

# Export Controls in an Era of Strategic Competition: Implications for the Existing Landscape and the Need for a New Multilateral Trade Review Regime

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## Abstract

*Strategic competition between the United States and China may be a defining feature of the 21st century. This article examines the implications of strategic competition, as well as of Russia's invasion of Ukraine, for export controls and the export control landscape as it exists at the start of 2023. To facilitate this examination, the article explores the objectives of export controls since the 20th century World Wars and identifies six main purposes of controls. These purposes are then used as the basis of an examination of how export controls are currently used, including how they are beginning to be used in relation to strategic competition, and how they should evolve such that they can be effective in addressing each of the purposes of controls that are identified.*

*Building on this analysis, the article also argues that the current multilateral export control regime is important to maintain to address some, but not all, of the challenges that export controls face in the current security context. As such, additional multilateral control mechanisms are required to fill the gaps in current multilateral export controls. Additionally, the article identifies measures that all countries should put in place to better manage strategic trade in the current security environment at the national level.*

## Keywords

Export control, emerging technologies, omni-use, omnipresent, trusted communities, United States, China, strategic autonomy, Wassenaar Arrangement

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## Introduction

The export control landscape is currently tumultuous. The main multilateral export control regimes largely stagnated during the COVID-19 period because of the difficulty of meeting in person. In parallel, the world has changed as Russia's invasion of Ukraine makes plain. Overnight, novel export control measures were leveraged against Russia as a form of sanction to choke the Russian defense complex.<sup>1</sup> But it is not only in relation to Russia that the landscape has changed. The rise of a geostrategically competitive China has resulted in the United States taking significant action to curb exports of strategic goods to China that could be used by its military and strategic programs. U.S. measures have recently been implemented that extend even to safeguarding technical leadership vis-à-vis China in fields like semiconductors, as new controls announced on October 7, 2022 demonstrate.<sup>2</sup>

In parallel, evidence has come to light of both Russia and China's reliance on U.S. or Western goods, software, and technology. Research has shown that Russia's missiles largely use Western-origin electronics. China's hypersonic missile program has benefited from U.S. and Western origin software.<sup>3</sup> These specific cases are likely to be the tip of the iceberg; the nature of globalized supply chains means that both Russia and China's military and strategic sectors are deeply reliant on and well-fed by Western supply chains despite the best efforts of the export control community. Additionally, cyber intrusion has emerged as a prevailing threat to export controls through the theft of export-controlled technology, with both Russia and China being active players in the cyberespionage scene.

Export controls are an important yet understudied instrument of international peace and security. From the 20<sup>th</sup> century World Wars to the Cold War, from responding to Iraq's Weapons of Mass Destruction (WMD) program to preventing terrorists from obtaining nuclear weapons, and from responding to Russia's invasion of Ukraine to responding to China's rise as a rival of the United States, export controls have been a go-to tool for policymakers. Indeed, the most recent U.S. National Security Strategy issued in October 2022 makes repeated mention of the role and importance of export controls.<sup>4</sup> It is not only the United States that has increased reliance

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1 "Commerce Implements Sweeping Restrictions on Exports to Russia in Response to Further Invasion of Ukraine", Department of Commerce, Feb 24, 2022, <<https://www.commerce.gov/news/press-releases/2022/02/commerce-implements-sweeping-restrictions-exports-russia-response>>.

2 The following two references taken together address this point. See "Remarks by National Security Advisor Jake Sullivan at the Special Competitive Studies Project Global Emerging Technologies Summit", September 16, 2023, <<https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/16/remarks-by-national-security-advisor-jake-sullivan-at-the-special-competitive-studies-project-global-emerging-technologies-summit/>> and "Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)", Department of Commerce, October 7, 2022, <<https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3158-2022-10-07-bis-press-release-advanced-computing-and-semiconductor-manufacturing-controls-final/file>>.

3 "American Technology Boosts China's Hypersonic Missile Program," *The Washington Post*, October 17, 2022, <<https://www.washingtonpost.com/national-security/2022/10/17/china-hypersonic-missiles-american-technology/>>.

4 National Security Strategy, The White House, October 2022, <<https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>>.

on export controls, but also China. China adopted its first criminal export control law in 2021 and has launched new initiatives at the United Nations concerning export controls.<sup>5</sup> These initiatives, which are examined in this article, are Chinese counter initiatives to U.S. export controls which it feels are directed against it in an era of strategic competition.

In this context, there is a need for a holistic analysis of how the export control landscape is affected by these developments and how export controls should evolve. Are the existing export control regimes capable of coordinating controls to address the current perceived security challenges or are new regimes required? Are new or additional measures required at the national level, and if so, what should they be? What should controls on so-called emerging technologies look like and how should they be coordinated internationally? There are several academic and practitioner-orientated articles focused on these questions. In relation to emerging technologies, several articles and reports have focused on the type of export controls that should be controlled and how these controls could operate in practice; other literature has sought to examine the challenges associated with subjecting emerging technologies to export controls; other literature again has examined the ability of the multilateral export control regimes to evolve to meet current security challenges, concluding that the nature of these regimes, including their informal, consensus-driven nature, together with a lack of high-level political support, limits their ability to respond to current security challenges; other still have focused on examining the nature of emerging technologies and how trusted communities may be created on a multilateral basis to manage them.<sup>6,7,8,9</sup>

This article seeks to complement existing research by undertaking a holistic analysis of the purposes for which export controls are implemented and examining the extent to which current measures satisfy these purposes. The article is largely an analysis of contemporary issues and secondary sources, but it does benefit from a small number of practitioner interviews and the author's participation in the open consultations for the United Nations Security Council resolution 1540 Committee's Comprehensive Review in 2022.

The article first sets out what factors are driving change in the export control landscape at present by examining the purposes for export controls. The article then builds on this to examine the multilateral export control regimes and then, in turn, examines what may need

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5 "Full Text: China's Export Controls," The State Council, The People's Republic of China, <[https://english.www.gov.cn/archive/whitepaper/202112/29/content\\_WS61cc01b8c6d09c94e48a2df0.html](https://english.www.gov.cn/archive/whitepaper/202112/29/content_WS61cc01b8c6d09c94e48a2df0.html)>.

6 See for example, Ian J Stewart, "Export Control and Emerging Technology Control in an Era of Strategic Competition," James Martin Center for Nonproliferation Studies, March 8, 2022, <<https://nonproliferation.org/export-control-and-emerging-technology-control-in-an-era-of-strategic-competition/>>.

7 Kolja Brockmann, "Drafting, Implementing, and Complying with Export Controls: The Challenge Presented by Emerging Technologies," *Strategic Trade Review*, Volume 4, Issue 6 (Spring/Summer 2018).

8 Michael Beck and Scott Jones, "The Once and Future Multilateral Export Control Regimes: Innovate or Die", *Strategic Trade Review*, Volume 5, Issue 8 (Winter/Spring 2019).

9 Brigitte Dekker and Maaike Okana-Heikams, "Emerging Technologies and Competition in the Fourth Industrial Revolution: The Need for New Approaches to Export Control", *Strategic Trade Review*, Volume 6, Issue 9 (Winter/Spring 2020).

to change at the national level. Finally, consideration is given to how best to coordinate novel controls including on emerging technologies. The paper concludes that the existing export regimes should continue to provide the backbone of multilateral export controls but that new regimes and additional measures at the national level are required for export controls to meet current security challenges.

## The Purpose of Export Controls

There are at least six purposes for which export controls have been implemented in modern history, as will be examined in this section. Before examining them, it is helpful to introduce factors that will aid in their analysis. These factors are not intended to provide absolute comparative criteria. Instead, they are intended to highlight certain distinctions between the purposes of export controls. These factors are whether the controls are thematic in nature or whether they are targeted; whether they target specific countries or groups of countries; and the nature of international trade at the time.<sup>10</sup>

### *The Six Purposes of Export Controls*

Wartime controls: The purpose of these controls is both to prevent an enemy from benefiting from the country's technical base and to steward the country's resources. Such controls place a priority on security over economic considerations. For example, during the First World War, the United Kingdom adopted the "Navicert" system whose purpose was to prevent shipments to enemies and to minimize the risk of diversion of goods through neutral countries.<sup>11</sup> The U.S. also adopted a "Trading with the Enemy" act which expressly forbade trade with enemies unless authorized by a license.<sup>12</sup>

Delineating trade with an adversary: During the Cold War, Western countries implemented the Coordinating Committee for Multilateral Export Controls (COCOM) regime which is generally understood to have been a technology denial regime aimed at ensuring western technology could not aid the Soviet Union from a strategic or military perspective. COCOM existed for nearly four decades from the 1950s to the 1990s and its nature and purpose did vary over time. While it generally reflected the principles of wartime controls and often did act as a technology denial regime, oftentimes the scope of COCOM was such that trade that could be deemed non-military or non-strategic could go ahead.<sup>13</sup>

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10 This last point is intended to get at how trade has changed over time. During the Cold War trade was largely within bloc rather than inter-bloc. More recently, globalization has meant trade is global in scope. Furthermore, the rise of the internet in recent decades has meant that trade in services and technology is as important as trade in goods.

11 H. Ritchie, *The "Navicert" System During the World War*, (Washington: Carnegie, 1938).

12 Trading with the Enemy, 50 U.S.C Ch. 53, <<https://uscode.house.gov/view.xhtml?path=/prelim@title50/chapter53&edition=prelim>>.

13 "The Origins of COCOM: Lessons for Contemporary Proliferation Control Regimes," Henry L Stimson Center, John H. Henshaw, May 1993, <<https://www.files.ethz.ch/isn/105597/Report7.pdf>>.

WMD proliferation controls: From the 1970s through the 1990s, states saw common cause in preventing WMD proliferation with regimes being introduced to serve different aspects of this purpose. It was in this period that the five multilateral export control regimes emerged: the Zangger Committee, the Nuclear Suppliers Group (NSG), the Australia Group, the Missile Technology Control Regime (MTCR), and the Wassenaar Arrangement. Of the purposes examined in this section, their primary purpose relates to WMD nonproliferation, except for the Wassenaar Arrangement, which also deals with military items.

United Nations Security Council resolution 1540-based controls: in the early 2000s, the United Nations Security Council adopted a binding resolution under chapter VII of the UN Charter that requires all UN Member States to implement export controls and other measures to prevent proliferation from and through non-state actors.<sup>14</sup> The driver for this was twofold: a global nuclear technology proliferation network and the 9/11 attacks, which increased concern about the possibility that terrorists could use WMD. Resolution 1540 requires all states to implement export controls including several specific provisions, but its scope is specifically limited to non-state actors and WMD. Many states have implemented export controls based on the requirements of resolution 1540. But those that do so in order to narrowly meet the requirements of the resolution would not have a well-rounded system of control that addresses other export control needs. There is a strong complementarity between resolution 1540 and the WMD-related export control regimes detailed in the previous bullet point, although there is no formal linkage between these measures.

Human security export controls: This category of controls is also relatively new and thus their scope is still emerging.<sup>15</sup> Given this, providing a definition or scope is challenging. The European Union (EU) has been a key actor in adopting such export controls, with the EU's new export control regulation adopted in 2021 containing measures including a new list of technology end-use controls.<sup>16</sup> The focus of this new EU approach is largely on ensuring that cybersurveillance technology exported from the EU is not used to repress populations. However, the scope of human rights-based controls is broader, with the EU also long maintaining a regulation on the export of equipment for torture, for example.<sup>17</sup> Human security has also been adopted as part of the licensing criteria of

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14 For a history and overview of resolution 1540, see Daniel Salisbury, Ian J. Stewart, Andrea Viski eds., *Preventing the Proliferation of WMDs: Measuring the Success of UN Security Council Resolution 1540* (Springer International Publishing, 2018).

15 Machiko Kanetake, "The EU's Export Control of Cyber Surveillance Technology: Human Rights Approaches," *Business and Human Rights Journal*, Vol. 4, No. 1, pp. 155-162, doi:10.1017/bhj.2018.18.

16 Council Regulation (EC) No. 821/2021 of 20 May 2021 Setting up a Community Regime for the Control of Exports, Transfer, Brokering and Transit of Dual-use Items (recast), Official Journal of the European Union, <<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2021:206:FULL&from=EN>>.

17 Council Regulation of the European Parliament and of the Council of January 16, 2019 Concerning Trade in Certain Goods which Could be Used for Capital Punishment, Torture, or Other Cruel, Inhuman, or Degrading Treatment or Punishment, (EU) 2019/125P, Official Journal of the European Union, <<https://eur-lex.europa.eu/EN/legal-content/summary/eu-ban-on-trade-in-instruments-of-torture.html>>.

the United States, European Union, and United Kingdom.

Strategic competition controls: This category of controls is a more recent development and is the primary focus of this paper. It comes particularly in the context of U.S. efforts to manage what U.S. officials often call the “malign state” actor threat.<sup>18</sup> It is somewhat ill-defined as it could be used in the context of both the perceived China challenge and the Russia challenge even though these cases differ particularly given Russia’s invasion of Ukraine. One primary difference is that the China challenge involves trying to balance trade and security interests whereas, at present at least, most Western trade with Russia has ceased or been greatly limited by the effect of sanctions. The scope of these controls is also still in development. The U.S. has taken unilateral action and has encouraged other countries to take action. However, so far, no overarching multilateral approach has emerged. This category has a strong overlap with those detailed in the second bullet point above. One reason for treating these categories as distinct is that controls in the Cold War era were dominated by COCOM. COCOM was a very specific mechanism that, among other features, gave all participating countries a veto over the trade of others. It is difficult to foresee anything like this being introduced today. A key reason for this is that COCOM predated globalization (and indeed was introduced shortly after World War Two when trade had already been heavily restricted). With globalization and the digitization of the economy, today’s landscape seems fundamentally different from the landscape that existed during the COCOM period.

### *Strategic Competition Controls*

Examining the purposes of controls in this way highlights the overlaps and differences associated with the purposes of controls. But where do strategic competition controls fit into this picture? In essence, it is argued that they most closely resemble wartime or COCOM-like controls aimed at adversaries, albeit while leveraging thematic-like controls targeting very specific sectors. This section informs this argument.

Wartime and COCOM controls generally focused on targeted countries. This included the Axis allies in World War Two and the Soviet bloc in the COCOM era. Thematic controls tend to focus on end-uses and end-users of concern. WMD controls have tended to focus on end-uses and end-users of concern in specific countries like Iran and North Korea (and earlier in India and Pakistan), but the principle of these controls is that they target the technologies relevant to the programs of concern and their misuse rather than the country as a whole. Human security export controls are new but appear to follow a similar pattern. For example, as implemented in the EU, they target specific technology and specific end-uses rather than countries as a whole.<sup>19</sup>

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18 “Covert, Coercive, and Corrupting: Countering the Chinese Communist Party’s Malign Influence in Free Societies: Remarks by David R. Stillwell, Assistant Secretary, Bureau of East Asian and Pacific Affairs,” State Department, October 30, 2020, <<https://2017-2021.state.gov/covert-coercive-and-corrupting-countering-the-chinese-communist-partys-malign-influence-in-free-societies/index.html>>.

19 Council Regulation (EC) No. 821/2021 of 20 May 2021 Setting up a Community Regime for the Control of Exports, Transfer, Brokering and Transit of Dual-use Items (recast), Official Journal of the European Union, <<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2021:206:FULL&from=EN>>.

The final category of note is sectoral controls. However, what is meant by sectoral controls must be carefully delineated from sectoral controls that have been adopted as part of sanctions rather than an export control system. For example, there were times during the Cold War when the U.S. and its allies imposed restrictions on the export of oil and gas development infrastructure to the Soviet Union.<sup>20</sup> Additionally, broad economic sanctions including sectoral sanctions were adopted by the UN and by individual states in response to the nuclear and missile developments of Iran and North Korea.<sup>21</sup>

The sectoral measures being adopted by the United States as a result of strategic competition with China should be viewed as distinct from such measures even though they do appear at first glance to be similar. A key distinction is that the premise of U.S. controls on semiconductors is that China is seeking to leverage its semiconductor sector in its military and strategic programs as part of China's so-called Military Civil Fusion (MCF) strategy.<sup>22</sup> This premise is more akin to the thematic controls examined above than the sectoral sanctions measures that have been adopted in other cases. This distinction is not necessarily clear cut, however, as a stated goal of recent U.S. action on China is also to maintain a generational lead over China about technology such as semiconductors.<sup>23</sup> Such a goal would be distinct from the goals pursued in any other export control scenario that has been identified. Nonetheless, the purpose of such controls is generally consistent with how controls have been used against adversaries and enemies.

## International Frameworks

The current international export control framework grounded in UNSC resolution 1540 and the export control regimes are most closely aligned to the thematic purpose of export controls examined in the previous section rather than the purposes that target specific states or adversaries. This leads to the question of how international frameworks are evolving as a result of strategic competition and how multilateral controls would need to evolve to be effective.

The existing export control regimes and resolution 1540 contribute to specific purposes of export controls, as examined in the previous section. The value of the 1540 mechanism and the export control regimes in addressing the thematic purposes of export controls will not diminish. As such, provided that the regimes continue to be functional despite increased tensions between key members, they should be maintained. To date, there has been no serious effort by the U.S. or Western countries to eject Russia from the Wassenaar Arrangement, although it should be

20 “Reagan Imposes Sanctions against Soviets,” *UPI*, Dec 29, 1981, <<https://www.upi.com/Archives/1981/12/29/Reagan-imposes-sanctions-against-Soviets/7980378450000/>>.

21 United Nations Security Council Resolution 1718, S/RES/1718 (2006), October 2006.

22 “Military-Civil Fusion and the People’s Republic of China,” U.S. Department of State, Undated, <<https://www.state.gov/wp-content/uploads/2020/05/What-is-MCF-One-Pager.pdf>>.

23 “Remarks by National Security Advisor Jake Sullivan at the Special Competitive Studies Project Global Emerging Technologies Summit,” White House, Sept 16, 2022, <<https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/16/remarks-by-national-security-advisor-jake-sullivan-at-the-special-competitive-studies-project-global-emerging-technologies-summit/>>.

borne in mind that China's application to join the Missile Technology Control Regime in 2004 was not taken forward, apparently at the objection of the U.S. and other western-orientated states.<sup>24</sup> As such, at least from a western perspective, the approach to the export control regimes appears to be akin to a "business as usual" approach despite the increased tensions of recent years. There are also strong reasons to doubt that a move to eject Russia from an arrangement such as the Wassenaar Arrangement could be successful given that countries such as Turkey, India, and South Africa are regime members and would presumably object to action targeted at Russia.

It is important to observe that, in relation to semiconductor controls, at least, the U.S. seems to have taken the approach of working with one or two key supplier states rather than seeking to build a new export control regime. In the case of the semiconductor sector, the rationale for this is that two countries – the Netherlands and Japan – are producers of key chokepoint technologies and that controls can thus be effective if only three countries agree to implement them.<sup>25</sup> It is as yet unclear whether this approach will be effective in the semiconductor sector. However, it is important to state that this approach cannot be relied upon as a primary approach for all emerging technology controls. While it may be the case that for Extreme Ultraviolet Lithography, only three countries need to agree, for many—or perhaps most—emerging technologies, multiple countries are holders of chokepoint technologies, meaning that bilateral agreements between 2-3 countries cannot be effective. It is this that necessitates a multilateral basis of control rather than a bilateral basis of control.

Russia and China, on the other hand, have sought to limit or change different aspects of the international governance landscape for export controls in recent years. Russia's actions focused on limiting the mandate of resolution 1540 which underwent its comprehensive review in 2021. Russia generally opposed any evolution of UNSCR 1540 away from its original scope despite proposals that it should increase focus on topics such as export control of emerging technology, proliferation finance, and intangible technology control. Russia also opposed an expansion of the mandate of the 1540 group of experts to proactively assist member states in implementing the resolution's requirements.<sup>26</sup> Russia's stated rationale was that since resolution 1540 was adopted under Chapter VII of the UN charter – a fact that had originally raised challenges to the legitimacy of the resolution – it was necessary to keep the resolution narrowly focused on its original scope and that addressing these more novel issues would thus break with this principle.<sup>27</sup> However, Russia's broader purpose in limiting the scope of the resolution is likely

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24 See for example, Niels Aadal Rasmussen, "Chinese Missile Technology Control – Regime or No Regime?," Danish Institute for International Studies, <[https://www.files.ethz.ch/isn/29608/nra\\_chinese\\_missile\\_technology\\_control.pdf](https://www.files.ethz.ch/isn/29608/nra_chinese_missile_technology_control.pdf)>.

25 See for example, "Japan, Netherlands to Join U.S. in Restricting Chip Equipment Exports to China, Bloomberg Reports," *Reuters*, January 27, 2023, <<https://www.reuters.com/technology/japan-netherlands-join-us-china-chip-controls-bloomberg-2023-01-27/>>.

26 Russia's position was put forward during the open consultations on UNSCR 1540 as part of the 1540 Comprehensive Review. Russia's main statement to the open consultations took place in meeting 3 of the open consultations, although Russia's interventions at other points in the open debate are also relevant. See (3rd meeting) 1540 Committee (Nonproliferation of Nuclear, Chemical, and Biological Weapons), Open Consultations - General debate, <<https://media.un.org/en/asset/k1x/k1xbo1ifdf>>.

27 Ibid.

related to the fact that countries are leveraging export controls, proliferation finance controls, and other measures as a result of Russia's invasion of Ukraine (both its 2014 invasion and its further invasion in 2022).

China has sought to challenge not resolution 1540 but the export control regimes. China is a member of only the Nuclear Suppliers Group, with its application to join the Missile Technology Control Regime (MTCR) in 2004 not having moved forward as a result of concerns about China's inadequate implementation of export controls.<sup>28</sup> In 2021, China introduced a UN General Assembly resolution on peaceful uses of technology whose purpose key states believe is ultimately to undermine the export control regimes by creating a UN export control mechanism.<sup>29</sup> This belief builds on the premise that as China cannot participate in decision-making in three of the four main export control regimes, China wishes to move export control discussions to a forum in which it can participate. What is notable is that China's General Assembly resolution does not build on or express support for resolution 1540.<sup>30</sup> In pursuing this resolution, China thus appears to be undermining the entire governance structure of modern export controls. China, for its part, seems to deny that it intends to undermine either resolution 1540 or the export control regimes.<sup>31</sup> Unlike Russia, China was not obstinate in the 1540 comprehensive review. Chinese officials, when interviewed by the author, also claimed that they did not have plans to create a UN-based export control mechanism as believed by key states.<sup>32</sup>

The challenges to the international frameworks for export controls are not limited to the ones described above. The export control regimes, in particular, face additional challenges which have largely been stalled in recent years, even before the COVID-19 pandemic introduced an additional chilling factor on the regimes. Perhaps foremost among these challenges is the question of membership. These regimes operate by consensus of member states. As these regimes form the basis of international governance of export controls, it is widely believed that increasing participation also increases the legitimacy of the regimes. However, increasing membership in a consensus-driven mechanism makes consensus more difficult. As a result, there has been a principled discussion underway for many years about how to address the issue of expanding the regimes.<sup>33</sup> At the same time, and particularly related to membership questions,

28 See for example, Niels Aadal Rasmussen, "Chinese Missile Technology Control – Regime or No Regime?," Danish Institute for International Studies, <[https://www.files.ethz.ch/isn/29608/nra\\_chinese\\_missile\\_technology\\_control.pdf](https://www.files.ethz.ch/isn/29608/nra_chinese_missile_technology_control.pdf)>.

29 "EU Explanation of Vote – United Nations 1st Committee: Promoting International Cooperation on Peaceful Uses in the Context of International Security," European Union External Action Service (EEAS), Feb 11, 2021, <[https://www.eeas.europa.eu/delegations/un-new-york/eu-explanation-vote-%E2%80%93-united-nations-1st-committee-promoting-international\\_en?s=63](https://www.eeas.europa.eu/delegations/un-new-york/eu-explanation-vote-%E2%80%93-united-nations-1st-committee-promoting-international_en?s=63)>.

30 "Promoting International Cooperation on Peaceful Uses in the Context of International Security", UN General Assembly, A/C.1/77/L.56, October 2021, <<https://daccess-ods.un.org/access.nsf/Get?OpenAgent&DS=A/C.1/77/L.56&Lang=E>>.

31 Interview with Fu Cong, February 2022.

32 Ibid.

33 See for example, Pierre Goldschmidt, "NSG Membership: A Criteria-Based Approach for Non-NPT States," Carnegie Endowment for International Peace, May 2011, <<https://carnegieendowment.org/2011/05/24/nsg-membership-criteria-based-approach-for-non-npt-states-pub-44147>>.

the consensus decision-making approach means export control regime decisions are often held hostage to bilateral political and diplomatic issues and disputes. This was true in 2015, for example, when Italy blocked India's entry to the Missile Technology Control Regime because of an unrelated bilateral dispute related to the arrest of Italian marines on a vessel transiting Indian waters.<sup>34</sup> In the current geopolitically charged environment, there is substantial scope for such external issues to result in consensus being blocked in the export control regimes.

In sum, it is clear that strategic competition and the more difficult relations between the U.S. and Russia and the U.S. and China is and will continue to have a chilling effect on the existing multilateral export control regimes. Nonetheless, unless China was to move to set up a new export control mechanism under UN auspices which currently would not gain the support of most Western countries, or unless the U.S. was to lead a serious effort to have Russia ejected from the Wassenaar Arrangement, it seems unlikely that strategic competition will result in an unraveling of the existing regime structures. This does not mean that activity in the export control regimes will not be affected by strategic competition. The regimes may continue to stagnate as countries evaluate whether new measures would be too targeted at specific states. However, the regimes themselves are likely to survive as forums for the coordination of thematic controls.

#### *What the Existing Regimes Should Do*

There are measures that the existing regimes can and should take even during this difficult period. As mentioned, recent reports have highlighted that Western software has aided the Chinese hypersonic missile program with the software not currently appearing on the lists of the export control regimes. Such specific issues should be discussed at the MTCR to agree that software designed or marketed to aid hypersonic system development should be subject to export control. This is one specific technical development that is not targeted at any specific country, so it should be possible to agree to this measure.<sup>35</sup> In the context of the revelations that Western origin goods are used in Russian and Iranian defense systems, the existing regimes should also discuss how to standardize catch-all and end-use controls and whether there are specific additional items that should be added to the lists.

The Wassenaar Arrangement should also take up several sector-specific topics. Some of these points will be difficult to agree on given the current political dynamics. But in some areas, consensus is possible when measures are technical rather than political and are well grounded in a clear need to act. Some of the areas the Wassenaar Arrangement should consider controlling:

- The export of supercomputing technical and consulting services;
- The export of medium-performance processing units. By this, it is meant processors such as the A-100 Nvidia processor which the U.S. reportedly banned for export to

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34 "Italy Blocks Indian Application to MTCR," Defense News, October 17, 2015, <<https://www.defensenews.com/home/2015/10/17/italy-blocks-indian-application-to-mtcr/>>.

35 This measure is not straightforward even though it may sound so; presently "marketed" is not generally a criteria as export controls tend to be criteria driven. However, it is evidently farcical for software designed and marketed to aid modelling of hypersonic flight not to be subject to control.

China;<sup>36</sup>

- The export of parts and components for quantum computers and communications systems;
- The export of machine learning models designed to address military use cases, any proprietary (e.g., nonpublic) datasets assembled to train such models, and any custom processing hardware intended to allow the deployment of such systems in military applications.

The Wassenaar Arrangement should also consider the topic of cybersecurity of export-controlled information. Presently, few countries require those holding technology (e.g., electronic information associated with controlled goods) to implement any form of cybersecurity to protect the data. The Wassenaar Arrangement should examine this topic to develop best practice guidance for industry on how to control such data. This would include risk management guidance (e.g., how to identify and prioritize export control data as part of a company's broader cyber security practices). Finally, the Wassenaar Arrangement should also discuss the alignment of military end-use controls. Many countries do not have military end-use controls at all and where they do, they often do not require companies to seek licenses when they know or have reason to know that items are destined for military end-use.

### The Need for a Trade Review Regime

A conclusion from the foregone analysis is that the existing export control regimes cannot serve all the purposes that export controls are currently being used for. Specifically, given the priority that the U.S. and allied countries place on managing trade, investment, and scientific cooperation with China in the context of strategic competition, an additional new regime is needed to enable multilateral coordination of controls in this context. The specific gap that this regime would address is that export controls are being used to target adversaries – or potential adversaries – and the coordination of such measures cannot be achieved through existing control frameworks. The purpose of this section is to examine what such a regime might look like.

The exact nature of such a regime would be subject to negotiation, meaning that it is difficult to foresee its exact scope. Generally, export control regimes have a few specific elements.<sup>37</sup> Examination of these elements in the context of the foreseen purpose of the regime may provide some indication of what such a regime may look like. The elements most export control regimes have included: guidelines, which are perhaps the core part of the regime as it is commitment to implement these guidelines that forms the basis of a state's participation

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36 “U.S. Officials Order Nvidia to Halt Sales of Top AI Chips to China,” *Reuters*, September 1, 2022, <<https://www.reuters.com/technology/nvidia-says-us-has-imposed-new-license-requirement-future-exports-china-2022-08-31/>>.

37 The author reviewed files related to the creation and workings of COCOM, the Nuclear Suppliers Group, and the MTCR in the UK national archives to inform this section.

in the regime; membership criteria such that, in addition to agreeing to adhere to the regime, current participants must agree to the newcomer's participation in the regime's mechanism; control lists which are complementary to the guidelines; and procedural elements such as those around how meetings are organized, how information is shared, and how denial notifications are issued. These elements are each examined in turn.

For the foreseen regime, the guidelines should focus on ensuring that a review is undertaken when trade, investment, and scientific cooperation contribute to military or WMD programs in potential adversary states. There is an important conceptual point contained in the previous sentence: the idea that the purpose of the regime is to enable the *review of cooperation rather than to deny certain countries' access to the technology*. This is a clear point of distinction with the COCOM arrangement whose purpose was to prevent the export of technology to the Soviet bloc. Particularly for regime adherence purposes, it will be important that the regime not be seen as a technology or trade denial regime, as discussed further below. An additional important point is that the scope of this review mechanism would not be limited to exports. As stated, the purpose of such a regime would be to coordinate how states ensure they are not inadvertently supporting military and strategic programs in countries such as Russia and China. As such, the scope of the guidelines would extend to include topics such as investment controls and visa screening.

The regime may agree on criteria for such a review which accounts for factors such as the directness of the risk (e.g., is the trade or cooperation partner a military or military linked entity, in which case the risk is very direct), and the significance of the cooperation (e.g., technology or research which is applied to specific military related ends is likely to be of more of a concern than technology that is generic). Such a regime is also likely to have to tackle a more complex issue in its guidelines. The objective that the U.S. has outlined with regards to its unilateral controls on semiconductors, at least, is to maintain a generational lead over their production. This objective does not appear in other export control regimes, and it is foreseeable that reaching consensus even in a new regime dedicated to addressing the technology and trade challenges associated with strategic competition will be challenged.

In terms of controlled technology, the envisioned regime may need to take a different approach than existing export control regimes. The existing regimes focus on very well-defined technology. For example, the Nuclear Suppliers Group does not control the export of nuclear weapons, per se. Instead, its control lists focus on specific items and technologies that are used in the nuclear fuel cycle that could contribute to a nuclear weapons program. An example from the Nuclear Suppliers Group dual-use list is carbon fiber with a specific set of technical characteristics which are set such that only carbon fiber suitable for use in uranium enrichment centrifuges is controlled. This is necessary, in part, because the regime members control all trade in the controlled technologies to all destinations worldwide. If the scope of the control was not tightly aligned to the item of concern, the regime would have a disproportionately large impact on trade.

The envisioned regime may need to focus more on thematic areas rather than specific items. For example, states should have visibility of trade, investment, or cooperation with China or Russia's military industrial complex even if this does not meet a specific control list threshold or criteria. The potential breadth of such a scope is narrowed by the fact that it would only be

applicable in relation to potentially hostile state actors such as Russia or China.

The next factor to consider is membership. The question of membership is a challenging one for the existing export control regimes. On the one hand, more adherents of the regime's guidelines always make the controls more effective. However, the involvement of more countries, and particularly countries with diverse viewpoints, makes it more difficult to achieve consensus on strategic issues within each regime. The dynamic would be somewhat different in the foreseen regime as there would be no possibility of countries such as Russia and China becoming members. Countries allied or aligned to the U.S., including NATO members and European Union members, South Korea, Japan, and Taiwan, are likely to be open to participating in a well-designed regime. This leaves many other countries that would have to decide to participate or not. This includes countries like South Africa, India, Brazil, the Philippines, and Malaysia. Such countries would doubtless be hesitant about joining a regime that was targeted at specific countries. At the same time, from a practical viewpoint, such countries probably would want to manage the risk posed by trade, investment, and scientific cooperation that could be used for military purposes in states such as Russia or China not least because failing to do so could incur their trade with the United States. As such, there may be scope to attract such countries to the foreseen regime provided that the regime is not overtly targeted at Russia or China.

The final factor relates to points of contact or regime secretariat. Each of the existing regimes has some form of point of contact, although the scope, size, and mandate of the point of contact varies. For this new regime, a point of contact would be helpful. To avoid the impression of this regime being a U.S. dominated mechanism, the point of contact should ideally be in a different part of the world, such as Europe or Asia.

## Effective Export Controls at the National Level Revisited

This final section revisits the question of what measures make up effective export controls at the national level. In 2015, the author and Catherine Dill published an article in this journal in which they set out the elements of a national export control system defined largely around the requirements of UNSC resolution 1540 and the requirements of the export control regimes.<sup>38</sup> From this analysis, the specific additional measures states should adopt beyond those required by resolution 1540 are as follows:

Military end-use and end-user controls. In the current security context, it is clear that procurement of non-listed technology is central to military and strategic programs. Adopting list-based controls and WMD-based end-use controls, as required by resolution 1540, therefore does not provide a broad enough base to manage current security challenges;

Investment controls. State actors have the means to invest in companies or even buy

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38 Catherine Dill and Ian J. Stewart "Defining Effective Strategic Trade Controls at the National Level", *Strategic Trade Review*, Vol 1, Issue 1 (Autumn 2015), <[https://strategictraderesearch.org/wp-content/uploads/2017/11/STR\\_01.pdf](https://strategictraderesearch.org/wp-content/uploads/2017/11/STR_01.pdf)>.

companies outright. By so doing, state actors can gain influence over to whom the company sells or can even transfer technology to the acquirer's country outright. Controls are needed to address this risk.

Vetting controls. A key technology transfer modality observed with state actors is the sending of staff and students to study, learn, and work overseas. This modality of technology transfer is not unique to state actors; non-state actor groups also leveraged this approach to acquire know-how for WMD. However, the scale and importance in a state actor context is significant. The Chinese and Russian student populations make up a significant percentage of the overall international student population in many countries. As such, vetting controls need to be implemented at scale and in a systematic and targeted way not to unduly affect universities or the broader societal benefits of international scientific cooperation.

## Conclusion

Export controls have always been an important tool through which states pursue national security interests. In recent years, export controls have become even more important. Export controls were central to the response to Russia's invasion of Ukraine. Perhaps even more importantly, export controls are a central tool through which the U.S. and China are attempting to address strategic competition.

This article has made the case that there is important nuance in terms of the scope and purpose of different export controls. While often lumped together as a single topic, this article has made the case that export controls are currently being used in pursuit of several different purposes with a subset of these purposes being new. Building on this, the article argues that there is a need to revisit international governance arrangements for export controls to align governance mechanisms with specific subsets of export controls. The article argues also that there is a need for national implementation of export controls to evolve so that states have the toolsets required to manage all of the security risks facing the state. At the international level, the case was made for the creation of a new trade review regime to coordinate specific export controls including emerging technology controls and sectoral export controls.

Perhaps more than anything, this article has made the case that export controls cannot be seen as static and that the governance arrangements for export controls should not be seen as fixed. In the years ahead, new challenges will doubtless emerge where export controls are seen as part of the solution. In thinking about the export control landscape, it is important to be open to revisiting the toolset such that it can evolve to meet contemporary security challenges.