings at a relevant forum, such as the UNSC.

Other countries and institutions are already contributing to international discussion of global catastrophic risk. The UN is releasing a survey of global risk in 2025.[206] The UK's Ministry of Defence has released a Global Strategic Trends in 2024.[207] The European Commission's Policy Lab has released a report on future global threats.[208] And, although not a nation or government body, the World Economic Forum releases a prominent global risk report every year.[209] However, there is little mechanism or forum to widely disseminate and discuss these results. If the American and Chinese missions to the UN came together with these organizations to host a discussion on global risk and present their findings, this would show that the two countries care about global risk and would spark conversation with the rest of the global community.

Perhaps the US and China could lead an effort to develop a comprehensive risk assessment framework for the UN system, building on the UN global risk report. The UN's report is intended to be held regularly, but is unlikely to persist without member state support. The two countries could support the establishment of a global risk assessment body within the UN, akin to the International Panel on Climate Change. It would align with the Pact for the Future, which requires the Secretary-General to consider approaches to handling complex global shocks.[210] A more feasible and immediate option would be a joint fund for research initiatives that help improve the assessment and understanding of global catastrophic risk.

Increase multilateral attention

Global catastrophic risk as an issue is mostly absent from multilateral forums. Some specific threats, like climate change or nuclear weapons, receive dedicated attention. However, despite focus on some risk topics, preventing or preparing for the most catastrophic scenarios from these threats is rarely addressed. This gap provides an opportunity for the US and China to step up. They are part of, and leaders in, a range of multilateral institutions. When they raise issues, other countries take notice. By putting global catastrophic risk on the agenda, further attention and action would be warranted.

The UN would be the logical first destination for agenda-setting on global catastrophic risk. The UN General Assembly, with its full membership and equal representation, would be a useful forum to deliberate, hold special sessions, and potentially pass resolutions. The UN system,



including its bodies and the Member States, put significant attention towards development, peace and security, and environmental issues. Still, a conference dedicated to global catastrophic risk could be co-convened to bring together Member States, academia, civil society, and the private sector.

Of the more exclusive or regional groupings, the US and China are together members of the UNSC, G20, the East Asia Summit (EAS) and Asia-Pacific Economic Cooperation (APEC). Together, they could add global catastrophic risk onto any given agenda. The UNSC and the EAS, in particular, would be powerful forums because of their security focus and the make-up of their membership, which includes Russia. They could develop joint statements and working groups. However, they have both become even more stifled due to geopolitical considerations.

In the forums where only one power is a participant, they could each take a leadership role. For the US, that could be in the North Atlantic Treaty Organization and the G7. For China, that could be in the BRICS grouping and the G77. They could each bring attention to global catastrophic risk with their allies and strategic partners, together uniting much of the world. If they also established a global risk-focused G2, bilateral working group, or special envoys, the US and China could better converge and align their respective efforts.

Increase capacity of multilateral institutions to support member states

The multilateral system is under significant pressure from various angles. Geopolitical tensions, rising nationalism and populism, and fragmentation of multilateral regimes has made multilateral agreement more difficult than it has perhaps ever been. Civil society and developing countries feel a growing sense of disillusionment and disappointment. These issues are arising just as global catastrophic risk needs global attention. The US and China can help improve the capacity of parts of the multilateral system that would deal with global catastrophic risk.

Together, they can spearhead great levels of funding towards key bodies, directing them towards activities that would help member states build resilience to global catastrophe. For example, the UN Office of Disaster Risk Reduction (UNDRR) could play a central role in global catastrophic risk reduction. It just has little focus, responsibility, or funding to do so. Being directed and guided by member states, the UNDRR needs the US and China to make those demands of it. To start, they could lead the implementation of the recommendations outlined as part of the midterm review of the Sendai Framework for Disaster Risk Reduction.[211] The Framework is due to end in 2030, so the major powers could help upgrade the framework for the types of crises and threats that are emerging beyond 2030.

Pooled funding mechanisms, such as the UN's Central Emergency Response Fund (CERF), the International Federation of Red Cross and Red Crescent Societies' Disaster Relief Emergency Fund (DREF), and the World Bank's Global Facility for Disaster Reduction and Recovery (GFDRR), also play critical roles in providing immediate financial assistance in the wake of disasters and



fostering long-term resilience. The US and China could allocate more resources, expand their mandates, or enhance their operational capacities to be more effective and responsive to global catastrophic risk.

The US and China could increase existing efforts to enhance early warning systems. Under the Sendai Framework, multi-hazard early warning systems are being designed and implemented. But about a third of the world population, mainly in low-income countries, are still not covered.[212] Additionally, these early warning systems are for disaster risk, not all types of global catastrophe. The US and China should already be working to achieve global coverage of early warning systems through the G20 Disaster Risk Reduction Working Group.[213] Indeed, they should double down on this work and ensure greater consideration is given to global catastrophes.

Rapid response also needs improving. The UN can deploy peacekeeping forces and mobilize humanitarian assistance. Yet these efforts are often hamstrung by bureaucratic delays, funding constraints, and logistical challenges. A US–China championed effort would help overcome these issues. A rapid deployment force might be needed to respond quickly to emerging situations and international crises. The calls for such a force – which has been floated for over twenty years – has simply not gained any traction.[214] Action 54 in the Pact for the Future, requiring the Secretary-General to consider approaches for dealing with complex global shocks would benefit from strong support from both the US and China.[215]

Strengthen multilateral mechanisms on specific threats

Existing multilateral mechanisms related to specific global catastrophic threats must be strengthened. The US and China are already party to such treaties, so it would require much less political capital while demonstrating significant leadership to the rest of the world.

The Non-Proliferation Treaty (NPT), the Chemical Weapons Convention (CWC), and the Biological Weapons Convention (BWC) are vital institutions in managing the risk from weapons of mass destruction. However, these treaties are not well-positioned for the integration of AI capabilities. These treaties should be upgraded to incorporate norms and rules around the application of AI to the threats covered by the existing treaties.[216]

Formal amendments and protocols would be difficult to negotiate because they bind states to stronger restrictions. As a start, the US and China could more easily champion other AI-related upgrades, such as interpretative declarations and technical updates to specify how existing treaty provisions apply to AI-enabled weapons. Given their respective defense programs, scientific capabilities, and diplomatic capital, the two powers would provide much-needed support to developing these upgrades.

The US and China could also lead efforts to ensure the safe and beneficial use of synthetic biology, both within the BWC context as well as other parts of the multilateral system. This could include working together to create standardized protocols for synthetic biology research,



production and application, and formulation of international ethical guidelines that address dual-use concerns.

Space governance, an area of existing collaboration, is relatively strong at the multilateral level. However, gaps and challenges remain that would require the US and China to work together. Space traffic, space debris, and commercial space activity are modern challenges that need addressing in the decades-old system of multilateral space governance. Just as the space domain is increasingly contested between the US and China, closing these less sensitive gaps would provide mutually beneficial governance and potentially open the door to further engagement on space issues.

In contrast to space governance, geoengineering is severely lacking in some form of global governance. The most relevant multilateral agreement is the 1978 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (the ENMOD Convention).[217] This Cold War era legislation has been ratified by 78 countries, including China and the US, but the policy is vague and needs an update in the context of geoengineering. Although ENMOD forbids any military or hostile application of environmental modification that would have "widespread, long-lasting or severe effects", it does not govern other applications of geoengineering.[218]

Increase strategic messaging

A major part of leading is communicating. China and the US need to increase messaging about global risk, global challenges, and what needs to be done to handle them. Strategic messaging requires a more coordinated effort both unilaterally and bilaterally to broadcast regularly and with clarity. Such an effort would highlight to countries around the world that global catastrophic risk is a priority, while also signaling that leaders continue to take the issue seriously and foster accountability.

Strategic messaging could use a variety of outlets. The two countries could use joint statements and communiques, joint press conferences, and speeches in multilateral institutions at all levels of government. The communication should emphasize that global catastrophic threats are a global priority, that the two countries are working together to reduce them, and that there are a number of areas of potential collaboration. Though the target audience is mostly other governments, middle powers and low-income countries can use these statements when they conduct their bilateral engagements. It also provides impetus for civil society to prioritize the issue.

A relatively recent example worth drawing lessons from is the 2022 joint statement between the leaders of the US, UK, China, Russia and France on preventing nuclear war.[219] It was a short and definitive statement, potentially in response to the prior year's Treaty on the Prohibition of Nuclear Weapons. Russia's invasion of Ukraine in February 2022, and subsequent saber-rattling did not inspire confidence that the statement held much weight. However, when leaders release messages of this kind, it provides a hook for other countries to engage and keep them accountable.



CLOSING REMARKS

The current trajectory of strategic competition between the US and China could lead to irrevocable global harm. Domestic, bilateral, and multilateral solutions are not easy to agree or implement in the current geopolitical environment. Some might be nearly impossible at this point in the fraught relationship. A goal of fully repairing the bilateral relationship entirely is idealistic. And, for many policymakers on both sides, winning this race, rather than strategic cooperation, is the goal. However, this course can and must be adjusted not only for the benefit of any one nation, but for all of humanity.[220]

As President Ronald Reagan said during his 1987 address to the 42d Session of the UN General Assembly, he said:

> "Cannot swords be turned to plowshares? Can we and all nations not live in peace? In our obsession with antagonisms of the moment, we often forget how much unites all the members of humanity…
>
> "Perhaps we need some outside, universal threat to make us recognize this common bond. I occasionally think how quickly our differences worldwide would vanish if we were facing an alien threat from outside this world…
>
> "We continue to have our differences and probably always will. But that puts a special responsibility on us to find ways – realistic ways – to bring greater stability to our competition and to show the world a constructive example of the value of communication and of the possibility of peaceful solutions to political problems."

These sentiments are an important guide to the US and China as they manage their bilateral relationship and global leadership. They can pursue action to bring about global stability and reduce risk of global catastrophe. Neither Washington nor Beijing need to wait for a global catastrophe to occur in order to take action.

This report aims to provide a vision for a possible path that navigates the strategic reality between the two countries. The scale and urgency of global catastrophic risk requires the two countries to work together.

The pursuit of cooperation over competition to address global catastrophic threats remains one of humanity's best hopes for a safer future.

About this report

This report is the first publication the authors are aware of focused on how strategic competition between the US and China shapes global catastrophic risk. This report aims to provide a holistic overview of this topic, while providing a framework for improving US-China management of global catastrophic risk. The framework and the report's contents were developed based on review of media, academic, think tank and government reporting, engagement with experts in US-China relations and the various global catastrophic threats, and structured analytical techniques to identify the key drivers and policy areas.

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We recognize the important work of Nathan Sears (1987-2023) who led important work on the intersection of existential risk and international relations.

About Global Shield

Global Shield is an international advocacy organization devoted to reducing all-hazards global catastrophic risk (GCR). We work with governments worldwide to enact policies to better understand, prevent, prepare for, and respond to global catastrophes, regardless of the threat that might produce them. We believe an all-hazards policy approach to addressing GCR can ensure governments are effectively shielding all of us from global catastrophes. At Global Shield, we envision a world in which all governments have acted decisively to reduce and, where possible, eliminate global catastrophic risk.



Endnotes

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