Testimony before the U.S.-China Economic and Security Review Commission Hearing on "Challenges from Chinese Policy in 2022: Zero-COVID, Ukraine, and Pacific Diplomacy"

Panel II: "Russia's Invasion of Ukraine and Implications for Integrated Deterrence"

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Co-Chairs Mann and Schriver, distinguished Commissioners and staff, thank you for the opportunity to participate in today's hearing. It is an honor to be here alongside esteemed experts on this panel. I am a Research Fellow at the Center for Security and Emerging Technology (CSET) at Georgetown University, where I lead our line of research on U.S. national competitiveness. This work centers on both the "promote" and "protect" sides of national competitiveness, as I believe it is impossible to compete without both working in tandem. As part of the "protect" piece, our work includes examining U.S. and multilateral export control policies to better understand how to most effectively wield these tools, particularly as it relates to China. Today, I will focus on this topic at the committee's request.

My testimony assesses lessons learned from the multilateral export controls implemented following Russia's invasion of Ukraine in February 2022. Weaved throughout my testimony will be a common theme: when export controls have clear vision or purpose and are done in conjunction with allies and partners—in other words, multilaterally or plurilaterally—they are more likely to achieve desired objectives. Moreover, we must also remember to temper our expectations when it comes to export controls, especially when thinking about China. The success we have witnessed in isolating the Russian economy over the past five months is unique to this scenario; a similar approach to China would yield vastly different results, in part due to the interconnectedness of global supply chains and China's role at the center of many of these.

I'd like to begin with a high-level overview of the export control response to Russia's invasion of Ukraine, followed by an assessment of export controls beyond Russia. I will then analyze how export controls have affected China, and what China has done to reduce its vulnerability to these controls. Lastly, I'll offer lessons learned, as well as recommendations for Congress, which include:

- Capitalizing on the multilateral coordination following the invasion of Ukraine by codifying a new multilateral export control regime to complement the four existing regimes. This regime should focus on using export controls to achieve objectives beyond nonproliferation;

- Establishing a Supply Chain Chokepoints Task Force to study global supply chains in critical technologies; and

- Establishing a well-resourced S&T analysis and monitoring organization with sustained funding to monitor global developments in emerging and foundational technologies.

Overview of Export Control Response to Russia's Invasion of Ukraine

Following Russia's invasion of Ukraine on February 24, 2022, the Bureau of Industry and Security (BIS) at the Department of Commerce imposed significant, novel, and complex export controls on Russia and Belarus. Under these new controls, the export from the United States, as well as the reexport from abroad, of any commodity, software, or technology subject to the Export Administration Regulations (EAR), whether U.S.- or foreign-made, now requires a license if destined for Russia or Belarus, which will generally be denied.[1] Please see the Appendix for additional information on relevant export controls terminology. Fundamentally, these export controls are designed to allow consumer goods to flow to Russia and Belarus while cutting the governments off from any Western technology that could support their militaries. More specifically, as CNAS' Emily Kilcrease laid out in her overview of these new controls, there are four elements of these new controls that are worth highlighting:[2]

New Economy-Wide Restrictions

- These economy-wide controls were designed to allow for the flow of purely commercial goods, while restricting the flow of even lower-level technology that might have military applications or is relevant to Russia's energy sector. These items are subject to a licensing policy of denial, meaning that licenses will be denied for the applicable items exported to Russia.

[1] Kevin Wolf et al., "U.S. Government Imposes Expansive, Novel and Plurilateral Export Controls Against Russia and Belarus," Akin Gump Strauss Hauer & Feld LLP, March 8, 2022, https://www.akingump.com/a/web/ayCoxfB41bXG1H8Y4jUWup/3FFMet/us-government-imposes-expansive-novel-and-plurilateral-export.pdf

[2] Emily Kilcrease, "NOTEWORTHY: The New Russia Export Controls," Center for a New American Security, March 7, 2022, https://www.cnas.org/press/press-note/noteworthy-the-new-russia-export-controls

Russia/Belarus Foreign Direct Product Rule (FDPR)

- The Russia/Belarus FDPR extends the new economy-wide restrictions to apply on an extraterritorial basis to the same scope of foreign goods, if those goods are made using U.S.-origin technology or software, or using equipment made from U.S.-origin technology or software.

New Entity List Rules

- More than 100 entities from both Russia and Belarus have since been added to BIS' Entity List, thereby barring them from receiving U.S.-origin items of any kind. In addition, the new FDPRs were applied to these entities. These controls have a much broader scope than the economy-wide rules, as they notably capture all items that are subject to the EAR, including those not listed on the Commerce Control List (CCL). These rules also impose a licensing policy of denial, and the only goods allowed to be exported to these listed entities are food and medicine.

New Military End User (MEU) Rules

- The new Russia/Belarus MEU rules expand the general restrictions related to military end uses and end users to cover all U.S.-origin items, including EAR99 items.[3]

These tools, in conjunction with financial sanctions, appear to have had a rapid and harsh effect on the Russian economy and military. Russian government reports from April claim that the country's GDP decline could hit 12.4 percent this year.[4] A May statement from the White House stated that two major Russian tank plants—Uralvagonzavod Corporation and Chelyabinsk Tractor Plant—have halted work due to a lack of foreign components.[5] On exports alone, Martin Chorzempa of the Peterson Institute for International Economics found that global exports to Russia have fallen significantly from both sanctioning and non-sanctioning countries, thereby

[3] EAR99 items are those that fall under BIS' jurisdiction but are not listed on the CCL. They usually consist of low-technology consumer goods and do not require a license in most situations, unless they are being exported to an embargoed country, to an end-user of concern, or in support of a prohibited end-use. For more information, see: "Commerce Control List (CCL)," Bureau of Industry and Security, U.S. Department of Commerce, https://www.bis.doc.gov/index.php/regulations/commerce-control-list-ccl

[4] "Russia's GDP decline could hit 12.4% this year, economy ministry document shows," Reuters, April 27, 2022, https://www.reuters.com/business/russias-gdp-decline-could-hit-124-this-year-economy-ministry-document-shows-2022-04-27/

[5] "FACT SHEET: United States and G7 Partners Impose Severe Costs for Putin's War Against Ukraine," The White House, May 8, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/08/fact-sheet-united-states-and-g7-partners-impose-severe-costs-for-putins-war-against-ukraine/

hampering Russia's ability to purchase products from overseas.[6] BIS Under Secretary Alan Estevez, in his testimony before the House Foreign Affairs Committee on July 19, stated that, from February 24 through July 1, U.S. exports in categories of items subject to the new U.S. export control license requirements decreased by 95.9 percent by value as compared to the same period in 2021. Secretary Estevez also noted that this rapid decline has led Putin himself to voice concern about where Russia will source critical inputs for Russian weapons systems.[7]

Chinese Response to Russia Export Controls

So how has China reacted to these events? After the initial imposition of export controls in late February, Ministry of Foreign Affairs (MOFA) Spokesperson Wang Wenbin responded to a question on the subject by stating the following:

> *China does not support the use of sanctions to solve problems, and is even more opposed to unilateral sanctions that have no basis in international law. China and Russia will continue to carry out normal trade cooperation in the spirit of mutual respect, equality, and mutual benefit.*[8]

In the weeks following the invasion, U.S. leadership stated publicly that there would be consequences for undermining U.S. export controls and sanctions against Russia.[9] In particular, U.S. policymakers and scholars emphasized the threat of secondary sanctions against China, since many in Washington and elsewhere believed that China would step in to backfill much of Moscow's needs. Since then, however, with the exception of a select number of Chinese firms, Beijing appears to be acting carefully to abide by U.S. export controls, based on publicly available information. On June 28, BIS added five Chinese firms to the Entity List alongside 31 other global firms for continuing to supply entity listed Russian firms.[10] Of the other 31 companies listed, 25 had China-based operations, demonstrating the wide global reach of

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[6] Martin Chorzempa, "Sanctions against Russia are also hurting its trade with nonsanctioning countries," Peterson Institute for International Economics, June 29, 2022, https://www.piie.com/research/piie-charts/sanctions-against-russia-are-also-hurting-its-trade-nonsanctioning-countries

[7] "Statement of Alan F. Estevez Under Secretary of Commerce for Industry and Security Before the House Foreign Affairs Committee," U.S. Department of Commerce, July 19, 2022, https://docs.house.gov/meetings/FA/FA00/20220719/115016/HHRG-117-FA00-Wstate-EstevezA-20220719.pdf

[8] "Foreign Ministry Spokesperson Wang Wenbin hosted a regular press conference on February 28, 2022" [2022年2月28日外交部发言人汪文斌主持例行记者会], Ministry of Foreign Affairs of the PRC, February 28, 2022, https://perma.cc/T4WS-KG38. (Original text: 中方不赞成用制裁手段解决问题，更反对没有国际法依据的单边制裁。我们要求美方在处理乌克兰问题和对俄关系时，不得损害中方和其他方面正当权益)

[9] Ana Swanson, "Chinese companies that aid Russia could face U.S. repercussions, commerce secretary warns," New York Times, March 8, 2022, https://www.nytimes.com/2022/03/08/technology/chinese-companies-russia-semiconductors.html

[10] Federal Register Vol. 87 No. 125, Rules and Regulations, June 30, 2022, https://www.bis.doc.gov/index.php/documents/regulations-docs/federal-register-notices/federal-register-2022/3053-87-fr-38920-entity-list-rule-effective-6-28-22-published-6-30-22/file

Chinese firms.[11] In response, MOFA Spokesperson Zhao Lijian responded with a similar message as his colleague in February. However, this time, his statement included warnings of retaliation:

> *We urge the U.S. side to immediately correct its mistakes, revoke relevant sanctions, and stop long-arm jurisdiction and unilateral sanctions against Chinese companies. China will take all necessary measures to resolutely safeguard the legitimate rights and interests of Chinese enterprises.*[12]

Is Beijing actually capable of retaliating as Zhao claims? Although China does not maintain as robust an export control system as the United States, Beijing has recently begun to up its game by implementing policies like the January 2021 "Anti-Foreign Sanctions Law" designed to censure foreign companies and individuals for implementing or complying with the sanctions of a foreign country "when those sanctions adversely affect Chinese citizens or otherwise interfere with China's internal affairs," in conjunction with its Export Control Law and "Rules on Counteracting Unjustified Extra-territorial Application of Foreign Legislation and Other Measures."[13] As CSIS' Jeannette Chu argues, the timing of these regulations reinforces perceptions of the retaliatory nature of these efforts. Although we have yet to see these policies fully implemented, the United States and allies should pay attention to how these develop.

Beyond Russia: The Future of Export Control Policy

The geopolitical, geoeconomic, and moral effects of Russia's unprovoked invasion of another sovereign nation can be felt across the entire world. It is critical that the United States and its allies are equipped to deal with this ongoing and immediate threat. At the same time, it is important to acknowledge the longer-term challenges that we face—namely from China. This is not to say that we must prioritize one over the other. Although some scholars believe that our efforts in Ukraine are a "distraction" from broader issues related to China and Taiwan, I believe the two situations deserve their own dedicated approaches that can in fact be pursued simultaneously without unduly straining U.S. resources.[14]

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[11] Alexandra Alper, "U.S. accuses five firms in China of supporting Russia's military," Reuters, June 29, 2022, https://www.reuters.com/world/us-accuses-chinese-companies-supporting-russias-military-2022-06-28/

[12] "Foreign Ministry Spokesperson Zhao Lijian's Regular Press Conference on June 29, 2022" [2022年6月29日外交部发言人赵立坚主持例行记者会], Ministry of Foreign Affairs of the PRC, June 29, 2022, https://perma.cc/7ZWM-AUN9. (Original text: 我们敦促美方立即纠正错误，撤销有关制裁措施，停止对中国企业进行长臂管辖和单边制裁。中方将采取一切必要措施，坚决维护中国企业的合法权益。)

[13] Jeannette Chu, "The New Arms Race: Sanctions, Export Control Policy, and China," Center for Strategic and International Studies, March 25, 2022, https://www.csis.org/analysis/new-arms-race-sanctions-export-control-policy-and-china

[14] Elbridge Colby and Oriana Skylar Mastro, "Ukraine Is a Distraction From Taiwan," Wall Street Journal, February 13, 2022, https://www.wsj.com/articles/ukraine-is-a-distraction-from-taiwan-russia-china-nato-global-powers-military-invasion-jinping-biden-putin-europe-11644781247

It has become commonplace, particularly among U.S. scholars and policymakers, to draw parallels between Ukraine and Taiwan due to historical and political similarities with respect to their relationships to Russia and China. Chinese leadership is surely paying attention to ongoing events in Ukraine, and the People's Liberation Army (PLA) will certainly study Russia's Ukraine campaign and attempt to draw lessons from it. Beijing is also likely taking notes on the risks of escalation, particularly in light of the crushing export controls and sanctions that were applied to Russia.[15] However, as scholar Bonnie Glaser noted in March, the Chinese themselves are not drawing parallels to Taiwan, and the Chinese Ambassador to the United States even argued that the two scenarios are "totally different things."[16] Ongoing assertions regarding the parallels between Ukraine and Taiwan are misplaced; as Dr. Andrew Scobell argues, "Xi Jinping's China is not Vladimir Putin's Russia, and Taiwan is not Ukraine."[17]

However, in comparing the multilateral response to Russia to a similar multilateral export control approach to China in response to an invasion of Taiwan, it is crucial to point out that we are unlikely to see the same multilateral approach to export controls applied to China in any scenario short of an invasion of Taiwan. If or when that does occur, there are several differences to keep in mind. First, China is already significantly more self-sufficient than Russia. Beijing has been pushing for self-sufficiency in high-tech sectors since the early 2000s. Furthermore, China already maintains more robust technology and manufacturing sectors; where Russia struggles to develop and produce all within its borders, China is already a one-stop-shop and is able to push certain technologies through the entire innovation cycle without ever going abroad. As such, export controls applied to China, even when applied with a clear objective and multilateral support, will have vastly different implications for China and the rest of the world.

China's Push for Self-Sufficiency

Before assessing future scenarios, it is important to understand the effects of recent U.S. export controls on China, as well as Beijing's attempts to reduce its vulnerabilities to these controls. Since the passage of the Export Control Reform Act of 2018 (ECRA), a large portion of U.S. export control efforts have focused on addressing concerns related to China's pursuit of commercial and military leadership in advanced technologies, particularly through access to U.S. companies and universities. China, however, has been on the track toward reducing the vulnerabilities associated with its reliance on foreign sources long before the recent geopolitical developments or the trade conflict with the United States.

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[15] Andrew Scobell, Ph.D and Lucy Stevenson-Yang, "China Is Not Russia. Taiwan Is Not Ukraine," U.S. Institute for Peace, March 4, 2022, https://www.usip.org/publications/2022/03/china-not-russia-taiwan-not-ukraine

[16] "Ukraine and Taiwan: Parallels and Early Lessons Learned," Center for Strategic and International Studies, March 22, 2022, https://www.csis.org/analysis/ukraine-and-taiwan-parallels-and-early-lessons-learned; and Qin Gang, "Chinese Ambassador: Where we stand on Ukraine," The Washington Post, March 15, 2022, https://www.washingtonpost.com/opinions/2022/03/15/china-ambassador-us-where-we-stand-in-ukraine/

[17] Scobell and Stevenson-Yang, "China Is Not Russia. Taiwan Is Not Ukraine," U.S. Institute for Peace.

Over the past three decades, China has been developing a multi-faceted approach to improving its technology prowess. Assertions of China's inability to innovate or move beyond its copycat culture are false and overly simplistic. As documented by CSET's William Hannas and Huey-meei Chang, China has spent decades building an indigenous S&T capacity and can innovate on its own terms while tracking global trends to move to new stages of novel technology development.[18] China's way of innovativeness is unique; it is a system of "re-innovation", or *zaichuangxin*, that does not mirror other global paradigms.[19] As such, China is keenly aware of its strengths and weaknesses, and is actively working to achieve its S&T innovation goals.

China's efforts to modernize its innovation system have centered on self-sufficiency and indigenous innovation, and it is critical to understand that these efforts predated most major U.S. and multilateral export control maneuvers.[20] The "Medium- to Long-Term Plan for Science and Technology Development (2006-2020)" (MLP; 国家中长期科学和技术发展规划) identified China's weak indigenous innovation capability as a driving force for policy change. The MLP outlined Beijing's plan for indigenous innovation, which referred to "enhancing original innovation, integrated innovation, and re-innovation based on the assimilation and absorption of imported technologies, in order to improve our national innovation capability."[21] Subsequent S&T policies and Five-Year Plans have centered on this theme, emphasizing the need for self-sufficiency in technology for both economic and national security reasons. For instance, the 2015 "Innovation-Driven Development Strategy" (IDDS; 国家创新驱动发展战略) argued that an indigenous innovation capability was needed to break through "major bottleneck problems" constraining economic and national security, and called for the reversal of situations in which "key and core technologies" were controlled by other nations.[22]

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[18] William C. Hannas and Huey-meei Chang, "China's Access to Foreign AI Technology," Center for Security and Emerging Technology, September 2019, https://cset.georgetown.edu/wp-content/uploads/CSET_China_Access_To_Foreign_AI_Technology.pdf

[19] Emily S. Weinstein, "Beijing's 're-innovation' strategy is key element of U.S.-China competition," TechStream, January 6, 2022, https://www.brookings.edu/techstream/beijings-re-innovation-strategy-is-key-element-of-u-s-china-competition/

[20] Although most major export controls against China came about in the last two decades, it is important to note the case of satellite technologies. In this instance, in response to concerns about technology transfer benefitting the Chinese missile development program, the U.S. government in 1999 unilaterally moved satellites from the Commerce Control List under BIS to the U.S. Munitions List under the State Department, thereby changing the export control classification of satellites from dual-use to munitions. For more information, see: Tim Hwang and Emily S. Weinstein, "Decoupling in Strategic Technologies: From Satellites to Artificial Intelligence," Center for Security and Emerging Technology, July 2022, https://cset.georgetown.edu/publication/decoupling-in-strategic-technologies/

[21] "The National Medium- and Long-Term Program for Science and Technology Development (2006-2020), State Council of the PRC, https://www.itu.int/en/ITU-D/Cybersecurity/Documents/National_Strategies_Repository/China_2006.pdf; and "Outline of the National Medium- and Long-Term Plan for Science and Technology Development" [国家中长期科学和技术发展规划刚要], State Council of the PRC, https://perma.cc/MQ48-E5PD

[22] Translation of the "Outline of the National Innovation-Driven Development Strategy" Issued by the CPC Central Committee and the State Council [中共中央 国务院印发《国家创新驱动发展战略刚要》], Center for Security

As such, Beijing has prioritized indigenous innovation in key strategic technology areas. The 2015 "Made in China 2025" (MIC 2025; 中国制造2025) strategy laid out China's aims for technology substitution in fields such as new energy vehicles, high-tech ship components, new and renewable energy equipment, industrial robots, high performance medical devices, mobile phone chips, and more.[23] In semiconductors specifically, the release of MIC 2025 and IDDS in 2015, and the establishment of the National Integrated Circuit (IC) Investment Fund the year before in 2014, marked a turning point in Beijing's approach to pushing the semiconductor industry toward reduced dependence on foreign suppliers.[24]

Meanwhile, for the past six years, semiconductors and semiconductor manufacturing equipment (SME) have become the focus of U.S. export controls on China. In May 2019, BIS added Huawei Technologies to the Entity List, citing "activities that are contrary to U.S. national security and foreign policy interests."[25] In 2020, the Commerce Department expanded restrictions on Huawei by imposing a new FDPR on Huawei, thereby limiting the company's access to foreign-made items containing, produced by, or the direct product of U.S.-origin technology or software.[26] Following this, Huawei issued a statement arguing that the move would "damage the trust and collaboration within the global semiconductor industry," and would "inevitably affect [Huawei's] business."[27]

In response to U.S. export controls, especially those on Huawei, the Chinese government is doubling down on self-sufficiency in semiconductors and other critical technologies. A 2021 study by scholar Paul Triolo found that Beijing is now mandating that Chinese companies begin to phase out reliance on U.S. semiconductors and other vital components. Notably, Triolo points out that this effort does not apply to chips or components from Japanese, South Korean, European, or Taiwan-based firms—the other leaders in this unique high-tech industry. As part of the indigenous chip push, Chinese tech giants like Alibaba, Tencent, Baidu and others have begun to focus on chip research and development (R&D).[28] Research entities in China are also

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and Emerging Technology, originally published on May 19, 2016, translated on December 11, 2019, https://cset.georgetown.edu/wp-content/uploads/t0076_innovation_driven_development_strategy_EN.pdf

[23] Jost Wübbeke et al., "Made in China 2025: The making of a high-tech superpower and consequences for industrial countries," Mercator Institute for China Studies, December 2016, https://merics.org/sites/default/files/2020-04/Made%20in%20China%202025.pdf

[24] Paul Triolo, "The Future of China's Semiconductor Industry," American Affairs Journal Vol. V Number 1, Spring 2021, https://americanaffairsjournal.org/2021/02/the-future-of-chinas-semiconductor-industry/

[25] "Huawei Entity List Frequently Asked Questions (FAQs)," Bureau of Industry and Security, Updated December 3, 2020, https://www.bis.doc.gov/index.php/documents/pdfs/2447-huawei-entity-listing-faqs/file

[26] Robert Slack, "Expansion of U.S. Huawei Restrictions: More Foreign-Made Items Are Caught By U.S. Export Controls," Trade and Manufacturing Monitor, Kelley Drye, August 25, 2020, https://www.ustrademonitor.com/2020/08/expansion-of-u-s-huawei-restrictions-more-foreign-made-items-are-caught-by-u-s-export-controls/

[27] "Media Statement on Foreign Direct Product Rule Changes Made by US Government," Huawei, https://www.huawei.com/en/facts/voices-of-huawei/media-statement-on-foreign-direct-product-rule-changes-made-by-us-government

[28] "Baidu says 2nd-gen Kunlun AI chips enter mass production," Reuters, August 18, 2021, https://www.reuters.com/technology/baidu-says-2nd-gen-kunlun-ai-chips-enter-mass-production-2021-08-18/; and

actively studying how to replace key U.S. components—like Intel's x86 processor—with domestic alternatives.[29] Most recently, in July 2022, *The Wall Street Journal* reported that China is now leading the world in building new chip factories, with 31 major factories set to be built by 2024.[30] Although many of these factories are expected to work on low-end chips, focusing on low-end chips may allow China to still achieve its technology leadership goals while avoiding U.S. export controls, which are mostly centered around high-end chips and related SME.

Beyond semiconductors, China is actively studying its vulnerabilities and crafting ways to overcome them. A recent CSET report by Ben Murphy highlighted China's self-identified strategic technology import dependencies—or "chokepoints"—by assessing a set of 35 articles published in 2018 by Chinese state-run media, and examining China's efforts to address these vulnerabilities. Understanding and studying Chinese self-identified vulnerabilities attempts to overcome them can help to inform future export control policies. These 35 articles, all published in *S&T Daily* and written by staff reporters, profile different technological import dependencies for China, ranging from advanced photolithography machines to foundational aviation-grade steel. In each of these instances, the "chokepoints" pieces lay out who the leading global providers are for the given technology, identifies who the Chinese provider or developer for that technology is (if at all), and discusses China's potential difficulties in overcoming this "chokepoint."[31]

As Murphy notes, some of these "chokepoints" are worse than others. For instance, certain import dependencies involve technologies that cannot easily be bought or copied. With regards to photolithography machines, He Rongming (贺荣明), general manager of PRC chip manufacturer Shanghai Micro Electronics Equipment (SMEE; 上海微电子), told *S&T Daily* that, even if ASML were to give him the blueprints for their photolithography machines, SMEE would still be unable to replicate them.[32] In other instances, some of the identified "chokepoints" required decades of research, data, and experimentation to refine their products, making catching up a daunting task for Chinese entities wishing to supplant foreign providers. A Chinese IT expert identified operating systems as falling under this category, as it took U.S. PC and mobile

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"Tencent flags progress on three chips in development, investment efforts," Reuters, November 3, 2021, https://www.reuters.com/business/cop/tencent-has-long-term-plan-chip-development-investment-2021-11-03/; and Coco Liu and Debby Wu, "Alibaba Just Unveiled One of China's Most Advanced Chips," Time Magazine, October 18, 2021, https://time.com/6108124/alibaba-china-chip/

[29] Wang Haoyu [王浩宇], "Design of Localized CPCI Motherboard Based on Zhaoxin X86 Architecture Processor" [基于兆芯X86架构处理器的国产化CPCI主板设计], Southwest Institute of Automation, Mianyang, Sichuan Province [四川省绵阳西南自动化研究所], 2020.

[30] Dan Strumpf and Liza Lin, "China Chases Chip-Factory Dominance–and Global Clout," Wall Street Journal, July 24, 2022, https://www.wsj.com/articles/china-bets-big-on-basic-chips-in-self-sufficiency-push-11658660402

[31] Ben Murphy, "Chokepoints: China's Self-Identified Strategic Technology Import Dependencies," Center for Security and Emerging Technology, May 2022, https://cset.georgetown.edu/wp-content/uploads/CSET-Chokepoints.pdf

[32] Murphy, "Chokepoints: China's Self-Identified Strategic Technology Import Dependencies," Center for Security and Emerging Technology.

phone operating systems like Windows, Android, and iOS years of trial and error to reach their current state.

To summarize, Beijing's history of long-term strategic planning, in conjunction with its active awareness of its strengths and vulnerabilities are helping Chinese leadership more effectively plan around U.S. export controls. Policies aimed at achieving self-sufficiency are not new; however, Chinese leadership has further emphasized and ramped up these efforts in the aftermath of U.S. export controls. For U.S. policymakers, studying these efforts will allow us to identify a clearer objective for our export controls.

The Need for a Multilateral Approach on Export Controls

As demonstrated by the Russia example, export controls are most effective when imposed multilaterally, and working with allies can eliminate the need for extraterritorial controls. This concept is not new. Even 30 years ago in the early years following the end of the Cold War, scholars emphasized the need for multilateralism in export controls and the limits of U.S. unilateral action: "The fundamental constraint on the ability of the United States to control the export of sensitive military and dual-use technologies is the availability of alternative sources of supply."[33] Although multilateral controls may be harder and take longer to put in place, they have historically proven to be more effective in the long run—a point agreed upon in the bipartisan Export Control Reform Act of 2018.[34]

Although we currently have multilateral export control regimes in place, these regimes are more narrowly focused on nonproliferation and conventional weapons, and are not equipped to deal with the multifaceted geopolitical challenges of the 21st century, particularly those related to competition with China. As such, the U.S. government should lead in the coordination of a new multilateral export control regime that is built to address today's issues. Since we have effectively created a framework for coordination—a *de facto* regime, per se—through our multilateral response to Russia, U.S. leaders should capitalize on this opportunity to codify this arrangement.

Why a new regime?

There are currently four multilateral export control regimes: the Nuclear Suppliers Group (NSG), the Australia Group (AG), the Missile Technology Control Regime (MTCR), and the Wassenaar Arrangement (WA). As suggested by their names, NSG controls nuclear-related items, and

[33] John H. Henshaw, "The Origins of COCOM: Lessons for Contemporary Proliferation Control Regimes," The Henry L. Stimson Center, May 1993, https://www.stimson.org/wp-content/files/file-attachments/Report7_1.pdf

[34] Export Control Reform Act of 2018 (ECRA): Paragraph 5: "Export controls should be coordinated with the multilateral export control regimes. Export controls that are multilateral are most effective…" and Paragraph 6: "Export controls applied unilaterally to items widely available from foreign sources generally are less effective in preventing end-users from acquiring those items…"

MTCR controls missile-related items. The AG is responsible for controlling items related to chemical and biological weapons, and the Wassenaar Arrangement—the successor of the Cold War-era Coordinating Committee for Multilateral Export Controls (COCOM)—controls conventional military-related items. Although they have and continue to serve an important purpose in geopolitics, there are elements of these regimes that are problematic, and many of the challenges we now face fall outside of the scope and jurisdiction of these four regimes.

First, both China and Russia are privy to some, although not all, of the regimes. Both are members of the NSG, and Russia also maintains membership in the WA and the MTCR, of which it currently chairs. Russia's membership and leadership roles have become increasingly disruptive since the February invasion. Since these regimes operate on consensus, it is impossible to remove Russia from these regimes without its consent (which it is unlikely to give), thereby lessening their effectiveness. For China, international organizations and fora have often been a place to advocate and push for its own interests.[35] For example, a March 2022 study by Jessica Drun and Bonnie Glaser found that China has used the United Nations (UN) to further institutionalize and normalize its own stance on Taiwan by signing secret agreements with UN bodies, restricting Taiwan's access to the UN and its facilities, and embedding Chinese national across various levels of UN staff.[36] If tensions between China and the U.S. and its allies grow, China's membership in the NSG is likely to become disruptive as well.

Beyond the issue of membership, the scope of the existing regimes is narrowly focused on controlling items related to conventional weapons and weapons of mass destruction (WMDs). At the time of their birth during and right after the Cold War, this made sense, as these were the primary shared geopolitical concerns. However, decades later, although these regimes retain some amount of salience, geopolitical challenges have shifted, threat landscapes have changed, and new adversaries have emerged. More specifically, the regimes' mandates do not permit actions to address contemporary policy issues, such as but not limited to the following[37]:

1. Responding to the national security threat posed by China's objective of obtaining strategic economic dominance in key technology areas;
2. Securing allied supply chain resiliency;
3. Preventing the misuse of commercial technologies to abuse human rights; and

[35] Yaroslav Trofimov, Drew Hinshaw, and Kate O'Keeffe, "How China Is Taking Over International Organizations, One Vote at a Time," Wall Street Journal, September 29, 2022, https://www.wsj.com/articles/how-china-is-taking-over-international-organizations-one-vote-at-a-time-11601397208

[36] Jessica Drun and Bonnie Glaser, "The Distortion of UN Resolution 2758 to Limit Taiwan's Access to the United Nations," German Marshall Fund of the United States, March 2022, https://www.gmfus.org/sites/default/files/2022-03/Drun%26Glaser-distortion-un-resolution-2758-limit-taiwans-access.pdf

[37] Kevin Wolf and Emily S. Weinstein, "COCOM's daughter?" WorldECR, May 2022, https://cset.georgetown.edu/wp-content/uploads/WorldECR-109-pp24-28-Article1-Wolf-Weinstein.pdf

4. Countering China's military-civil fusion (MCF) strategies.[38]

Furthermore, these four voluntary regimes govern the export control systems of U.S. allies; but beyond that, the export control systems of our allies have, until recently, been relatively underdeveloped. In fact, the existing regimes, and thus the laws of U.S. allies, do not allow for controls over unlisted items against specific countries, end users, or end uses, except if related to WMD, nonproliferation, or arms embargo objectives. A 2020 study by the Mercator Institute for China Studies noted that the EU only adopts one-for-one controls on items that are agreed upon in the multilateral regimes, but does not have the power to add controls itself.[39] The lack of ability to control based on end users and end uses (outside of the scope of nonproliferation or conventional weapons-related items) greatly hampers regimes' and the allies' abilities to control items that pose economic or national security risks, specifically in the context of a given country like China. This inability to impose end user controls presents serious challenges for the scope of current multilateral regimes, particularly in the context of China's MCF strategy, which aims to make the distinctions between civilian end users and military end users essentially nonexistent.[40] Controls on exports to specific end users (and end uses) are necessary when the items in question are widely available and widely used in benign or beneficial civil applications.[41]

Our current regimes are also unable to address the misuse of commercial technologies to abuse human rights. This is especially relevant in the context of China and surveillance technologies, a subject of which I know the Commission and my co-panelists have studied at length.[42] Although the United States has worked to impose export controls and sanctions on companies and entities complicit in the atrocities in Xinjiang, these have all happened unilaterally; therefore, listed companies like iFlytek, and others have continued to thrive both within China and in third-party countries.[43] The Biden administration recognizes a need for multilateral human rights controls; in

[38] According to the U.S. Department of State, "Military-Civil Fusion," or MCF, is an aggressive, national strategy of the Chinese Communist Party (CCP). Its goal is to enable the PRC to develop the most technologically advanced military in the world. As the name suggests, a key part of MCF is the elimination of barriers between China's civilian research and commercial sectors, and its military and defense industrial sectors." For more information, see: "Military-Civil Fusion and the People's Republic of China," U.S. Department of State, May 2020, https://www.state.gov/wp-content/uploads/2020/05/What-is-MCF-One-Pager.pdf

[39] Noah Barkin, "Export Controls and the US-China Tech War: Policy challenges for Europe," Mercator Institute for China Studies, March 18, 2020, https://merics.org/en/report/export-controls-and-us-china-tech-war

[40] The Hon. Christopher A. Ford, "Rethinking Multilateral Controls for a Competitive World," National Security Law Journal Vol. 9:2, 2022.

[41] Wolf and Weinstein, "COCOM's daughter?" WorldECR.

[42] "China's Smart Cities Development," SOS International prepared for the U.S.-China Economic and Security Review Commission, January 2020, https://www.uscc.gov/research/chinas-smart-cities-development; and Sheena Chestnut Greitens, "Dealing with Demand for China's Global Surveillance Exports," Brookings Institution, April 2020, https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200428_china_surveillance_greitens_v3.pdf

[43] "Addition of Certain Entities to the Entity List," Bureau of Industry and Security via the Federal Register, October 9, 2019, https://www.federalregister.gov/documents/2019/10/09/2019-22210/addition-of-certain-entities-to-the-entity-list; and "FACT SHEET: Executive Order Addressing the Threat from Securities Investments that Finance Certain Companies of the People's Republic of China," The White House, June 3, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/03/fact-sheet-executive-order-addressing-

December 2021, the White House issued a joint statement announcing the Export Control and Human Rights Initiative alongside Australia, Denmark, and Norway.[44] This is a step in the right direction, and I hope to see more like-minded countries join the Initiative. However, the topic has not come up publicly since it was first announced.

Creating a new regime

A new export control regime is vitally needed to improve our ability to deal with the aforementioned challenges. It should capitalize upon the *de facto* group of techno-democracies—advanced, high-tech producer countries with shared democratic values—that emerged since the Ukraine invasion, which includes 38 countries, including Taiwan. It will be imperative to include Taiwan in this regime, both for practical and moral reasons. On the practical side, as home to the largest semiconductor company in the world, Taiwan should be included in all conversations about semiconductor supply chains. This is particularly salient for the objectives #1 and #2 that I laid out in the previous section. In order to most effectively use export controls to respond to 1) the national security threat posed by China's objective of obtaining strategic economic dominance in key technology areas, and 2) securing allied supply chain resiliency, Taiwan will need a seat at the table.

I am not advocating for replacing or ending the current four regimes, nor do I believe that the United States and our allies should reduce our commitments to the existing regimes. On the contrary, I believe that these regimes serve as the foundations for their members' and adherents' domestic export controls within the context of traditional nonproliferation objectives. These regimes have and should continue to serve as critical venues for discussion and diplomacy. Rather, I strongly urge the creation of a new regime that can fill the gaps in the current regimes and bring export control policy into the 21st century. This new regime should also not be considered as a way to alienate countries that are not yet part of ongoing multilateral or plurilateral export control discussions, or are not considered to be leading technology producers. Once the concept gets off the ground, I would encourage the United States and other countries to actively include other nations that are deemed critical across high-tech supply chains.

As a first step to creating a new regime, the United States and allies should state in a common document what we have essentially agreed to in the context of Russia—impose new substantially similar controls on regime-listed items and items not on regime lists that are important to

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the-threat-from-securities-investments-that-finance-certain-companies-of-the-peoples-republic-of-china/; and "Chinese AI company iFlytek thrives despite techno-trade war," SupChina, February 12, 2020, https://supchina.com/2020/02/12/chinese-ai-company-iflytek-thrives-despite-techno-trade-war/; and "iFLYTEK Reports 62% Increase in H1 2021 Net Profits," iFlytek company website, September 9, 2021, http://www.iflytek.com/en/news/199.html

[44] "Fact Sheet: Export Controls and Human Rights Initiative Launched at the Summit for Democracy," The White House, December 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/12/10/fact-sheet-export-controls-and-human-rights-initiative-launched-at-the-summit-for-democracy/

Russia's strategic economic and military objectives. From there, the signatories can then establish a charter similar to that of the U.S.-EU Trade and Technology Council's export control working group.[45]

The initial mandate of this new regime should be clear and concise, as export controls are most effective when they come with a clear vision of what needs to be controlled, by whom, and to what end. As a start, members could identify the commodities, software, technologies, end uses, and end users that warrant control, on the basis of shared national security, economic security, and human rights issues, that currently fall outside of the scope of the existing four regimes. When thinking through this issue, members should consider whether the item in question would either: 1) advance a traditional export control objective that cannot be advanced thanks to the disruptive membership of Russia and/or China; or 2) address one or more of the contemporary national security, economic security, or human rights challenges that cannot be addressed through current coordinated export controls.[46] In addition, allies would need to make assurances that they would, in a relatively short period of time, harmonize and align their domestic controls with those of the United States and other allies, particularly as it relates to military end use controls related to Russia, China, and other threat actors.

Creating this new regime is relatively simple, and Congress is not required to provide any additional authorities to begin this process. Although the Export Control Reform Act of 2018 (ECRA) does not call for the United States to lead an effort to create a new regime of techno-democracies, it clearly authorizes such an effort with U.S. participation. For example, paragraph 16 of ECRA gives the administration the broad authority to "undertake any other action as is necessary to carry out" ECRA's national security and human rights objectives.[47] The harder part will be getting allies on board and their domestic systems up to speed. Allies have broken the mold by proving that they can control items outside of the scope of traditional nonproliferation objectives; however, these new policies must be codified into law and given proper authorities so they can be most effective moving forward.

A sense of urgency is necessary in creating this new regime, and we cannot afford to miss out on the momentum created by the multilateral action in response to Russia's invasion of Ukraine earlier this year. Formalizing a new regime sooner rather than later will put the United States and allies in a better position to deal with emergencies as they arise and avoid having to pull together ad hoc coalitions in response to incidents. In the context of a potential invasion of Taiwan, having this regime in place would allow the United States and allies to move rapidly and effectively against China in support of Taiwan.

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[45] "U.S.-EU Summit Statement," The White House, June 15, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/15/u-s-eu-summit-statement/

[46] Wolf and Weinstein, "COCOM's daughter?" WorldECR.

[47] "Public Comments of Kevin Wolf, Emily Kilcrease, and Jasper Helder Regarding Areas and Priorities for US and EU Export Control Cooperation under the US-EU Trade and Technology Council," January 14, 2022, https://www.akingump.com/a/web/da8PXpEZoaPekNsTPUmfmr/011422us-euttcwolfkilcreasehelderfinal.pdf

What's more, members of Congress have recently expressed concerns about our inability to act on harsh export controls before Russia's invasion of Ukraine. BIS Under Secretary Alan Estevez responded by saying that he did not think we would have been able to get the same multilateral response if we had acted before the invasion, and he argued that unilateral action on the part of the United States would not have been nearly as effective at deterring and/or preventing the invasion. Moving forward, if a new regime is already in place, the established information channels created and formalized by this new regime would allow for more efficient information sharing before, during, and after a potential crisis.

Conclusion: A Need for Tempered Expectations and Critical Assessments

Studying the use of export controls against Russia following its invasion of Ukraine allows us to see just how effective export controls can be when applied multilaterally and with a clear objective in mind. When applying this lesson to China, however, it is important to have tempered expectations; China is not Russia, and these controls will not look the same when applied to China.

In particular, there are some specific lessons to keep in mind. First, as the saying goes, we must ensure that we are not "cutting our own jugular" just to spite the Chinese. Second, export controls should be imposed through multilateral channels whenever possible, as unilateral controls have proven to be ineffective and eventually counterproductive. The satellite technology case study from the 1990s provides an excellent example of how export controls, especially unilateral ones, can have unintended consequences. In unilaterally moving satellites from the CCL to the U.S. Munitions List, the U.S. government inadvertently destroyed the competitiveness of the U.S. satellite industry. The U.S. share of worldwide satellite exports decreased from 73 percent in 1995 before the policy change in 1999, to just 25 percent in 2005.[48] In 2014, BIS estimated that the U.S. satellite industry lost between $988 million and $2 billion in foreign sales between 2009 and 2012 due to export controls.[49] To add insult to injury, a 2020 report from this Commission argued that China has now emerged as a leading player in space technologies despite U.S. efforts, partly due to a domestic push to indigenize space R&D capabilities.[50] In this instance, we can see that a lack of consideration of long-term effects led to unintended consequences and eventually did not solve the objective in question.

[48] Hugo Meijer, Trading with the Enemy: The Making of US Export Control Policy Towards the People's Republic of China (New York, NY: Oxford University Press, 2016): 284.
[49] Office of Technology Evaluation, U.S. Space Industry "Deep Dive" Assessment: Impact of U.S. Export Controls on the Space Industrial Base (Washington, D.C.: U.S. Department of Commerce, February 2014), 28, https://www.bis.doc.gov/index.php/documents/technology-evaluation/898-space-exportcontrol-report/file.
[50] Mark Stokes, Gabriel Alvarado, Emily Weinstein, and Ian Easton, China's Space and Counterspace Capabilities and Activities (Arlington, VA: Project 2049 Institute, 2020), https://www.uscc.gov/sites/default/files/2020-05/China_Space_and_Counterspace_Activities.pdf.

In addition, export controls are designed to impose strategic delay by preventing entities from accessing critical technologies. They are not designed to be wielded as tools of economic destruction, although that of course can be a side effect (intended and unintended). In the context of China, the United States cannot expect export controls to cripple China's high-tech sectors or prevent China from indigenously innovating.

Moreover, we cannot expect unilateral controls to be effective, as China can easily source what it needs from third-parties. Even if the U.S. government chose to apply the FDPR more broadly, it would likely only work for a short time, and would eventually incentivize companies to offshore production in order to avoid U.S. export controls regulations. The United States is no longer the only source of technology and high-tech expertise; indeed, CSET's work on "Chokepoints" provides further examples of these workarounds—China identifies leading providers for several essential technologies outside of the United States, namely in part of Europe, Japan, and South Korea.[51] Thus, to ensure the effectiveness of export controls, we must approach them with other high-tech nations.

Finally, export controls are only one part of our larger national security toolbox. These defensive measures, alongside sanctions and other tools, are critical tools, and will likely be vital in any conflict that arises with China. However, the defensive tools are most effective—both unilaterally and multilaterally—when used in conjunction with "run faster" policy options. Regardless of a potential Taiwan invasion scenario, it will be crucial for the United States and allies to work together to ensure that we are bolstering domestic innovation and easing burdens on bilateral and multilateral investments and S&T collaboration. Additionally, it behooves us to work together to incentivize companies to move their production out of China and into places like Southeast Asia and Latin America.

To conclude, I propose the following recommendations for U.S. policy:

1. **Capitalize on the multilateral coordination following the Ukraine invasion by codifying a new multilateral export control regime to complement the four existing regimes. This regime should focus on controlling beyond nonproliferation objectives.**

While Congress does not need to provide the executive branch with any additional authorities to lead this effort, it should move swiftly to codify the *de facto* regime while it still has momentum in order to prepare for various contingencies, including a potential invasion of Taiwan. It will be critical to have this in place before a Taiwan invasion scenario, as it will vastly improve our ability to coordinate with allies and have the greatest potential impact on the Chinese economy and military. As part of this effort or separately, the United States should work to establish multilateral controls for human rights objectives. Although relevant in the context of China,

[51] Ben Murphy "Appendix: Key Details of the 35 "Chokepoint" Technologies," Center for Security and Emerging Technology, https://docs.google.com/spreadsheets/d/1e1qEMe5FDB_zvlKcu67CpNK2rlC7UFsa/edit#gid=2146773379

these human rights controls should be applied to any entities worldwide that are found to be complicit in designing, manufacturing, selling, or using commercial technologies to abuse human rights.

In conjunction with these efforts, the United States should work with like-minded nations to assist them in updating their domestic export control regimes. Absent any progress on a new multilateral regime, this is a necessary step in modernizing export controls that will help us prepare for future emergency scenarios.

2. Establish a Supply Chain Chokepoints Task Force to study global supply chains in critical technologies.

Additional research is required to identify chokepoints in global supply chains. The relevant data exists but is often behind paywalls or held closely by industry for comparative advantage reasons. In other cases, the data is not actually written out, but exists in the minds of academics and researchers working at the cutting edge. A task force dedicated to examining supply chain chokepoints could act as a middleman between industry/academia and the U.S. government, as it could aggregate and anonymize data to protect comparative advantages and other competition issues while providing the U.S. government—and hopefully the public in some form—with the information necessary to hone how we use tools like export controls.

This effort should be twofold. First, this task force should study instances where China views themselves as vulnerable, similar to the efforts in CSET's Chokepoints report. It should also examine instances where the United States and like-minded countries are vulnerable to China—like lithium, pharmaceuticals, and more. These efforts will be critical to how we assess when and how to use export controls.

3. Establish a well-resourced S&T analysis and monitoring organization with sustained funding to monitor developments in emerging and foundational technologies.

Given the now-globalized nature of S&T innovation and the central role of technology in national security, effective strategy and policy require open-source collection and analysis of S&T developments worldwide.[52] As such, Congress should mandate the establishment of an open-source S&T analysis center that uses unclassified sources to monitor global developments in emerging technologies. This center should be an independent entity housed outside of the intelligence community, and its mandate should focus on S&T collection, analysis, and decision support. As noted by CSET Director Dewey Murdick in testimony before Congress, this type of entity can achieve the following objectives:[53]

[52] Tarun Chhabra, William Hannas, Dewey Murdick, and Anna Puglisi, "Establishing a new open-source National Science and Technology Analysis Center," Center for Security and Emerging Technology, https://cset.georgetown.edu/wp-content/uploads/CSET-Policy-Recommendation-OSINT-One-Pagers.pdf

[53] Dewey Murdick, Ph.D., "Testimony before the Senate Select Committee on Intelligence: Countering the People's Republic of China's Economic and Technological Plan for Dominance," Center for Security and Emerging

- Create an unclassified foundation on top of which more sensitive threat work can be overlaid;
- Function seamlessly across foreign and domestic technological challenges;
- Assemble a critical mass of resources that are hard to find due to high setup costs, such as technical infrastructure, data resources, expert input, and analytic talent; and
- Work to enable innovations to move from research to practice.

Thank you once more for the opportunity to address these issues before the Commission and alongside my fellow panelists. I look forward to your questions.

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Technology, May 11, 2022, https://cset.georgetown.edu/wp-content/uploads/2022.05.11-Testimony-before-the-Senate-Select-Committee-on-Intelligence.pdf

Appendix: Glossary of U.S. Export Control Terminology

Term	Definition
End User	The person abroad that receives and ultimately uses the exported or reexported items (i.e., commodities, software, and technology). 15 CFR 748.5(f).
End Use	How and for what purpose the item exported or reexported is used.
Military End User	Refers to "the national armed services (army, navy, marine, air force, or coast guard), as well as the national guard and national police, government intelligence or reconnaissance organizations, or any person or entity whose actions or functions are intended to support 'military end uses'." 15 CFR 744.21(g).
Military End Use	Refers to items incorporated into a military item on a munitions list; or any commodity that is designed for the use, development, production or deployment of military items on a munitions list. 15 CFR 744.21(f).
Entity List	The list of persons and entities identified in the Export Administration Regulations (EAR) to whom items subject to the EAR may not, with rare exceptions, be exported, reexported, or transferred without a license. Entities are added to the list if there is a reasonable cause to believe, based on specific and articulable facts, that the entity has been involved, is involved, or poses a significant risk of being involved in activities that are contrary to the national security or foreign policy interests of the United States. 15 CFR 744.11.
Foreign Direct Product Rule	The rules in the EAR that govern when an otherwise uncontrolled foreign-made item outside the United States is subject to the jurisdiction of the EAR if produced with certain types of commodities, software, or technologies that are subject to the EAR. 15 CFR 734.9.