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ORIGINAL ARTICLE

Demystifying China's Critical Minerals Strategies: Rethinking 'De-risking' Supply Chains

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Abstract
'De-risking' is the latest buzzword in the China strategy of the United States and its allies. It means limiting dependence on and engagement with China in select strategic sectors. One of such sectors concerns critical minerals (CMs) which are essential for the ongoing green economic transition. To secure access to CMs and reduce reliance on China, the US and its allies have been developing networks for ally-shoring supply chains. A major problem with the 'de-risking' strategy in this regard is that it treats China as the risk and hence excludes China from the discussions and collaboration on global supply chain issues. In this paper, we argue that this strategy fails to consider China's strategies and policies regarding CMs. We therefore offer a detailed analysis of China's policies which shows that they have been primarily aimed at addressing internal challenges and policy priorities in China rather than dominating, weaponizing, or causing disruptions in global supply chains. To address supply chain risks most effectively, international collaborative frameworks should engage with, rather than exclude, China. Confrontational strategies with 'China being the risk' at the core might themselves be a risk by undermining rational policymaking and leading to disruptive policies.

Keywords: China; critical minerals; green industrial policy; de-risking; de-coupling; geopolitical tensions; ally-shoring; supply chains; IPEF; WTO

1. Introduction

China's deep integration in global supply chains in the current geopolitical context is leading major economies to take actions to reduce dependence on China as their main source of supply and to diversify. One key area of mounting concerns has been the supply of critical minerals (CMs), especially as governments worldwide are ratcheting up their efforts to transition to a greener economy. For instance, the United States' (US) Inflation Reduction Act (IRA) of 2022 commits billions of dollars to promote manufacturing, and advancement and deployment of technologies, in clean energy industries.[1] Equally committed to a green transition, the

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[1]The White House, 'Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action' (January 2023), www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf.

European Union (EU) has rolled out an expansive tools to enhance its economic sovereignty and global competitiveness in major green technologies, particularly renewable energies and electric vehicle (EV) batteries.[2]

CMs are vital for a range of strategic sectors, including the green industry, which explains why the demand for them is growing exponentially as the green industrial policy proliferates. As the International Energy Agency has estimated, the demand for lithium, nickel and cobalt, and copper and rare earths – key minerals used for the production of EVs and major renewable, such as wind turbines and solar photovoltaics – will increase by 90%, 70%, and 40% respectively over the next two decades.[3] The extraction of these minerals, however, is concentrated in a few economies such as Latin America and Australia (for lithium), Chile (for copper), Indonesia (for nickel), the Democratic Republic of Congo (for cobalt), and China (for rare earths which include a group of elements vital for clean energy applications).[4] While China does not control most of the mineral resources, its dominance of the refining operations –intermediate processes necessary for purifying the minerals into usable components for manufacturing – is a major cause of the concern due to China's disruptive potential (as a large share of minerals extracted worldwide are exported to China for processing).[5] Therefore, based on a shared concern about China as a potential disruptive force in critical supply chains, the G7 governments recently announced a 'de-risking' strategy whereby they seek to reduce supply chain dependence on China through individual and joint actions.[6] Compared to 'de-coupling', which would involve completely disengaging with China economically, 'de-risking' is seen to be a more moderate strategy aimed at limiting dependence on, and engagement with, China in select strategic sectors while still engaging with China in other economic areas and activities.[7] Despite the perceived difference in the degree of disengagement, both strategies emerged from the intensified geo-political tensions and strategic rivalry between the US and China such that the US and its allies increasingly treat China as a serious threat to their strategic and economic goals.[8] Concerns over China's dominance of CMs supply chains, in particular, are worsened by China's increasing recourse to coercive actions and hence the possibility of China weaponizing its dominance of critical supply chains, which was also the G7 Leaders' Communiqué. Thus, where critical sectors are concerned, a 'de-risking' strategy may eventually develop into supply chain 'de-coupling'.[9] However, a growing body of studies has shown that supply chain 'de-coupling' in strategic sectors adversely affects all sectors in individual economies and supply chains worldwide.[10]

[2]A. Terzi, A. Singh, and M. Sherwood (2022) 'Industrial Policy for the 21st Century: Lessons from the Past', European Economy Discussion Paper 157, https://economy-finance.ec.europa.eu/publications/industrial-policy-21st-century-lessons-past_en; European Commission (2023) 'A Green Deal Industrial Plan for the Net-Zero Age COM(2023)62 Final', https://commission.europa.eu/document/41514677-9598-4d89-a572-abe21cb037f4_en.

[3]International Energy Agency (2023) 'The Role of Critical Minerals in Clean Energy Transitions', World Energy Outlook Special Report, https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf, 5–7.

[4]Ibid., 13 and 30.

[5]Ibid., 31–32.

[6]The White House, 'G7 Hiroshima Leaders' Communiqué' (20 May 2023), www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/g7-hiroshima-leaders-communique/.

[7]S. Olson (2023) 'What Does the G7 Summit Mean for China?', Hinrich Foundation, www.hinrichfoundation.com/research/article/us-china/what-does-the-g7-summit-mean-for-china/.

[8]See generally E. Solingen (2021), 'Introduction: Geopolitical Shocks and Global Supply Chains', in E. Solingen (ed.), *Geopolitics, Supply Chains, and International Relations in East Asia*. Cambridge: Cambridge University Press, 1–20; I. Vertinsky et al. (2023) 'The Political Economy and Dynamics of Bifurcated World Governance and the Decoupling of Value Chains: An Alternative Perspective', *Journal of International Business Studies* 54, 1351.

[9]A. Capri (2023) 'China Decoupling Versus De-risking: What's the Difference?', Hinrich Foundation, www.hinrichfoundation.com/research/article/trade-and-geopolitics/china-decoupling-vs-de-risking/.

[10]M.G. Attinasi et al. (2023) 'The Economic Costs of Supply Chain Decoupling', European Central Bank Working Paper Series No. 2839, www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2839~aaf35001a3.en.pdf; M. Ando et al. (2024), 'Supply Chain Decoupling: Geopolitical Debates and Economic Dynamism in East Asia', *Asian Economic Policy Review* 19, 62.

Both the US and the EU are developing multi-dimensional strategies to strengthen CMs supply chains, targeting the geographic concentration of extractive and processing activities, particularly the dominant position of China. They seek to foster domestic mining and processing capabilities and partner with allies and like-minded resource-rich economies.[11] A range of partnerships have been developed through existing trade agreements and new arrangements with an aim to strengthen and expand the friend-shoring of CMs supply chains.[12] Other resource-seeking economies have followed suit. The United Kingdom (UK),[13] Japan,[14] South Korea,[15] and India,[16] for example, have each entered a partnership with resource-rich Australia. In doing so, Australia is looking to capitalize on the surging demand for CMs worldwide and attract foreign capital and technological knowhow to help bolster its own extraction and processing capabilities.[17] At the same time, resource-rich economies, such as Indonesia, Canada, Chile, and Mexico, have taken steps to protect their mineral resources and related industries through export restrictions,[18] foreign investment screening,[19] nationalization,[20] and other defensive tools. These defensive policies, coupled with the potential competition between resource-seeking economies for CM supplies,[21] could be as disruptive as the feared actions from China. Therefore, they call into question whether de-risking from China is a sensible approach to safeguard CMs supply chains. Already, leading commentators have cautioned that de-risking can only have a limited effect and carries its own risks.[22]

[11]D. Wood et al., 'The Mosaic Approach: A Multidimensional Strategy for Strengthening America's Critical Minerals Supply Chain', Wilson Center, www.wilsoncenter.org/sites/default/files/media/uploads/documents/critical_minerals_supply_report.pdf; The White House, 'Fact Sheet: Securing a Made in America Supply Chain for Critical Minerals' (22 February 2022), www.whitehouse.gov/briefing-room/statements-releases/2022/02/22/fact-sheet-securing-a-made-in-america-supply-chain-for-critical-minerals/; European Commission, 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions' (16 March 2023), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023DC0165.

[12]US Department of State, 'Minerals Security Partnership Convening Supports Robust Supply Chains for Clean Energy Technologies' (22 September 2022), www.state.gov/minerals-security-partnership-convening-supports-robust-supply-chains-for-clean-energy-technologies/; V. Crochet and W. Zhou (2024) 'Critical Insecurities? The European Union's Strategy for a Stable Supply of Minerals', *Journal of International Economic Law*, 1–19 (Advance).

[13]The Hon Madeleine King MP, 'Australia–UK Boost Cooperation on Critical Minerals' (4 April 2023), www.minister.industry.gov.au/ministers/king/media-releases/australia-uk-boost-cooperation-critical-minerals.

[14]The Hon Madeleine King MP, 'Australia–Japan Strengthen Critical Minerals Cooperation' (22 October 2022), www.minister.industry.gov.au/ministers/king/media-releases/australia-japan-strengthen-critical-minerals-cooperation.

[15]Department of Foreign Affairs and Trade, 'Partnering with Korea on Clean Energy Technology and Critical Minerals' (February 2022), www.dfat.gov.au/about-us/publications/trade-investment/business-envoy/business-envoy-february-2022/partnering-korea-clean-energy-technology-and-critical-minerals.

[16]The Hon Madeleine King MP, 'Milestone in India and Australia Critical Minerals Investment Partnership' (10 March 2023), www.minister.industry.gov.au/ministers/king/media-releases/milestone-india-and-australia-critical-minerals-investment-partnership.

[17]Australian Government, Department of Industry, Science and Resources, 'Australia's Critical minerals Strategy: Discussion Paper' (2 December 2022), https://consult.industry.gov.au/2023critminsstrategy.

[18]The National Bureau of Asian Research, 'Indonesia's Nickel Export Ban, Impact on Supply Chains and the Energy Transition' (19 November 2022), www.nbr.org/publication/indonesias-nickel-export-ban-impacts-on-supply-chains-and-the-energy-transition/.

[19]Government of Canada, 'Government of Canada Orders the Divestiture of Investments by Foreign Companies in Canadian Critical Minerals Companies' (2 November 2022), www.canada.ca/en/innovation-science-economic-development/news/2022/10/government-of-canada-orders-the-divestiture-of-investments-by-foreign-companies-in-canadian-critical-mineral-companies.html.

[20]Reuters, 'Mexico's Lopez Obrador Orders Ministry to Step up Lithium Nationalization' (19 February 2023), www.reuters.com/world/americas/mexicos-lopez-obrador-orders-ministry-step-up-lithium-nationalization-2023-02-19/; Financial Review, 'Chile Unveils Plans to Nationalise Vast Lithium Industry' (21 April 2023), www.afr.com/policy/energy-and-climate/chile-unveils-plans-to-nationalise-vast-lithium-industry-20230421-p5d2bv.

[21]The New York Times, 'The US Needs Minerals for Electric Cars. Everyone Else Wants Them Too' (23 May 2023), www.nytimes.com/2023/05/21/business/economy/minerals-electric-cars-batteries.html.

[22]H. Broadman (2023), 'The G7's Empty Rhetoric on "Economic Coercion" and "De-Risking"', Forbes, www.forbes.com/sites/harrybroadman/2023/05/31/the-g7s-empty-rhetoric-on-economic-coercion-and-de-risking/?sh=7fdc09a94a90; R. Ossa

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Our key argument in this paper is that the de-risking strategy for securing CMs supply chains is predominantly based on prevailing narratives against China. Yet, a thorough examination of China's CMs strategies and policies is missing in the current academic and policy debate, causing a lack of understanding and potentially irrational policymaking. To fill this glaring gap, we conduct a detailed analysis of the evolution of China's strategies on mineral resources. This analysis offers evidence for an objective assessment of what China's CMs strategies are designed to achieve. We show that these strategies have been primarily aimed at addressing a range of internal challenges and policy priorities in China rather than dominating, weaponizing, or disrupting global supply chains.

In the remainder of this paper, we review the development of China's CMs strategies, starting with Chinese policies and practices to foster the rare earths industry since the 1970s (Section 2). This is followed by a detailed discussion of China's current CMs strategies, released in 2016, focusing on the major inward and outward policy tools employed to pursue the strategies (Section 3). Based on these discussions, Section 4 outlines and reflects on the 'de-risking' strategy, including the ongoing development of ally-shoring or friend-shoring CMs supply chains. It argues that the strategy should target risks in supply chains rather than China. To address these risks most effectively, international collaborative frameworks, such as the US-led Indo-Pacific Economic Framework for Prosperity (IPEF), should include, rather than exclude, China in the discussions and cooperation. However, given the current geopolitical context, the World Trade Organization (WTO) remains the only forum that could include the two world's superpowers in cooperative initiatives on global supply chains. Section 5 sets forth some concluding remarks.

2. Developing and Regulating the Rare Earths Industry

China's strategies for CMs date back to at least the 1970s, although for decades they were predominantly focused on the rare earths industry.[23] The evolution of these strategies was closely aligned with the changing situations of the rare earths industry and the development of national policy priorities. Central to this evolution was a gradual shift from a strong push for the growth of this infant industry at the initial stage to an increasingly balanced approach to address a mix of economic and non-economic goals. Some of the policy tools employed by the Chinese government to support and regulate the rare earths industry continue to form an integral part of China's ongoing strategies on CMs today.

A major policy tool that contributed to the explosive growth of China's rare earths industry in the 1980s was an export rebate system providing a refund of export or value-added taxes up to 17% for rare earth products.[24] This export promotion strategy was primarily aimed at building the domestic industry by attracting new producers and stimulating production, although it was also used to grow China's foreign exchange reserves.[25] Coupled with other financial support for the industry, this strategy elevated China to the world's largest rare earths producer and supplier within a short period of time.[26] However, this strategy also generated a raft of problems, chief among which were illegal mining, over-production, smuggling, depletion of natural resources, and pollution. Since the early 1990s, the Chinese government started to address

(2023), 'Pillar of Economic Security', Finance & Development, International Monetary Fund, www.imf.org/en/Publications/fandd/issues/2023/06/pillar-of-economic-security-ralph-ossa.

[23]Y. Shen et al. (2020) 'China's Public Policies toward Rare Earths, 1975–2018', *Mineral Economics* 33, 127.

[24]Ibid., 130.

[25]D. Yang et al. (2015), *Research on China's Rare Earth Industry Development and Policy*. Beijing: China Social Sciences Publishing House, 256.

[26]W.M. Morrison and R. Tang (2012) 'China's Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States', US Congressional Research Service R42510, https://sgp.fas.org/crs/row/R42510.pdf, 9; A. Bålgår (2021) 'Implications and Challenges of China's Supremacy on the Global Rare Earths Market', *Global Economic Observer* 9(1), 55, 58.

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these problems by limiting domestic production and exports through production quotas, and resource and export taxes.[27] The government also started to protect rare earths as strategic minerals through restrictions on foreign investment in the upstream activities from exploration to processing of rare earths.[28] Such foreign investment must take the form of Sino-foreign joint ventures subject to approval by Chinese authorities. Notably, China used the foreign investment policies to facilitate the importation of advanced technology and machinery for the separation and purification of rare earths, which significantly contributed to the development of China's processing capabilities.[29] In addition, China's robust financial support for the rare earths industry increasingly focused on research and development (R&D) to foster technological capabilities in the processing and commercial application of rare earths.[30] As it became the world's leader of rare earths processing technologies, China gradually acquired unparalleled scale and efficiency in rare earths processing when compared to its foreign counterparts.[31] These policies also enabled China to gain a first-mover advantage in, and to become a global hub for, the processing of minerals.

In the 2000s, the Chinese government tightened some of the above-mentioned restrictions, eventually causing rare earth production and exports to fall.[32] However, illegal mining and smuggling remained rampant due to weak enforcement at local levels, which intensified the concerns about over-exploitation and environmental pollution. To strengthen the regulation of the rare earths industry, the central government released its first Development Plan for the Rare Earths Industry (2009–2015) further controlling exports and mining projects and activities, imposing specific environmental obligations, and systemically restructuring the industry by consolidating rare earth mining operations to a handful of state-owned enterprises (SOEs).[33] These moves were accompanied by a change of policy priorities to the use of domestic rare earth resources to foster more value-added downstream manufacturing and in a more sustainable manner.[34] The White Paper on the Situations and Policies of China's Rare Earths Industry, released by the State Council in 2012, set out clearly the aforesaid challenges facing the industry and the government's commitment to strike a balance between supporting the production of rare earths for economic growth and protecting natural resources and the environment.[35]

As the single dominant supplier of rare earths at the time, China's export restrictions caused serious disruptions to global supplies and price hikes and consequently triggered a high-profile dispute launched by the US, the EU, and Japan at the World Trade Organization (WTO) in 2012.[36] The Chinese measures were widely criticized for effectively 'subsidizing' downstream industries (e.g. steel, semiconductors, photovoltaics products) by maintaining low input prices at home to confer a substantial cost advantage to these industries over their foreign competitors.[37]

[27]Shen, 127, supra n. 23.

[28]P. Tse (2011) 'China's Rare-Earth Industry', US Geological Survey Open-File Report 2011–1042, https://pubs.usgs.gov/of/2011/1042/of2011-1042.pdf, 5.

[29]Y. He (2016) 'Re-Control the Market for Strategic Power: China's Reregulation of its Rare Earth Industry', Ph.D. dissertation, Georgia Institute of Technology, https://repository.gatech.edu/server/api/core/bitstreams/8bd15e46-c329-4bd8-b513-5204721f4e0f/content, at 172.

[30]Ibid., 175–178.

[31]Carnegie Endowment for International Peace, 'The Upgrade of Supply Chain: China's Technological Policies and Rare Earths Industries'(7 December 2012), https://carnegieendowment.org/2012/12/07/zh-event-4029.

[32]Shen, supra n. 23, 132–133; Morrison and Tang, supra n. 26, 10.

[33]S. Kalantzakos (2018) *China and the Geopolitics of Rare Earths*. Oxford: Oxford University Press, 127–128; Tse, supra n. 28, 5; Morrison and Tang, supra n. 26, 12–14; Bâlgăr, supra n. 26, 60–62.

[34]Shen, supra n. 23, 129–130.

[35]Information Office of the State Council, 'Situation and Policy of Rare Earth in China'(20 June 2012), www.gov.cn/zhengce/2012-06/20/content_2618561.htm.

[36]Morrison and Tang, supra n. 26, 24–25; M. Schmid (2019) 'Rare Earths in the Trade Dispute between the US and China: A Déjà Vu', *Intereconomics* 54, 378, 381.

[37]M. Bronckers and K. Maskus (2014) 'China – Raw Materials: A Controversial Step towards Evenhanded Exploitation of Natural Resources', *World Trade Review* 13(2), 393, 402–404; Morrison and Tang, supra n. 26, 24–28.

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Nevertheless, the development of the Chinese policies in the rare earths industry reviewed above reveals other strategic goals relating to natural resources preservation and environmental protection through systemic industrial reforms. This was also evidenced by China's timely implementation of the adverse WTO rulings in this dispute. After the WTO tribunals ruled that the measures ran afoul of China's WTO obligations and were not justifiable under the relevant exceptions, China removed the restrictions in a timely manner and, more importantly, used the rulings to push forward the domestic reforms.[38] As the Ministry of Commerce (MOFCOM) and the Ministry of Industry and Information Technology (MIIT) confirmed in their public announcements, the rulings offered an opportunity for the central authorities to strengthen coordination in an effort to reinforce other WTO-consistent regulatory tools as well as local enforcement of national sustainable development policies in the rare earths industry.[39]

Indeed, the WTO decision stimulated another wave of regulatory actions by the central government including, *inter alia*, compelling rare earths companies to internalize their environmental costs and combating illegal production through further industrial consolidation.[40] With the restrictions removed, China's rare earths exports resurged significantly in the following years until 2019 when global demand declined due to the effort of major advanced economies to diversify supply sources and build their own CMs sectors so as to reduce dependency on China.[41] While China remained a key supplier of rare earths in the global market, its share went below 50% from a peak of 97% before the WTO dispute was initiated.[42] At the same time, due to China's ambitious and fast-developing industrial policies, including those on green technologies, its demand and imports of rare earths continued to grow.[43]

In 2016, the central government released the second Development Plan for the Rare Earths Industry (2016–2020) which included a comprehensive set of strategies and goals in line with the overarching national plans for the thirteenth five-year period.[44] To address the longstanding and emerging problems in the industry, the plan emphasized innovation and upgrading, market-oriented growth, consolidation, protection and management of rare earths resources, development of environmental standards, increasing application of rare earths to strategic sectors, and development of new supply chains based on domestic and overseas markets.[45] Indeed, when it comes to offshore supply chains, China already had years of experience investing in rare earths assets and projects overseas, particularly via SOEs. Some commentators have observed that these investments served to strengthen China's dominance over the rare earths industry.[46] Increasingly, however, such investments have become necessary for China to secure supplies of rare earths for its own economic needs.

This shift of strategic priorities from 'dominating' to 'securing' the rare earths supply chains is affirmed in China's current policies for the fourteenth five-year period (2021–2025). For the first time, the central government consolidated its industrial strategies on rare earths into a holistic development plan for the so-called 'raw materials industry'. This industry, including steel, non-ferrous metals, building materials, and new materials sub-sectors, is labelled by the government as

[38]W. Zhou (2019) *China's Implementation of the Rulings of the World Trade Organization*. Oxford and Portland, Oregon: Hart Publishing, 85.

[39]C. Wang (2018) 'WTO Rare Earths Case's Influence on China's Domestic Regulatory Changes', *Journal of World Trade* 52(2), 307, 315, 321–326.

[40]Shen, supra n. 23, 139–140.

[41]Bâlgăr, supra n. 26, 64;, Kalantzakos, supra n. 33, 137–154.

[42]Bâlgăr, supra n. 26, 64; Shen, supra n. 23, 140.

[43]M. Hui (2023) 'China's Rare Earths Industry Has a Raw Materials Problem', QUARTZ, https://qz.com/china-rare-earths-raw-materials-shortage-1850232896.

[44]Ministry of Industry and Information Technology, 'Development Plan for the Rare Earths Industry' (29 September 2016), www.gov.cn/xinwen/2016-10/18/content_5120998.htm.

[45]Industrial Culture Development Center of MIIT, 'Development Plan for Rare Earths Industry (2016–2020): An Official Interpretation', www.miit-icdc.org/info/1012/8568.htm.

[46]Kalantzakos, supra n. 33, 121–123.

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'the bedrock for the real economy'.[47] On rare earths, the Development Plan for the Raw Materials Industry, jointly released by three authorities in December 2021, reinforced the strategies and goals from the previous development plan and highlighted the growing challenges for enhancing supply chain security, strengthening and expanding overseas markets, pursuing high-quality development, technological independence, and green and digital transitions, amongst others.[48] This plan continued to promote industrial consolidation and upgrading to control mining activities and create fewer but more globally competitive national firms.[49]

The above review of the evolution of China's rare earths industrial strategies provides evidence for our observations. It shows that the key driver of these strategies has been China's domestic economic needs and policy priorities. While these strategies did and will continue to have spillover effects on trading partners, such effects were often by-products of China's pursuit of internal regulatory goals. As documented above, China's strategic goals shifted from building an infant rare earths industry by boosting production and exports to promoting the industry's structural and technological upgrade, fostering more value-added downstream sectors, and protecting natural resources, the environment, and security of supply chains. The pursuit of these objectives does not show, explicitly or implicitly, a deliberate strategy of China to cause disruptions in global supply chains or harm to trading partners.

There are numerous examples of economic or trade policies adopted by governments based on their own national interest which inadvertently impacted other nations due to a lack of consideration of the measures' potential effects in a globalized, interdependent world.[50] A recent example is the IRA by which the US seeks to reshore EV supply chains via massive subsidies. While the IRA is designed to advance US chosen climate and industrial objectives, it has significant ramifications for trading partners including US allies such as Japan and the EU. As further discussed in Section 4, it also leads to decoupling from China in EV supply chains, including CMs used for EV production. China's policies are similarly designed to advance its own national interest to which the potential global effect of such policies is subordinate in the policymaking. One may argue that even in the extreme case where China imposed export restraints on rare earths to support downstream sectors and address over-exploitation and environmental problems, it was primarily motivated by the need to pursue new economic priorities and tackle long-standing, internal challenges. This observation is supported by recent empirical studies which show that China's export restrictions on rare earths did not target any specific economy.[51] China's ongoing strategies to secure access to CMs more broadly are substantially similar to those adopted by other major economies. The following section will discuss these strategies in detail to provide more supportive evidence for our assessment of how best to understand their implications for the de-risking approach.

3. Critical Minerals, Economic Security and Supply Chains

China is not only a predominant supplier of CMs but also one of the world's top importers of many of these minerals which are needed to support the industrial policies that have underpinned

[47]Xinhua, 'China Unveils Five-Year Plan to Boost Raw Materials Industry' (29 December 2021), http://english.www.gov.cn/statecouncil/ministries/202112/29/content_WS61cc59bcc6d09c94e48a2e25.html.

[48]Ministry of Industry and Information Technology, 'The 14th Five Year Plan for the Development of Raw Materials Industry'(21 December 2021), www.gov.cn/zhengce/zhengceku/2021-12/29/content_5665166.htm.

[49]Ministry of Industry and Information Technology, 'Continue to Expand and Strengthen Rare Earth Enterprises Groups During the 14th Five Year Plan Period' (30 December 2021), www.cs-re.org.cn/policy/a1875.html.

[50]Take the proliferation of industrial subsidies as an example. See OECD, 'Government Support in Industrial Sectors: A Synthesis Report', OECD Trade Policy Paper No. 270 (7 April 2023), www.oecd-ilibrary.org/trade/government-support-in-industrial-sectors_1d28d299-en.

[51]S. Evenett and J. Fritz (2023) 'Revisiting the China–Japan Rare Earths Dispute of 2010', Voxeu Column, https://cepr.org/voxeu/columns/revisiting-china-japan-rare-earths-dispute-2010.

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its decades of economic growth.[52] As climate policies become central to its 'development vision and strategy', China has become increasingly ambitious in its climate actions.[53] Thanks to a vast array of supportive policies, renewable energy and EV sectors – the two pillars for a low-carbon energy transition – have undergone tremendous development over the past decade. China now leads the expansion of renewable energies, EVs, and related technologies globally.[54] At the same time, these green technologies are also key components of China's technology- and innovation-oriented development plans and remain the country's prioritized, strategic high-tech sectors.[55] This entrenched commitment to an intertwined green and technological transition has been a major driving force behind China's growing demand for CMs. Thus, like other resource-seeking economies, China also faces considerable challenges associated with supply shortages and price volatility and has been developing strategies to strengthen its supply chains.[56]

3.1 Overarching Strategies

China did not have an official list of CMs in its national policy until recently. The National Plan for Mineral Resources (2016–2020) (hereinafter 'Mineral Resources Plan' or 'Plan'), for the first time, created a pool of 24 'strategic minerals', including six energy resources, 14 metallic minerals, and four non-metallic minerals – see Table 1.[57] The Plan outlines the missions and targets for that five-year period and longer-term goals up to 2025.

The strategic minerals are considered indispensable for the protection of China's national and economic security and for the growth of its strategic, emerging industries. Notably, the minerals essential for major green technologies, such as lithium, copper, nickel, cobalt, graphite, zinc, chromium, and rare earths, are all included in the list. This is a testament to China's determination to promote its green industries particularly the EV and renewable energy sectors. Meanwhile, this list also reflects China's concerns about potential shortages and supply chain risks due to fast-growing domestic demand and intensified global competition.[58] As estimated, there will be a steady and significant increase in China's domestic need for a wide range of minerals until 2035 or beyond.[59] While foreign observers have reported that China remains a major supplier of certain CMs,[60] Chinese scholars have cautioned that China does, or will in the future, face shortage and supply problems in relation to at least nine minerals, including cobalt, lithium,

[52]US Congressional Research Services, 'China's Mineral Industry and US Access to Strategic and Critical Minerals: Issues for Congress' (20 March 2015), https://crsreports.congress.gov/product/pdf/R/R43864/6.

[53]International Energy Agency, 'An Energy Sector Roadmap to Carbon Neutrality in China' (September 2021), www.iea.org/reports/an-energy-sector-roadmap-to-carbon-neutrality-in-china, 37; C. Hart, J. Zhu, and J. Ying (2018) 'Mapping China's Climate & Energy Policies', Embassy of the Federal Republic of Germany Beijing, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786518/China_Climate_Map_Public_Secured_2019-3-1.pdf.

[54]International Energy Agency, supra n. 53; M.M. Fang and W. Zhou (2022) 'Greening the Road: China's Low-Carbon Energy Transition and International Trade Regulation', *Leiden Journal of International Law* 35(2), 357–378.

[55]National Manufacturing Power Construction Strategy Advisory Committee, 'Made in China 2025 Key Technology Roadmap'(October 2015), www.cae.cn/cae/html/files/2015-10/29/20151029105822561730637.pdf; Central Government of the PRC, 'Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy' (24 October 2021), www.gov.cn/zhengce/2021-10/24/content_5644613.htm.

[56]H. Wang et al. (2023) 'China's Electric Vehicle and Climate Ambitions Jeopardized by Surging Critical Materials Prices', *Nature Communications* 14, www.nature.com/articles/s41467-023-36957-4.

[57]National Development and Reform Commission, 'National Plan for Natural Resources (2016–2020)', 11 May 2017, www.ndrc.gov.cn/fggz/fzzlgh/gjjzxgh/201705/t20170511_1196755.html.

[58]J.P. Ge and J.Q. Liu (2020) 'International Comparison of Critical Mineral Strategies: Historical Evolution and Tool Selection', *Resources Science* 42(8), 1464, 1470–1471.

[59]B.J. Wen et al. (2019) 'China's Demand for Energy and Mineral Resources by 2035', *Strategic Study of Chinese Academy of Engineering* 21(1), 68.

[60]R. Castillo and C. Purdy (2022) 'China's Role in Supplying Critical Minerals for the Global Energy Transition: What Could the Future Hold?', LTRC, www.brookings.edu/wp-content/uploads/2022/08/LTRC_ChinaSupplyChain.pdf, 6.

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Table 1. China's national list of critical minerals

National Plan for Mineral Resources (2016–2020)			
14 metallic minerals		4 non-metallic minerals	
Iron	Chromium	Phosphorous	Graphite
Copper	Aluminium	Potassium	Fluorite
Gold	Tungsten	6 energy resources	
Nickel	Molybdenum	Coal	Natural gas
Tin	Antimony	Petroleum	Shale gas
Cobalt	Rare earths	Uranium	Coalbed methane
Lithium	Zirconium		

chromium, nickel, beryllium, zirconium, manganese, niobium, and tantalum.[61] Thus, leading commentators in China have categorized these and some other minerals as 'shortage strategic and critical minerals' and suggested that the national list be updated accordingly.[62]

The Plan outlines China's overarching strategies for the entire mineral resources industry, combining inward and outward ones. The inward strategies focus on fostering mining activities, improving efficient use and preservation of minerals, upgrading industrial structures, advancing innovation, and promoting a circular economy and 'green development' of the industry. The Plan treats the inward strategies as being fundamental to China's minerals security and directs the provision of fiscal support and other differential and preferential treatment to the strategic minerals segment. It also mandates the establishment of risk warning and reporting mechanisms to provide the information for the central government to develop policies and capabilities to guide the development of the strategic minerals sector and protect the security of these resources.

The outward strategies focus on promoting international cooperation on mining activities in China and globally. On the one hand, the Plan commits to enhancing the access for foreign investors to China's mining industry with an aim to attract foreign capital, advanced technology, and managerial skills and expertise. On the other hand, the Plan emphasizes collaboration with economies involved in the Belt and Road Initiative (BRI). Such collaboration targets not only mining activities but also joint forums and platforms for policy and information exchange as well as R&D and training of executives and specialists. The Plan also calls upon the creation of large and globally competitive Chinese multinational companies to strengthen and expand mining projects overseas, using China's existing and future joint projects within BRI economies (such as infrastructure) as a pathway. This strategy based on outbound investment and regional and global cooperation is essential for China to compete with other resource-seeking economies, stabilize CMs supply chains, and overcome escalating geopolitical tensions and uncertainties more broadly.

In the current fourteenth five-year period (2021–2025), the central government has not published an updated strategy document yet. Nevertheless, the Fourteenth Five-Year Plan, China's top-level national blueprint, places growing emphasis on the green transition as a core element of China's pursuit of high-quality, sustainable development.[63] The plan also carries on China's robust industry policy with even stronger commitments to promoting the development of

[61]A.J. Wang (2022), 'Security of China's Strategic and Critical Minerals under Background of Great Power Competition', *Bulletin of Chinese Academy of Sciences* 37(11), 1550, 1555.

[62]J.W. Li et al. (2023), 'Determination of China's Strategic and Critical Minerals List', *Acta Geoscientica Sinica* 44(2), 261.

[63]Xinhua, 'Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035' (13 March 2021), www.gov.cn/xinwen/2021-03/13/content_5592681.htm.

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strategic, emerging industries, including the major green sectors noted above. Internally, the plan reiterates the need to safeguard domestic supply chains in general and, more specifically, the security of CMs by strengthening state control of these minerals, improving the safety of reserve mechanisms, and accelerating exploration activities. Externally, it encourages cooperation on global supply chains, standards setting, trade and investment liberalization, and facilitation etc. through existing and new trade agreements and the BRI. Accordingly, the Fourteenth Five-Year Plan reaffirms the missions and goals envisaged in the Mineral Resources Plan.

Following these two national plans, local governments have issued their own plans for mineral resources at the provincial level for the fourteenth five-year period, including longer-term goals up to 2035.[64] Based on local endowments and advantages, the provincial plans focus on similar or different groups of (critical) minerals and set specific exploration plans and mining targets. At the same time, they all emphasize the balancing act towards environmental protection and sustainability by developing and applying advanced technologies, planning and management systems etc. at different stages of mining activities.

3.2 Policy Tools for the Inward Strategies

3.2.1 Subsidies

Subsidies are a longstanding internal policy tool employed by the Chinese government to boost domestic mineral exploration and production. In the past few years, the use of subsidies has increasingly focused on the exploration of CMs. Between 2017 and 2021, central and local governments provided fiscal support for exploration activities on a yearly basis leading to the injection of billions of government funding in these activities.[65] In a recent announcement, the Ministry of Natural Resources reaffirmed that the exploration of CMs is crucial for the stable supply and reservation of these minerals and hence will remain the priority of the government's fiscal support.[66] Since 2021, local governments have committed to spending more on the exploration of CMs available in their regions for the green transition.[67]

Apart from direct transfers of funds, preferential taxation and loans are the other two major types of subsidy programs in the mining industry. The Natural Resource Taxation Law authorizes local governments to provide tax exemptions or reductions for the exploration of a wide range of minerals.[68] When it comes to metallic CMs, such as copper, nickel, cobalt, lithium and zirconium, the General Guidelines for Non-ferrous Metals Industry, released by the State Council in 2016, commits to increase tax benefits and policy loans for mining companies particularly actions taken to advance the technological upgrade and digital and green transitions of the

[64]See e.g. Hubei Provincial Department of Natural Resources, 'Overall Plan for Mineral Resources in Hubei (2021–2025)' (1 November 2022), www.dzzyisp.com/news/laws/2022/1101/8080.html; Sichuan Provincial Department of Natural Resources, 'Overall Plan for Mineral Resources in Sichuan (2021–2025)' (8 February 2023), www.sc.gov.cn/10462/c108551/2023/2/8/f14c9e2b14804079a711e0971e1db72c.shtml; Yunnan Provincial Department of Natural Resources, 'Overall Plan for Mineral Resources in Yunnan (2021–2025)' (30 October 2022), http://dnr.yn.gov.cn/html/2022/tongzhigonggao_1030/33927.html; Chongqing Department of Natural Resources, 'Overall Plan for Mineral Resources in Chongqing (2021–2025)' (2 December 2022), www.cq.gov.cn/zwgk/zfxxgkzl/fdzdgknr/ghxx/zxgh/202212/t20221202_11402695.html.

[65]Ministry of Natural Resources, 'Report of National Geological Survey in 2021' (13 June 2022), www.chinacaj.net/i,16,17058,0.html.

[66]Ministry of Natural Resources, 'Focusing on Strengthening the Exploration of Scarce Strategic Minerals and Accelerating the Promotion of Key Mining Projects' (05 July 2023), www.jiemian.com/article/9691108.html.

[67]People's Government of Inner Mongolia Autonomous Region, 'General Plan for Mineral Resources in Inner Mongolia Autonomous Region (2021–2025)' (19 August 2022), www.wuda.gov.cn/zscd/43403.jhtml; Yunnan Provincial Department of Natural Resources, supra n. 61.

[68]The National People's Congress, 'Natural Resource Taxation Law in People's Republic of China'(26 August 2019), www.chinatax.gov.cn/chinatax/n810341/n810755/c5136082/content.html.

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mining industry.[69] Local governments have rolled out more specific subsidy programs. For example, in 2020 the Yunnan government provided 1 billion yuan and covered up to 80% of interest costs for entities engaging in the production and reservation of tin, germanium, indium, copper, electrolytic aluminum, lead, and zinc.[70] The government of Shangrao City provided not only direct transfers of fund, tax refund, and policy loans but also input for its local non-ferrous metals sector, including electricity and gas, at discount rates.[71] It also scaled up fiscal support to build a supply chain management platform for supply chain integration across upstream and downstream sectors.

Apart from exploration activities, Chinese subsidies in the mining sector have continued to focus on R&D to advance new mining and processing technologies particularly those needed for the green development of the industry.[72] Accordingly, China has applied the same strategy and policy in the rare earths industry to maximize its global competitiveness in the processing of other CMs, such as lithium, nickel, and cobalt.[73]

3.2.2 Licensing

The massive support for mining activities is balanced by policy tools aimed at enhancing the sustainability of the mining industry and the protection of the environment. The first major tool is a nationwide approval system for all mining activities introduced in 1986.[74] This system is essential for the central government to plan exploration activities at the national level and control the allocation of mining rights to qualified entities that are mainly state-owned. As noted in Section 2, this system was used to regulate and restructure the rare earths industry to address problems of illegal mining, smuggling, and pollution. Restrictions on the granting of mining rights in the rare earths industry as well as mining quotas have remained in place even after the Mineral Resources Plan was introduced in 2016 to promote the exploration of CMs.[75] While similar restrictions have not been applied to other CMs essential for the green transition, in practice the mining and production of these minerals is similarly concentrated in the hands of a few SOEs.[76] Nevertheless, the lack of restrictions on the production of these CMs is indicative of China's growing demand for these minerals. This is evidenced by the reports of the China Geological Survey which assess the global and domestic reserves of select CMs. Its latest report released in July 2023 found that a list of nine CMs – iron, chromium, nickel, cobalt, lithium, copper, aluminum, phosphorous, and

[69]State Council of the People's Republic of China, 'General Guidelines on Creating a Good Market to Promote Structural Adjustment, Transformation, and Increasing Profits in the Non-ferrous Metals Industry' (16 June 2016), www.gov.cn/zhengce/content/2016-06/16/content_5082726.htm.

[70]The People's Government of Yunnan Province, 'Measures to Support the Development of the Real Economy' (22 April 2020), www.yn.gov.cn/zwgk/zfgb/2020/2020d10q/szfwj/202004/t20200426_203069.html.

[71]The People's Government of Shangrao City, 'Nine Measures to Stabilize the Development of Nonferrous Metals Industry in Shangrao'(12 May 2020), www.zgsr.gov.cn/zgsr/szfbgswj/202007/db3f21c4a3b74c8aa81cb333559dd0ef.shtml.

[72]Ministry of Industry and Information Technology, 'Development Plan for Non-ferrous Industry (2016–2020)' (28 September 2016), www.ndrc.gov.cn/fggz/fzzlgh/gjjzxgh/201707/t20170707_1196827_ext.html; Ministry of Industry and Information Technology, 'Understanding the Development Plan for Non-ferrous Industry (2016-2020)' (01 November 2016), http://gxt.jl.gov.cn/xxgk/zcwj/zcfg_zcjd/201611/t20161101_2460170.html.

[73]International Energy Agency, 'World Energy Outlook' (October 2022), https://www.iea.org/reports/world-energy-outlook-2022, 219.

[74]People's Congress, 'Mineral Resources Law of the People's Republic of China' (19 March 1986), as amended.

[75]Ministry of Natural Resources, 'Notice on the Standardization of the Approval Management of Rare Earth and Tungsten Mining Rights' (14 December 2018), www.gov.cn/zhengce/zhengceku/2018-12/31/content_5439309.htm; Ministry of Natural Resources, 'Notice on Issuing the Quota for the First Batch of Rare Earth Mining, Smelting and Separation in 2023' (01 March 2023), www.hunan.gov.cn/zqt/zcsd/202303/t20230327_29297349.html.

[76]See e.g. LeadLeo, 'Overview of China's Nickel Ore Industry in 2019' (2019), http://pdf.dfcfw.com/pdf/H3_AP202009071408676726_1.pdf, 20–22; LeadLeo, 'Overview of China's Lithium Ore Industry in 2019' (2019), http://pdf.dfcfw.com/pdf/H3_AP202009011406021852_1.pdf, 14; LeadLeo, 'Overview of China's Cobalt Ore Industry in 2020' (March 2020), https://pdf.dfcfw.com/pdf/H3_AP202010271423967673_1.pdf?1603810731000.pdf, 21; YiPu, 'Market Analysis of China's Chromium Ore Industry' (12 May 2021), http://yipuzixun.com/newsinfo/1469780.html.

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potassium – is at higher supply risk compared to other minerals.[77] This list is still being developed as the authority continues to monitor domestic and global reserves of CMs. As the exploration of CMs remains a policy priority, the tension between mining activities and environmental protection is destined to intensify in the foreseeable future.

3.2.3 Environmental Protection and Circular Economy

To deal with the challenges associated with its environmental goals, the Chinese government has consistently stressed the need to strike a balance between CMs security and sustainable development. Thus, the green development of mining activities has become a central element of China's inward strategies on CMs. Apart from the licensing system, which contributes to managing and standardizing mining activities, the government has introduced a series of laws and regulations to mitigate the adverse effects of mining on the environment. Like the measures applied to the rare earths industry outlined in Section 2, these policy instruments are designed to ensure mining activities are increasingly aligned with national environmental goals. Thus, they require mining entities to comply with licensing conditions and environmental standards and obligations and to internalize environmental costs while imposing severe penalties on those that fail to do so.[78]

The other major set of policy tools focus on promoting a circular economy. As early as in 2005, the National Development and Reform Commission (NDRC) issued a policy document requiring the maximization of the recycling and utilization of wastewater, exhaust gas, and waste residue generated during mining and smelting.[79] Commentators also put forward a 3R strategy to build a 'mining circular economy' through *reducing* the consumption of mineral resources during exploration, processing, and utilization, *reusing* waste from these activities, and *recycling* used resources.[80] This strategy is incorporated into the Circular Economy Promotion Law (as amended in 2018),[81] which promotes a circular economy nationwide. As regards mining activities, the law requires the competent authority to assess whether the mining techniques used by entities would achieve the relevant standards and enhance efficient use of resources, mining quality, reuse of mine wastewater, recycling of resources etc. Similar requirements can also be found in other laws that regulate specific segments of the circular economy.[82] More recently, the Implementation Plan for Carbon Peak in the Non-ferrous Metals Industry, published by the NDRC in November 2022, set a specific recycling target whereby the proportion of 'recycled metal supply' must reach over 24% during the fourteenth five-year period as well as a

[77]Xinhua, 'China Released the Assessment of Thirteen Mineral Resources Reserves in the World' (July 2023), www.xinhuanet.com/expo/2023-07/10/c_1212242757.htm.

[78]State Council, 'Outline for National Ecological and Environmental Protection' (26 November 2000), www.gov.cn/gongbao/content/2001/content_61225.htm, clause 16; State Council, 'Mineral Resources Policy in China' (December 2003), www.gov.cn/zhengce/2005-05/27/content_2615726.htm; People's Congress, 'Water Pollution Prevention Law of the People's Republic of China' (1 January 2018), www.mee.gov.cn/ywgz/fgbz/fl/200802/t20080229_118802.shtml, article 42 and chapter 7; Ministry of Land and Resources, 'Green Mine Construction Specification of Non-ferrous Metal Industry' (22 June 2018), http://gi.mnr.gov.cn/201804/P020180418366246265581.pdf.

[79]National Development and Reform Commission, 'Promote the Development of Circular Economy in the Non-Ferrous Metal Industry' (21 November 2005), www.gov.cn/ztzl/2005-11/21/content_102070.htm, clause 4.

[80]Y. Zhao et al. (2012) 'Discussion on the Model of Mining Circular Economy', *Energy Procedia* 16, 438; M. Guo et al. (2007), 'Improving Multipurpose Utilization of Mineral Resources by Developing Mining Recycling Economy', *Conservation and Utilization of Mineral Resources* 3, 1.

[81]People's Congress, 'Circular Economy Promotion Law of the People's Republic of China' (26 October 2018), www.npc.gov.cn/zgrdw/npc/xinwen/2018-11/05/content_2065669.htm.

[82]People's Congress, 'Cleaner Production Promotion Law of the People's Republic of China' (29 February 2012), www.mee.gov.cn/ywgz/fgbz/fl/201904/t20190428_701287.shtml, article 25; People's Congress, 'Prevention and Control of Solid Waste Pollution Law of the People's Republic of China' (29 April 2020), www.mee.gov.cn/ywgz/fgbz/fl/202004/t20200430_777580.shtml, article 42.

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longer-term goal to develop a green, low-carbon circular industrial system by the end of the fifteenth five-year period (i.e. 2026–2030).[83] It is therefore undeniable that the sustainable development of the mining industry plays an indispensable role in China's overall strategies on CMs, although the balancing act required to achieve such sustainability will remain an existential challenge for Chinese leaders.

3.2.4 Risk Warning and Reporting Mechanisms

The final major policy tool we briefly review in this paper is risk warning and reporting mechanisms. Introduced by the Mineral Resources Plan in 2016, such mechanisms are designed to collect the information necessary for the government to monitor the supply and demand of CMs as well as to formulate timely policy responses to potential shortages and uncertainties. Commentators have observed that such mechanisms can play a critical role in helping the Chinese government develop better plans for mining activities and sustainable development as well as to secure a stable supply of CMs at reasonable prices in the context of growing international competition for these minerals.[84] As noted above, the China Geological Survey has embarked on some pilot work on this front via its periodic reports on domestic and global reserves of CMs. The authority is progressively expanding the list of CMs for assessments and going forward is committed to updating the relevant data more frequently.[85] At the same time, local governments are developing mechanisms for monitoring and reporting CMs security risks within their regions.[86]

The policy and regulatory developments reviewed above are not exhaustive. Nevertheless, they are the major components of China's CMs strategies and hence evidence of China's priorities and future plans in this space. Through the inward strategies, China is clearly focused on addressing the mounting challenges it faces to secure CMs supplies while ensuring sustainable development. Given the pressing need to uplift the technological and green capabilities of its mining industry and to secure CMs supplies from both domestic and foreign sources, China has sought to complement the inward-looking strategies with outward-looking ones.

3.3 Policy Tools for the Outward Strategies

3.3.1 Inbound Foreign Investment

China's longstanding practices in using foreign investment to support its own industrial policies and economic priorities are widely documented.[87] While the mining industry has been one of the most protected sectors, it is being slowly opened up for foreign investment. The balancing act here is the desire for advanced foreign technology and expertise on the one hand and the need to limit the participation of foreign equity in mining on the other hand. Thus, the Mineral Resources Plan sets forth an overarching principle to promote foreign investment in the mining sector with a focus on mining technologies, equipment, and managerial skills for exploration, efficient utilization, recycling, environmental management, and ecological restoration.

When the 'negative list' approach was introduced under China's new Foreign Investment Law in 2019,[88] foreign investors were only prohibited from investing in rare earths, radioactive

[83]National Development and Reform Commission, 'Implementation Plan for Carbon Peak in the Non-ferrous Metals Industry' (10 November 2022), www.cnii.com.cn/ycl/202211/t20221116_428272.html, clause 1.3.

[84]M. Zheng et al. (2022) *China's Strategic Mineral Resources: National Security Risk Assessment and Early Warning System (2020–2050)*, Beijing: Economic Science Press, 31.

[85]Xinhua, supra n. 7.

[86]See e.g. n. 64, Chongqing Department of Natural Resources.

[87]W. Zhou et al. (2020) 'Technology Transfer Under China's Foreign Investment Regime: Does the WTO Provide a Solution?', *Journal of World Trade* 54(3), 455, 460–469.

[88]People's Congress, 'Foreign Investment Law of the People's Republic of China' (15 March 2019), http://tfs.mofcom.gov.cn/article/fl/202101/20210103034662.shtml.

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minerals, such as uranium, and the exploration and mining of tungsten.[89] These limited prohibitions remained unchanged in the following two years.[90] In 2022, all prohibitions were lifted and replaced by a general permission for foreign entities to invest in the mining sector subject to the approval of competent authorities depending on the projects or activities involved.[91] Exploration, mining, transfer of mining license etc. require prior approval of the Ministry of Natural Resources or its departments at the provincial or equivalent level.[92] At the same time, the Chinese government also maintains a separate 'positive list' of industries in which foreign investment is encouraged. The currently applicable list released in October 2022 includes the exploration and mining of minerals in short supply, new technologies that improve the utilization of mineral residue, and mine restoration, amongst others.[93]

This gradual opening-up of the mining industry for foreign investment is a strategic move to facilitate the entry of foreign capital, technology, and expertise in line with China's policy priorities for the development and modernization of the industry. Meanwhile, the approval and licensing system has offered a safeguard mechanism allowing the Chinese government to maintain control over mining resources and activities. Thus, despite the gradual opening-up, foreign investment in the mining sector has remained strikingly minimal in terms of both the number of investors and the value of investment since 2019.[94] Besides, China's security laws highlight the security risks that may arise from foreign investment in critical energy and resources and require such investments to apply for security review.[95] This review provides another layer of control by the Chinese government over mining resources and activities. Going forward, however, China will need to ensure that these 'screening' mechanisms are not used in ways that may disincentivize foreign investment. To achieve its CMs industrial strategies, China will need to create a more open, transparent, and predictable regulatory environment for foreign investors.

3.3.2 Outbound Direct Investment and the Belt & Road Initiative

Outbound direct investment is another longstanding, major policy tool used by the Chinese government to gain access to mineral resources overseas. When the well-known 'Go Global' policy was introduced in China's Tenth Five-Year Plan in 2000, energy and resources were already one of the prioritized sectors.[96] The government provided significant financial support and

[89]National Development and Reform Commission, 'Special Management Measures and Rules for Foreign Investment Access (Negative Lists) in 2019' (30 June 2019), www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201906/W020190905495179303648.pdf.

[90]National Development and Reform Commission, 'Special Management Measures and Rules for Foreign Investment Access (Negative Lists) in 2020' (June 2020), www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202006/P020200624549035288187.pdf; National Development and Reform Commission, 'Special Management Measures and Rules for Foreign Investment Access (Negative Lists) in 2021' (18 September 2021), www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202112/P020211227540591870254.pdf.

[91]National Development and Reform Commission, 'Special Management Measures and Rules for Foreign Investment Access (Negative Lists) in 2022' (25 March 2022), www.ndrc.gov.cn/xxgk/zcfb/ghxwj/202203/P020220325357066649367.pdf, item 17.

[92]People's Congress, supra n. 74.

[93]National Development and Reform Commission, 'Positive Lists of Foreign Investment Industries in 2022' (26 October 2022), www.gov.cn/zhengce/zhengceku/2022-10/28/content_5722417.htm.

[94]Ministry of Commerce, 'Statistical Bulletin of FDI in China in 2020' (5 November 2020), http://images.mofcom.gov.cn/wzs/202011/20201111182920243.pdf, 45; Ministry of Commerce, 'Statistical Bulletin of FDI in China in 2021' (25 November 2021), http://images.mofcom.gov.cn/wzs/202111/20211125164038921.pdf, 25; Ministry of Commerce, 'Statistical Bulletin of FDI in China in 2022' (December 2022), http://images.mofcom.gov.cn/wzs/202211/20221102151438905.pdf, 28.

[95]People's Congress, 'National Security Law of the People's Republic of China' (01 July 2015), www.gov.cn/zhengce/2015-07/01/content_2893902.htm, article 5; National Development and Reform Commission, 'Measures for the National Security Review of Foreign Investment' (19 December 2020), www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202012/P020201219582032130362.pdf, article 4.2; National Development and Reform Commission, 'Construction of the Measures for the National Security Review of Foreign Investment' (22 December 2020), https://news.bjx.com.cn/html/20201222/1124205.shtml.

[96]Central Government of the People's Republic of China, 'Proposal of the Central Committee of the Communist Party of China on Formulating the 10th Five-Year Plan for National Economic and Social Development' (11 October 2000), www.gov.cn/gongbao/content/2000/content_60538.htm.

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preferential policies to promote overseas exploration projects targeting minerals in short supply and in urgent need for economic development in China.[97]

While such investment is dominated by SOEs, major private enterprises have also invested abroad in resource extraction. Both SOEs and private entities are encouraged by government policies that provide financial support and impose less stringent requirements on outward investment in the mining sector as compared to others.[98] The financial support in particular gave advantage to Chinese mining entities in the long haul as they were able to invest in exploration and extraction of minerals which were not yet economically viable, such as those for the green transition, well before their competitors. Similarly, it has enabled these entities to operate in politically riskier jurisdictions such as central Africa which Western investors usually shy away from.[99] Additionally, China has been encouraging its domestic industries to invest in the extraction of the minerals they need abroad so as to vertically integrate. The goal of such a strategy is to avoid price volatility in commodity markets as the minerals are sold at stable intra-group price and to ensure security of supply in case of shortages as companies can reserve internal production of minerals for downstream processing in China. This strategy has notably been followed by Chinese steel makers which own large deposits abroad[100] and, more recently, by Chinese EV makers, some of which are fully vertically integrated from mineral extraction to EV assembly.[101]

In short, the 'Go Global' policy and the associated supportive programs led to explosive growth of Chinese outbound investment particularly in the energy and resources sector.[102] Today, Chinese investment in resource-rich countries, such as Australia, Chile, Peru, Indonesia, and the Democratic Republic of Congo, remains predominantly focused on mining projects.[103]

To enhance market access for its investors in resource-rich economies, China has resorted to two major tools: free trade agreements (FTAs) and the BRI. China has an existing FTA with Australia, Chile, and Peru.[104] While China does not have an FTA with Indonesia on a bilateral basis, both countries are parties to the China–ASEAN FTA and the Regional Comprehensive Economic Partnership (RCEP).[105] However, China's accomplishments in securing market access

[97]Ministry of Finance, 'Interim Measures for the Management of Funds for Risk Exploration of Foreign Mineral Resources' (17 August 2011), www.nea.gov.cn/2011-08/17/c_131056155.htm; Ministry of Land and Resources, 'Opinions on Further Encouraging and Guiding Private Capital to Invest in the Land and Resources' (15 June 2012), www.gov.cn/zhengce/2016-05/22/content_5075672.htm, clause 2; State Council, 'Notice on Further Guiding and Governing the Overseas Investment Direction' (18 August 2017), www.gov.cn/zhengce/content/2017-08/18/content_5218665.htm, clauses 3.4 and 6.1.

[98]E. Economy and M. Levi (2014) *How China's Resource Quest is Changing the World, by All Means Necessary*. Oxford: Oxford University Press, Chapters 3 and 4.

[99]D. Shambaugh (2013) *China Goes Global, The Partial Power*. Oxford: Oxford University Press, Chapter 5.

[100]Economy and Levi, supra n. 98.

[101]H. Sanderson (2022) *Volt Rush, The Winners and Losers in the Race to Go Green*. UK: One World, Chapters 4 and 5.

[102]J. Shankleman (2009) 'Going Global: Chinese Oil and Mining Companies and the Governance of Resource Wealth', Woodrow Wilson International Center for Scholars, www.wilsoncenter.org/sites/default/files/media/uploads/documents/Shankleman_Going%20Global.pdf.

[103]KPMG and The University of Sydney, 'Demystifying Chinese Investment in Australia' (April 2023), https://assets.kpmg.com/content/dam/kpmg/au/pdf/2023/demystifying-chinese-investment-in-australia-report.pdf; E. Ellis (2021) 'Chinese Advances in Chile', Global Americans, https://theglobalamericans.org/2021/03/chinese-advances-in-chile/; J. Kessler (2023) 'Amid Political Turmoil in Peru, China Attempts Business as Normal', Politics & Current Affairs, https://thechinaproject.com/2023/02/14/amid-political-turmoil-in-peru-china-attempts-business-as-normal/; S. D. Negara and L. Suryadinata (2022) 'Sino-Indonesian Relations: Getting Closer or Further Apart?', Asialink, https://asialink.unimelb.edu.au/insights/sino-indonesian-relations-getting-closer-or-further-apart; A. Colville (2023) 'Mining the Heart of Africa: China and the Democratic Republic of Congo', Politics & Current Affairs, https://thechinaproject.com/2023/06/07/mining-the-heart-of-africa-china-and-the-democratic-republic-of-congo/.

[104]Ministry of Commerce, 'China–Australia FTA' (23 May 2005), http://fta.mofcom.gov.cn/topic/enaustralia.shtml; Ministry of Commerce, 'China–Chile FTA' (November 2005), http://fta.mofcom.gov.cn/topic/china_chile_upgrade.shtml; Ministry of Commerce, 'China–Peru FTA' (28 April 2009), http://fta.mofcom.gov.cn/topic/enperu.shtml.

[105]Ministry of Commerce, 'China–ASEAN FTA' (22 November 2015), http://fta.mofcom.gov.cn/topic/china_asean_upgrade.shtml; Ministry of Commerce, 'Regional Comprehensive Economic Partnership' (23 May 2005), http://fta.mofcom.gov.cn/topic/enperu_recp.shtml.

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commitments under these FTAs have been limited, although the established partnerships provide a good foundation for further development of these commitments. For example, in the FTA negotiations with Australia, one of China's primary goals was to relax Australia's foreign investment review processes. While China was successful in seeking more favorable treatment for its private investors, all investments by Chinese SOEs in Australia are still subject to review.[106] Since SOEs dominate China's investment in mining projects, Australia's screening mechanism remains a major hurdle to such investments. More recently, Australia introduced a stand-alone national security review mechanism which effectively renders all foreign investment in mining projects reviewable.[107] Increasingly, Australia has used its screening mechanisms to block Chinese investments, particularly those by Chinese SOEs.[108]

Under the investment chapter of the China–Peru FTA, both parties commit to promote and protect bilateral investment via standard obligations, such as non-discrimination, fair and equitable treatment, full protection, restrictions on expropriation and nationalization, and transfer of investment returns.[109] This FTA also allows investor-state disputes to be resolved via bilateral negotiation or international conciliation or arbitration, thereby creating mechanisms to enforce the obligations. As far as the mining industry is concerned, Peru maintains a general carve-out which precludes foreigners from acquiring ownership in any mine within fifty kilometers of the Peruvian border.[110] This is the only major differential treatment applicable to all foreign investors vis-à-vis domestic ones,[111] meaning that the FTA does not confer more favorable treatment on Chinese investors.

Under the China–Chile FTA, Chile retains the freedom to regulate and screen foreign investment and does not provide more favourable treatment for Chinese investors either.[112] However, this FTA contains 'reasonable endeavour' clauses to facilitate cooperation on mining projects.[113] Such cooperation has been promoted via bilateral Strategic Dialogue on Economic Cooperation and Coordination, which currently focuses on the development of copper smelting technology, lithium resources, clean energy, among other areas.[114]

The investment chapter under the China–ASEAN FTA has provisions on investment liberalization and protection and enforcement similar to those of the China–Peru FTA.[115] It also has a

[106]KPMG and The University of Sydney, supra n. 103; W. Zhou (2017) 'Chinese Investment in Australia: A Critical Analysis of the China–Australia Free Trade Agreement', *Melbourne Journal of International Law* 18(2), 407, 408–414.

[107]The Treasury, 'Foreign Investment in Australia – National Security' (4 July 2023), https://foreigninvestment.gov.au/guidance/types-investments/national-security; The Treasury, 'Foreign Investment in Australia – Mining' (04 July 2023), https://foreigninvestment.gov.au/guidance/types-investments/mining.

[108]J. Kehoe et al. (2021) 'Treasurer Blacklists China Investments', Financial Review, www.afr.com/politics/federal/treasurer-imposes-informal-ban-on-china-investments-20210112-p56thm; K. Needham (2023) 'Australia Blocks Chinese Investment in Rare Earth Firm Citing National Interest', Reuters, www.reuters.com/article/australia-china-rareearths-idUSKBN2V209R.

[109]Ministry of Commerce, 'China–Peru FTA', Chapter 10 – Investment, supra note 104, http://fta.mofcom.gov.cn/bilu/annex/bilu_xdwb_10_en.pdf.

[110]Ibid., 'Section B: Peru's Schedule of Specific Commitments', http://fta.mofcom.gov.cn/bilu/annex/bilu_fujian6_02_en.pdf.

[111]F. Pickmann and M. Chirinos (2022) 'Dentons Global Mining Guide: Peru', Dentons, www.dentons.com/en/insights/newsletters/2022/january/17/dentons-global-mining-guide/dentons-global-mining-guide-2022/peru.

[112]Ministry of Commerce, 'China–Chile FTA', Annex 8-A: Schedules of Specific Commitments, Part II: Schedule of Chile, supra n. 4, http://fta.mofcom.gov.cn/chile/xieyi/fujian8_A_02_en.pdf.

[113]Ministry of Commerce, 'China–Chile FTA', supra n. 4, http://fta.mofcom.gov.cn/chile/xieyi/freetradexieding2.pdf, articles 112–113.

[114]Ministerio de Relaciones Exteriores, 'Chile and China hold Fourth Strategic Dialogue on Economic Cooperation and Coordination with focus on mining, infrastructure, energy, innovation and technology' (4 January 2023), www.minrel.gob.cl/news/chile-and-china-hold-fourth-strategic-dialogue-on-economic-cooperation.

[115]Ministry of Commerce, 'China–ASEAN FTA', supra n. 105, http://fta.mofcom.gov.cn/inforimages/200908/20090817113007764.pdf.

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general provision that encourages the parties to cooperate in a range of areas including mining.[116] RCEP's investment chapter provides a higher level of liberalization by including a general prohibition on a range of performance requirements relating to, for instance, imports and exports, use of local content, sale restrictions, and technology transfer.[117] The chapter also includes investment facilitation commitments which require the parties to streamline domestic screening processes and promote transparency and policy exchange.[118] These additional commitments are in line with recent developments in international investment facilitation rules[119] and would contribute to enhancing the market access of Chinese investors in RCEP economies, including resource-rich Indonesia.[120]

Overall, China's strategy to promote investment in mineral resources overseas has relied more on a 'soft law' approach via cooperation while pursuing binding obligations only incrementally. This approach leaves room for both China and its trading partners to maintain their existing and preferred regulatory regime in the mining sector. This approach is also manifested by China's effort to strengthen diplomatic relations and expand cooperation with economies associated with the BRI. By June 2023, China had signed a memorandum of understanding (MOU) with 152 economies.[121] While the MOU develops a primary framework for general or sectoral cooperation, China and its counterparts have also signed numerous secondary agreements which implement the primary agreements and set forth the details of cooperation in individual projects.[122] Most of these agreements are not publicly available. However, the combined effect of these agreements has been the explosion of Chinese investment in BRI-participating economies particularly in infrastructure projects tailored to the need of the host countries.[123] These projects have facilitated cooperation in other projects including mining, creating a win-win situation for the economic growth of the host countries on the one hand and China's demand for energy and resources on the other hand.[124] As estimated, Chinese companies hold an interest in around 11% of global cobalt and copper production, 13% of global lithium production, 6% of global nickel production, and 63% of global rare earths production.[125] Yet, it is also important to recognize that except for rare earths, China does not hold a dominant position in global production of major CMs which is controlled by companies of other major players, such as the UK, the US,

[116]Ibid., https://asean.org/wp-content/uploads/2021/08/Framework-Agreement-on-Comprehensive-Economic-Co-Operation_ASEAN-Rep-of-China.pdf, article 7.2.

[117]Ministry of Commerce, 'Regional Comprehensive Economic Partnership', supra n. 105, article 10.6.

[118]Ibid., article 10.17.

[119]See e.g. WTO, 'Investment Facilitation for development', www.wto.org/english/tratop_e/invfac_public_e/invfac_e.htm.

[120]Note that RCEP entered into force for Indonesia only on 2 January 2023, and an assessment of its actual effect on Chinese investment in Indonesia requires more data and evidence. See Association of Southeast Asian Nations, 'RCEP Agreement enters into force for Indonesia' (04 January 2023), https://asean.org/rcep-agreement-enters-into-force-for-indonesia/.

[121]Belt and Road Portal, 'List of Countries that have Entered in Cooperation Agreements with China to Jointly Build the Belt and Road' (26 June 2023), www.yidaiyilu.gov.cn/p/77298.html.

[122]H. Wang (2021) 'The Belt and Road Initiative Agreements: Characteristics, Rationale, and Challenges', *World Trade Review* 20(3), 282.

[123]Belt and Road Portal, 'Weekly Report of Projects', www.yidaiyilu.gov.cn/list/w/xmzb?page=10; OECD, 'China's Belt and Road Initiative in the Global Trade, Investment and Finance Landscape' (2018), www.oecd.org/finance/Chinas-Belt-and-Road-Initiative-in-the-global-trade-investment-and-finance-landscape.pdf; C.N. Wang (2023) 'China Belt and Road Initiative (BRI) Investment Report 2022', Green Finance & Development Center, https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2022/.

[124]J. McBride et al. (2023) 'China's Massive Belt and Road Initiative', Council on Foreign Relations, www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative; C.N. Wang (2023) 'China Belt and Road Initiative (BRI) Investment Report 2023 H1', Green Finance & Development Center, https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2023-h1/; Belt and Road Portal, 'China and Algeria Sign a Three-Year Cooperation Plan in Critical Fields (2022–2024)' (8 December 2022), www.yidaiyilu.gov.cn/p/295291.html.

[125]L. Leruth et al. (2022) 'Green Energy Depends on Critical Minerals. Who Controls the Supply Chains?', PIIE, www.piie.com/sites/default/files/documents/wp22-12.pdf, 8–17.

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South Africa, Russia, and Canada.[126] To reinforce its supply chain security in the global race for CMs, China has been ratcheting up its effort to expand investment in resource-rich countries, particularly its existing trading/BRI partners.[127] However, resource-rich economies' growing protection of their mining resources due to security and other economic development concerns, as noted earlier, is posing mounting challenges for China's pursuit of its strategic goals.[128]

Finally, it is worth noting that China has taken a different, more collaborative stance than that of the EU and the US when dealing with resource-rich developing countries' desire to use their own CMs to move up the industrial value chain. For example, China has worked with Indonesia to develop downstream nickel ore industries. Indonesia has some of the world's largest reserves of this mineral but used to export most of it to China for processing. To develop downstream industries, such as stainless steel or EV batteries, Indonesia started to impose export restrictions on nickel around a decade ago. While the EU challenged Indonesia's action at the WTO[129] and imposed trade defence duties on imports of downstream products exported from Indonesia,[130] China, instead, signed a number of BRI agreements with Indonesia to encourage Chinese companies to invest in Indonesia's mining and downstream industries and promised preferential finance for these ventures.[131] This cooperative approach has worked well for China to develop further investment opportunities as a trusted partner in resource-rich developing countries.

3.3.3 Trade and FTAs

For China's exploration and mining activities overseas to satisfy its domestic demand for CMs, Chinese investors must be able to sell the mining outputs back home. Thus, China has maintained low to zero import tariffs on energy and mineral resources, including major green minerals: see Table 2.[132] Partnerships established with BRI economies may have also helped facilitate exports of goods including minerals to China.[133] Moreover, China has sought to include a general

[126]Ibid.

[127]J. Nyabiage (2023) 'China and Congo Agree to Regular Checks on Mining Deals', China Diplomacy, www.scmp.com/news/china/diplomacy/article/3222042/china-and-congo-agree-regular-checks-mining-deals; M. Arkyasa (2023) 'China's Dominance in Indonesian Nickel Mining Challenges the West', Indonesia Business Post, https://indonesiabusinesspost.com/risks-opportunities/chinas-dominance-in-indonesian-nickel-mining-challenges-the-west/.

[128]Global Times, 'Chile's Lithium Nationalization Plan May have Negative Impact on China's Supply' (24 April 2023), www.globaltimes.cn/page/202304/1289705.shtml; Z. Hansrod (2023) 'Long Road for DRC as it Renegotiates Minerals Deal with China', RFI, www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china; A. Sood (2023) 'Indonesia Cracks Down on Illegal Nickel Exports to China as Experts Urge Price Protection for Miners', This Week in Asia, www.scmp.com/week-asia/economics/article/3226817/indonesia-cracks-down-illegal-nickel-exports-china-experts-urge-price-protection-miners; Government of Zimbabwe, 'Base Minerals Export Control (Unbeneficiated Base Mineral Ores) Order 2023 (Zimbabwe)' (2023), www.veritaszim.net/sites/veritas_d/files/SI%202023-005%20Base%20Minerals%20Export%20Control%20%28Unbeneficiated%20Base%20Mineral%20Ores%29%20Order%2C%202023.pdf.

[129]WTO, 'Indonesia – Measures Relating to Raw Materials' (8 December 2022), www.wto.org/english/tratop_e/dispu_e/cases_e/ds592_e.htm.

[130]European Commission, 'Commission Implementing Regulation (EU) 2021/2012' (17 November 2021), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R2012&from=EN; European Commission, 'Commission Implementing Regulation (EU) 2022/433' (15 March 2022), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R0433&from=EN; European Commission, 'Commission Implementing Regulation (EU) 2020/1408' (6 October 2020), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1408&from=EN. For more details, see V. Crochet (2022) 'Trade Defence Instruments: A New Tool for the European Union's Extractivism', *European Journal of International Law* 33(2), 381.

[131]European Commission, 'Commission Implementing Regulation (EU) 2022/433', supra n. 130.

[132]Ministry of Commerce, 'Response to the Suggestions (No. 7858) of the People's Congress' (19 November 2021), www.mofcom.gov.cn/zfxxgk/article/gkml/202111/20211103219245.shtml#:~:text=%E7%9B%AE%E5%89%8D%E6%88%91%E5%9B%BD%E5%AF%B9%E8%BF%9B%E5%8F%A3%E8%83%BD%E6%BA%90,%E8%BF%9B%E5%8F%A3%E5%85%B3%E7%A8%8E%E5%9D%87%E4%B8%BA%E9%9B%B6%E3%80%82.

[133]China Power, 'How Will the Belt and Road Initiative Advance China's Interests?', https://chinapower.csis.org/china-belt-and-road-initiative/.

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Table 2. China's import tariff rates for green minerals in 2023[136]

HS code	Green minerals	Import tariff rates (%)
72026000	Nickel	0
81052020	Cobalt	0
28051910	Lithium	1
72024100	Chromium	0
28399000	Zirconium (Salt)	2
25041010	Graphite	1
28053019	Rare Earths	0

prohibition on export restrictions in its FTAs even though such clauses merely incorporate the relevant WTO rules (i.e. GATT Article XI:1).[134] Like the general WTO rules, these FTAs also leave export duties unregulated. Going forward, it would be in China's interest to include restrictions on export duties in its FTAs because it has already agreed to eliminate such duties, except for a short list of exemptions, under its WTO accession package.[135] However, given the rise of export restrictions on CMs in resource-rich developing economies, the efficacy of trade rules would increasingly hinge on how to ensure they could be effectively enforced and how to dissuade the abuse of such restrictions.

As shown in Section 2, China itself resorted to export restrictions and taxes on CMs in breach of its WTO obligations. Although the WTO dispute settlement system was effective at pushing China to comply with its obligations in *China–Raw Materials* and *China–Rare Earths*,[137] it cannot eliminate the possibility that these measures may be reintroduced. After the disputes, China did reimpose similar export restraints on 11 raw materials in 2016.[138] However, the US and the EU were again able to use the system to push China to remove these measures in a timely fashion,[139] which testifies to the effectiveness of the system when dealing with China. Since then, China has maintained an export tax on a list of raw materials, including two green CMs (i.e. nickel and chromium),[140] largely consistently with the exemptions envisaged in its WTO

[134]China–Australia FTA, supra n. 104, chapter 2; China–Peru FTA, supra n. 104, chapter 2; China–ASEAN FTA, supra n. 105, article 8; RCEP, article 2.16.

[135]WTO, 'Accession of the People's Republic of China WT/L/432' (23 November 2001), article 11.3 and annex 6.

[136]Ministry of Finance, 'Table of Provisional Import Tariff Rates in 2023' (2023), www.gov.cn/zhengce/zhengceku/202212/29/5734125/files/031aee21d6ae4106adeabc0636625db2.pdf.

[137]WTO, 'China – Measures Related to the Exportation of Various Raw Materials' (28 January 2013), www.wto.org/english/tratop_e/dispu_e/cases_e/ds394_e.htm; WTO, 'China – Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum' (20 May 2015), www.wto.org/english/tratop_e/dispu_e/cases_e/ds431_e.htm.

[138]WTO, 'China – Export Duties on Certain Raw Materials' (08 November 2016), www.wto.org/english/tratop_e/dispu_e/cases_e/ds508_e.htm; WTO, 'China – Duties and other Measures concerning the Exportation of Certain Raw Materials' (23 November 2016), www.wto.org/english/tratop_e/dispu_e/cases_e/ds509_e.htm.

[139]These raw materials were antimony, chromium, cobalt, copper, graphite, indium, lead, magnesia, talc, tantalum and tin. See United States Trade Representative, '2018 Report to Congress on China's WTO Compliance' (February 2019), https://ustr.gov/sites/default/files/2018-USTR-Report-to-Congress-on-China%27s-WTO-Compliance.pdf, 35.

[140]Customs Tariff Committee of the State Council, 'Customs Tariff of Import and Export Commodities of the People's Republic of China in 2019' (2019), www.gov.cn/xinwen/2018-12/31/5353742/files/388a1dcfed64453983cf95f3af874b41.pdf, 1127–1131; Customs Tariff Committee of the State Council, 'Customs Tariff of Import and Export Commodities of the People's Republic of China in 2020' (2020), http://gss.mof.gov.cn/gzdt/zhengcefabu/201912/P020191230547817604455.pdf, 1179–1183; Customs Tariff Committee of the State Council, 'Customs Tariff of Import and Export Commodities of the People's Republic of China in 2021' (2021) http://czj.cq.gov.cn/zwgk_268/cszc/202012/P020201231694960873112.pdf, 1245–1249; Customs Tariff Committee of the State Council, 'Customs Tariff of Import and Export Commodities of the People's Republic of China in 2022' (2022), www.gov.cn/xinwen/2021-12/31/5665850/files/2b07cb12bbb94c2eb14d3525596ab9fb.pdf, 1428–1432; Customs Tariff Committee of the State Council, 'Customs Tariff of Import and

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accession commitments.[141] China has also applied an export licensing system on some CMs, including nickel, cobalt, chromium, zirconium, and rare earths,[142] although it does not seem to have maintained restrictions (e.g. quotas) on their exportation. Nevertheless, China may well reintroduce export quotas on CMs when needed. There are at least three situations in which China may do so.

First and foremost, export restrictions may be reinstated when they are needed to address the internal challenges China faces in pursuing a delicate balance between securing domestic supply and reservation of CMs for economic development and advancing its climate and sustainability agenda. In these circumstances, China will likely prioritize domestic policy needs over international obligations, at least on a temporary basis.

The second situation is where retaliation becomes a desirable policy response to actions by other states. As discussed in detail elsewhere, China has pursued a defensive strategy in response to US sanctions since the outset of the bilateral trade war in 2018.[143] Faced with US bans on the sale of high-tech microchips to China, China recently curbed the exportation of gallium and germanium (two niche minerals used to manufacture electronics and semiconductors), although the Chinese action was arguably not intended to cause immediate, major economic impacts[144] but to demonstrate its will and ability to take more meaningful retaliatory actions if the US sanctions continued to escalate. China categorized the two minerals as dual-use items under its Export Control Law 2020 and sought to justify the export restraints on the ground of national security.[145]

The third situation concerns the possibility that China may resort to more assertive foreign policies and proactive/coercive actions in dealing with sensitive political matters. However, the circumstances in which China may take such actions are arguably limited. China's coercive actions in recent times suggest that the triggering events need to be perceived by Chinese leaders as causing or having the potential to cause political instability in China. The most cited examples involve human rights issues in Xinjiang, diplomacy in Hong Kong and Taiwan,[146] which are matters of the highest sensitivity in China's political system. To protect its own credibility in the global economy, it is likely that China would strictly confine any coercive actions to such highly political sensitive circumstances. This means that China would not weaponize trade and disrupt supply chains as often and widely as is sometimes perceived. Rather, it is reasonable to observe that China will seriously weigh the benefits and costs of economic coercion and become

Export Commodities of the People's Republic of China in 2023' (2023), www.gov.cn/zhengce/zhengceku/2023-01/02/5734605/files/eafdb87c9c654702a5cd7f5f11dca10f.pdf, 1472–1476.

[141]WTO, 'China's Accession Protocol', supra n. 135.

[142]Ministry of Commerce, '2019 Export Licencing Management Commodities Catalogue' (29 December 2019), www.gov.cn/zhengce/zhengceku/2018-12/31/content_5436895.htm, items 414–420, 456; Ministry of Commerce, '2020 Export Licencing Management Commodities Catalogue' (31 December 2019), www.mofcom.gov.cn/article/b/e/201912/20191202927141.shtml, 18–20; Ministry of Commerce, '2021 Export Licencing Management Commodities Catalogue' (31 December 2020), https://law.esnai.com/upload_files/19/20211520473908162.pdf, 18–20; Ministry of Commerce, '2022 Export Licencing Management Commodities Catalogue' (31 December 2021), www.mofcom.gov.cn/article/zcfb/zcdwmy/202112/20211203233746.shtml, 19–20; Ministry of Commerce, '2023 Export Licencing Management Commodities Catalogue' (30 December 2022), www.mofcom.gov.cn/article/zcfb/zcblgg/202212/20221203376706.shtml, 19–20.

[143]W. Zhou et al. (2023) 'Trade vs. Security: Recent Developments of Global Trade Rules and China's Policy and Regulatory Responses from Defensive to Proactive', *World Trade Review* 22(2), 193.

[144]A. Liang and N. Marsh (2023) 'Gallium and germanium: What China's new move i. microchip war means for world', BBC News, www.bbc.com/news/business-66118831; Reuters, 'China to Restrict Exports of Chipmaking Materials as US Mulls New Curbs' (4 July 2023), www.reuters.com/markets/commodities/china-restrict-exports-chipmaking-materials-us-mulls-new-curbs-2023-07-04/.

[145]Renmin, 'From 01 August, China will Implement Export Controls on Gallium and Germanium Related items – a Necessary Measures to Maintain National Security' (12 July 2023), www.news.cn/politics/2023-07/12/c_1129744648.htm.

[146]V. Cha (2023) 'Examining China's Coercive Economic Tactics', Center for Strategic & International Studies, www.csis.org/analysis/examining-chinas-coercive-economic-tactics.

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increasingly cautious so as to minimize the negative impact on its global reputation and engagement.

This detailed analysis of China's strategies on CMs has reinforced our observation that these strategies are not designed or intended to cause disruptions in global supply chains. China has consistently prioritized its domestic policy goals seeking to find solutions to its internal challenges. While these strategies are adopted to enhance China's global competitiveness and supply chain security rather than pursue confrontation, they have important economic and strategic implications for China's trading partners. Apart from the external tools on trade and investment which directly impact or compete with other economies in CM supply chains, internal tools for environmental, developmental, and other legitimate goals would also affect trading partners indirectly. For instance, the consolidation of SOEs in the mining industry to better manage and standardize mining activities for sustainability significantly elevates the global competitiveness of these entities in CM supply chains in terms of bidding for mining projects overseas, pricing power, production efficiency, etc.[147] SOEs may also be used as a vehicle to pursue strategic goals such as controlling CM assets, processing facilities, supplies or exports, as demonstrated by China's outbound investment policies and defensive or proactive actions in response to policies adopted by other governments. Overall, China's CM strategies have enabled it to gain a first-mover advantage in global mining activities and a more advanced position in securing supply chains. Like similar policies developed in other economies, these strategies and policies tend to complicate and affect CM supply chains, even just as a side effect. However, given the fast development of similar CMs strategies in other major economies, it would be unwise to argue that China should not develop its own. The sensible solution to the potential disruption or confrontation in CM supply chains is international cooperation, which is discussed below.

4. Rationalizing the De-Risking Strategy

The term 'de-risking' was undefined in the G7 Leaders' Communiqué of 20 May 2023 and remains ambiguous today. When it comes to China and CMs, the Communiqué essentially raised the following concerns: over-reliance on China for the supply of CMs which can be affected by China's non-market policies and practices and economic coercion.[148] In a policy brief released on 30 June 2023, the EU reiterated the necessity to pursue constructive and stable relations with China while at the same time reducing critical dependencies and vulnerabilities, including in its supply chains, and de-risking and diversifying where necessary and appropriate.[149] In an effort to align its approaches to China with those at the EU level, Germany released a detailed China Strategy in July 2023. This Strategy considers China as a serious competitor and systemic rival and calls upon 'reducing dependencies in critical areas, keeping geopolitical aspects in mind when taking economic decisions, and increasing our resilience'.[150] However, none of these documents flesh out the meaning of 'de-risking'.

The ambiguity left in the de-risking strategy provides the political flexibility for the US and the EU to adjust their approaches to China in light of changing circumstances. The strategy's practical scope can, therefore, vary depending on how it is implemented. Through economic sanctions

[147]Q. Zhou and S. Brooke (2022) 'China Merges Three Rare Earths State-Owned Entities to Increase Pricing Power and Efficiency', China Briefing, www.china-briefing.com/news/china-merges-three-rare-earths-state-owned-entities-to-increase-pricing-power-and-efficiency/; B. Sultan (2023), 'Vertical Integration of Chinese Companies on Rare Earth Minerals Production as Strategic Supremacy', Modern Diplomacy, https://moderndiplomacy.eu/2023/11/30/vertical-integration-of-chinese-companies-on-rare-earth-minerals-production-as-strategic-supremacy/.

[148]The White House, supra n. 6.

[149]European Council, 'European Council Conclusions on China' (30 June 2023), www.consilium.europa.eu/en/press/press-releases/2023/06/30/european-council-conclusions-on-china-30-june-2023/.

[150]The Federal Government, 'Strategy on China', www.auswaertiges-amt.de/blob/2608580/49d50fecc479304c3da2e2079c55e106/china-strategie-en-data.pdf, 34.

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exemplified by bans on chips exports and investment in select high-tech sectors, the US's de-risking has in effect embraced the abandoned de-coupling strategy.[151] It is not impossible that the EU's de-risking may also entail *de facto* de-coupling in critical areas.

As far as CMs are concerned, there is already a clear trend of ally-shoring leading to the fast development of a range of partnerships aimed at moving CMs supply chains away from China and Chinese entities and breaking up China's dominance over processing of CMs.[152] These partnerships are largely based on aspirational terms seeking to foster cooperation among like-minded economies on diversification of supply chains, investment in and development of upstream and downstream sectors, R&D, standards setting, regulatory transparency and information exchange, etc.[153] The Supply Chains Agreement under the IPEF, released on 7 September 2023, was a significant expansion of the ally-shoring of supply chains to a much broader context with China excluded. This agreement seeks to consolidate and institutionalize supply chain initiatives by creating the relevant bodies to facilitate and oversee the development of specific action plans as well as a Supply Chain Crisis Response Network to ensure emergency communications.[154] Major areas of cooperation include:

- detecting (potential) supply chain risks, disruptions, and bottlenecks,
- mobilizing investment,
- promoting regulatory transparency,
- enhancing technical assistance and capacity building,
- minimizing market distortions and unnecessary trade restrictions, and
- promoting labor standards.

The emerging partnerships on CMs supply chains have thus become an integral element of the de-risking strategy. Led by the US, these partnerships are arguably driven primarily by the ongoing geopolitical tensions with China rather than the best approaches to addressing challenges for (CMs) supply chains. This might be similar in the case of the growing number of CMs strategic partnerships signed by the EU with its trading partners such as Kazakhstan, Ukraine, and Namibia.[155] Indeed, one of the goals of such partnerships is to increase financing not only for

[151]A. Demarais (2023) 'What Does 'De-Risking' Actually Mean?', FP, https://foreignpolicy.com/2023/08/23/derisking-us-china-biden-decoupling-technology-supply-chains-semiconductors-chips-ira-trade/; The White House, 'Executive Order on Addressing United States Investments in Certain National Security Technologies and Products in Countries of Concern' (09 August 2023), www.whitehouse.gov/briefing-room/presidential-actions/2023/08/09/executive-order-on-addressing-united-states-investments-in-certain-national-security-technologies-and-products-in-countries-of-concern/.

[152]Some of these arrangements are listed in Section 1.

[153]See Prime Minister of Australia, 'Australia – Japan Partnership Concerning Critical Minerals' (22 October 2022), www.pm.gov.au/sites/default/files/media/JAPAN-AUSTRALIA_MOU_221022.pdf; Department of Industry, Science and Resources, 'Joint Statement of Intent between Australia and the United Kingdom on Collaboration on Critical Minerals' (4 April 2023), www.industry.gov.au/publications/joint-statement-intent-between-australia-and-united-kingdom-collaboration-critical-minerals; Government of Canada, 'MOU between Canada and South Korea on Cooperation in Critical Mineral Supply Chains, the Clean Energy Transition and Energy Security' (16 May 2023), www.international.gc.ca/country_news-pays_nouvelles/2023-05-16-korea-coree.aspx?lang=eng; The White House, 'United States – Australia Statement of Intent: Climate, Critical Minerals, and the Clean Energy Transformation' (20 May 2023), www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/australia-united-states-statement-of-intent-climate-critical-minerals-and-the-clean-energy-transformation/.

[154]US Department of Commerce, 'US Department of Commerce Publishes Text of Landmark Indo-Pacific Economic Framework for Prosperity (IPEF) Supply Chain Agreement' (07 September 2023), www.commerce.gov/news/press-releases/2023/09/us-department-commerce-publishes-text-landmark-indo-pacific-economic.

[155]European Commission, 'Memorandum of Understanding between the European Union and Ukraine on a Strategic Partnership on Raw Materials' (2021), https://ec.europa.eu/docsroom/documents/46300/attachments/1/translations/en/renditions/native; European Commission, 'Memorandum of Understanding on a Partnership on Sustainable Raw Materials Value Chains and Renewable Hydrogen between the European Union represented by the European Commission and the Republic of Namibia' (2022), https://single-market-economy.ec.europa.eu/system/files/2022-11/MoU-Namibia-batteries-hydrogen.pdf; European Commission, 'Memorandum of Understanding between the Republic of

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mining projects in these countries but also for processing. This serves the dual goal for the EU to sell the partnerships as win-win for its partners by helping them to move further up in the value chain as well as move some CM processing away from China.

These external partnerships are complemented by domestic actions. As flagged above, through tax credits to EVs made of inputs originating in the US or its preferential trading partners, the US's IRA seeks to push EV makers, even outside China, to not rely on Chinese CMs, thereby effectively decoupling from China in CM supply chains. To include allies originally ineligible for the IRA subsidies, the US and Japan entered an Agreement on Strengthening Critical Minerals Supply Chains.[156] The US is also negotiating similar arrangements with other allies including the EU.[157] At the same time, under its proposed Critical Raw Materials Act, the EU is suggesting to develop new tools to ensure that the EU does not rely on a single source of CMs supply for more than 65% of its needs of a given mineral.[158] Here, it is notable that the US's actions take a much harder stance towards China as the EU does not aim to cut all ties.

For economic, strategic and security reasons, it is rational for governments to diversify supply chains, avoid over-dependency on any single source of supply and compete in resource-abundant markets. China has pursued such diversification and global competition via its CMs strategies discussed in this paper. Major resource-seeking economies, including the US and the EU, have also adopted similar industrial policies and strategies to secure access to CMs in support of a green transition.[159] These strategies will not only intensify competition among themselves but also impact or disrupt global supply chains in similar ways as China's strategies. The same can be said about the defensive policy tools adopted by resource-rich developing economies such as nationalization, local content, or performance requirements and export restrictions.

Excluding China from discussions and cooperation on global supply chain matters turns 'de-risking' into *de facto* 'de-coupling', which is infeasible and tends to increase rather than reduce disruptions. It is unachievable because China remains a central player in global supply chains including CMs and a top trading partner with a majority of the world.[160] It is also because apart from the US, other economies, including major US allies, continue to work with China under BRI, FTAs, and other existing and potential initiatives. It generates disruptions because *de facto* de-coupling is likely to cause escalation of geopolitical tensions and retaliatory actions, consequently creating unnecessary trade fragmentation, barriers, and uncertainties which undermine supply chain resilience.[161]

The de-risking strategy should focus on addressing the supply chain risks rather than targeting China. As discussed in this paper, China's CMs strategies, although proactive and ambitious, are

Kazakhstan and the European Union on a Strategic Partnership on Sustainable Raw Materials, Batteries and Renewable Hydrogen Value Chains' (2022), https://single-market-economy.ec.europa.eu/news/strategic-partnership-between-european-union-and-kazakhstan-sustainable-raw-materials-batteries-and-2022-11-08_en

[156]Office of the United States Trade Representative, 'United States and Japan Sign Critical Minerals Agreement' (28 March 2023), https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/march/united-states-and-japan-sign-critical-minerals-agreement.

[157]European Commission, 'EU Moves Forward with Critical Minerals Agreement Negotiations with the US' (14 June 2023), https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3214.

[158]European Commission, 'Proposal for a Regulation of the European Parliament and of the Council establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulation (EU) 2019/1020, COM (2023)160 final' (March 2023), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023PC0160.

[159]Crochet and Zhou, supra n. 12; C.P. Bown (2023) 'Industrial Policy for Electric Vehicle Supply Chains and the US-EU Fight over the Inflation Reduction Act', PIIE Working Papers, www.piie.com/publications/working-papers/industrial-policy-electric-vehicle-supply-chains-and-us-eu-fight-over.

[160]H. Yeo et al. (2023) 'Strengthening Regional Supply Chain Resiliency Through the Indo-Pacific Economic Framework (IPEF)', Asia Society Policy Institute, https://asiasociety.org/sites/default/files/2023-05/ASPI_RegSupplyChain_issuepaper_finalize.pdf, 5.

[161]E. Benson et al. (2023) 'Securing Semiconductor Supply Chains in the Indo-Pacific Economic Framework for Prosperity', CSIS, https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-05/230530_Benson_SemiconductorSupplyChains.pdf?VersionId=SIbU7F4LQk82X5EHIx1Ffjr7j.3nbfiu.

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primarily aimed at strengthening its strategic competitiveness for economic development and security. This distinction between competition and confrontation is crucial for rationalizing supply chain strategies going forward. Instead of confrontation, the de-risking strategy should focus on promoting fair competition and cooperation. In almost all aspects of the IPEF Supply Chains Agreement, the governments involved would be better off to include China in the deliberation and cooperation. The IPEF's collective responses to supply chain risks and emergencies can be more effective with China's participation. It would also provide an alternative framework, apart from the WTO, to push China to increase regulatory transparency and coordination while disincentivizing it from non-market policies and practices as well as coercive actions. Finally, it would also provide an opportunity for collective mining-related standard-setting on environmental, labor, and other issues.

However, given the current geopolitical context, it would be unrealistic to expect that the IPEF would be open to China. Thus, the WTO remains the only forum that would include both the US and China in the deliberation and cooperation on global supply chain issues including CMs. Given the global nature of these issues, it would also be ideal if the matters contemplated in the IPEF Supply Chains Agreement can be discussed at the multilateral level. With the world's two superpowers involved, this would enhance certainties in the global economy as to how they may manage their tensions, respond to existential challenges including supply chains and economic security, and hopefully play a leadership role in stabilizing and advancing the rules-based economic order.

5. Conclusion

The proliferation of green industrial policies worldwide is leading to a global race for CMs based on a wide array of strategies and policy tools to secure CMs supply chains. While resource-rich developing economies have relied predominantly on defensive policies to protect their mineral resources and foster industrial capabilities in related sectors, the US and its allies have been developing networks for ally-shoring CMs supply chains while de-risking from China. Leaving the de-risking strategy undefined, they maintain the political flexibility to pursue *de facto* 'de-coupling' when needed. The US's bans on exports of chips to and investment in select high-tech sectors in China are telling examples of de-coupling. As the geopolitical tensions and strategic competition between the world's two superpowers intensify, the change of the policy description from de-coupling to de-risking may not change the substance in practice. In any case, treating China as *the* 'risk' will remain indispensable for the political demand in the US for the foreseeable future.

Other countries should react rationally to extreme policies adopted amid geopolitical tensions. US allies have already started doing so, causing the strategic reorientation from de-coupling to de-risking, although they still view China as a major risk in global supply chains. Unlike the US, even the EU is not aiming at cutting all ties with China when it comes to CMs. Other economies such as many IPEF members have continued or even broadened engagement with China in economic activities. De-coupling or its variations are therefore infeasible and would cause disruptions in global supply chains.

The de-risking strategy should focus on addressing supply chain risks rather than targeting China. Rationalizing the strategy in this direction, as we have argued in this paper, must be based on a comprehensive understanding of China's strategies. Through a detailed analysis of China's strategies on CMs, we have shown that these strategies have been used to tackle the existing and emerging challenges in the Chinese economy rather than to cause supply chain disruptions in external markets. By prioritizing its own economic and security interests, China's policies and practices did and will continue to impact trading partners, just like policies adopted by other economies for a lack of consideration of their global implications.

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As part of the de-risking strategy, governments have every reason to pursue diversification of supply sources. However, to de-risk supply chain risks, cooperation is essential. Most of the mechanisms being developed under partnerships on supply chains, including those focused on CMs, can achieve better outcomes by involving China in the discussions and collaboration. This is not only because China remains a key player in global supply chains and a major trading partner with many countries including US allies. This is also because collaboration with China under an established framework such as IPEF and the WTO would provide the opportunity to incentivize China to enhance transparency and exchange of its policy and regulatory developments and engage in discussions of advanced environmental and labor standards, while disincentivizing it from non-market policies and practices and coercive actions. To the contrary, a confrontational strategy with 'China being the risk' at its core will only undermine rational policymaking and lead to mutually destructive and globally disruptive policies and practices, be it de-coupling or de-risking.

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