

US Critical Mineral Policies and Alliance Strategies in an Age of Geopolitical Rivalry

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Abstract

We examine the goeconomic strategies of the US regarding critical minerals through the lens of geopolitical rivalry with China. Chinese companies, mostly state-owned enterprises, play a prominent role in the extraction and processing of minerals critical to the energy transition. Drawing on the balance of power theory, we argue that the US, the incumbent hegemon, can employ both domestic policies and alliance-building strategies to counterbalance China’s dominance in critical mineral sectors. Empirically, we first assess the nature of US domestic policies with respect to promoting domestic critical mineral production and restricting foreign investment in the extractive sectors through investment screening measures, and then assess the degree to which the US has relied on Five Eyes alliance partners to achieve common strategic goals. We find evidence that the US uses a multifaceted goeconomic approach involving domestic policies and alliance strategies to counterbalance China’s dominant position in critical mineral supply chains.

Keywords

China–US rivalry; critical minerals; Five Eyes; goeconomics; state-owned enterprises

1. Introduction

US–China rivalry has escalated in recent years (Allison, 2017; Kim, 2018), extending its scope to include climate-related technologies and critical minerals (Kalantzakos, 2020; Shen, 2022). China dominates in both sectors, with other countries highly dependent on China for critical minerals (Castillo & Purdy, 2022). As critical minerals are essential inputs for the global energy transition and an integral part of the global fight

against climate change (International Energy Agency, 2021), dominance by a single state over critical mineral supply chains suggests the importance of de-risking strategies by countries seeking to reduce resource dependence on China. De-risking here refers to reducing the risks of overdependence on a single country in critical industries while maintaining basic trade and investment activities with that country (Capri, 2023). It is distinct from decoupling, which entails completely cutting off economic connections with a rival country. We focus on de-risking because countries like the US are currently adopting such strategies in critical sectors with regard to China (Sullivan, 2023). While most discussion focuses on de-risking in advanced technologies, such as the US CHIPS and Science Act and efforts to rally allies to restrict exports of semiconductor tools to China (Donnelly, 2023; Malkin & He, 2023), scant attention has been paid to critical minerals (Kalantzakos, 2020; Zhou et al., 2023). De-risking from China in this context poses unique challenges due to the geographic concentration of critical minerals in specific countries, which may not be US allies, and the high economic and environmental costs associated with their extraction and processing, making diversification away from China challenging (Castillo & Purdy, 2022).

In this article, we address the underexplored questions of what de-risking strategies the US has adopted concerning critical minerals. Specifically, we investigate the US' critical mineral strategies and policies from the perspective of its hegemonic rivalry with China, focusing on its efforts to de-risk and counterbalance China's dominance in critical minerals.

Our work builds on classic realist theories focused on the balance of power (Gilpin, 1981; Walt, 1985; Waltz, 1979), along with their recent applications to understand economic policies in a geopolitical context (Donnelly, 2023; Malkin & He, 2023; Roberts et al., 2019). We argue that when an incumbent hegemon such as the US perceives a threat to its position, it tends to take balancing actions, including domestic and external strategies, to maintain or enhance its relative power. In the context of critical minerals, the US perceives significant risks arising from dependence on China for these resources and the potential for China to weaponize its dominance in this sector. Accordingly, we suggest that the US may adopt geoeconomic strategies—using economic instruments for geopolitical gains (Blackwill & Harris, 2016)—to counter China's growing dominance in the critical mineral sector. Domestic balancing strategies include policies to boost domestic production and strengthen foreign investment screening measures (ISMs). External balancing strategies are based on diffusing these strategies through alliances (Roberts et al., 2019). We summarize these arguments in a theoretical framework (Table 1), categorizing US strategies into four types aimed at enhancing the strategic position of the US and its allies relative to China.

We use this theoretical framework to empirically address the following question:

Does the US use domestic policies and international alliances to de-risk and counterbalance China's dominance in the critical mineral sector, and, if so, what specific strategies does it employ?

To understand the US' external balancing strategy, we consider critical mineral strategies of its allies in the Five Eyes (FVEY) intelligence alliance, including Australia, Canada, New Zealand, and the UK. We focus on this alliance for three reasons. First, these countries are part of a common intelligence network, share similar economic and political institutions, and have common roots in Anglo-Saxon common law, all of which facilitates policy collaboration and policy convergence (Hemmings & Varnish, 2021; Holzinger & Knill, 2005). Second, these countries either possess potentially abundant critical mineral resources or serve as hosts for

global resource companies, thereby increasing their appeal as potential alliance partners for the US to build an alternative critical mineral supply chain. Third, the FVEY countries have been identified by observers as a coordinated group forming a “protectionist huddle” designed to limit foreign interference and investment within their borders and support secure supplies of critical minerals (Kissin, 2023).

Analyzing documents pertaining to critical minerals in all FVEY countries, we find that the US has used domestic policies and alliance-building strategies to both promote the critical mineral sector in the US and allied countries and weaken China’s access to resources and capabilities in critical mineral sectors. Domestically, the US has implemented industrial policies to support domestic critical mineral development. Additionally, it has linked the extractive sector to national security concerns in its domestic ISMs and trade policies, thus weakening China’s access to critical minerals in the US. Internationally, the US has established collaborative partnerships to promote trade and investment with Australia and Canada in critical mineral supply chains. Our results suggest that a US ally’s shared concerns over dependence on China’s critical mineral supplies, coupled with the strategic importance of critical mineral businesses for the country’s competitive advantage, increase incentives to align with US policies in critical mineral sectors. Specifically, Australia, Canada, and the UK have expressed concerns regarding reliance on China’s dominance in critical minerals and have strengthened or adopted ISMs to enhance regulatory scrutiny over foreign investments, particularly those involving foreign state-owned enterprises (SOEs), in critical minerals in their respective countries, showing convergence in ISMs with those of the US. In the case of New Zealand, despite potentially hosting a variety of critical minerals (GNS, 2024), current mining operations in the country remain relatively small, and it has yet to adopt stringent ISMs or form a partnership with the US on critical minerals.

Our study contributes to geoeconomics research by studying geoeconomic policies (as opposed to military strategies) in the context of internal and external balancing. Building on current scholarship on geoeconomics (Babić et al., 2022; Malkin & He, 2023; Weinhardt et al., 2022), we examine how states rely on economic policies both domestically and internationally to balance a rising rival power. In particular, we enhance understanding of the conditions leading to convergence in geoeconomic policies among the hegemon and its allies. Furthermore, our study advances the current discussion on de-risking (Farrell & Newman, 2023) by expanding its focus beyond advanced technologies and employing a balance of power perspective to unpack internal and external de-risking strategies. We find that the de-risking strategies in critical minerals entail industrial, trade, and investment policies, highlighting the various roles of economic policies in geopolitical competition within an understudied strategic sector.

In the following section, we present our theoretical framework, using the balance of power theory to understand the US–China rivalry. Next, we study the existing power relations in the critical mineral sector, focusing on the perceived threat posed by China’s control of the supply chains of specific critical minerals. We then outline how the US can use both domestic and international strategies to strengthen its position in the critical mineral sector. Finally, we present our analysis and findings, followed by our conclusion.

2. Theoretical Framework: Balance of Power in the US–China Rivalry

The liberal world order that emerged during the first phases of globalization is being challenged by shifting geopolitical and geoeconomic developments manifested in the US–China rivalry. This rivalry intensifies as China increases its economic and military power and is amplified by fundamental differences in economic,

political, and value systems (Allison, 2017; de Graaff et al., 2020). We see a rise in interventionist economic policies from advanced industrialized states, led by the US, aimed at counterbalancing the expansion of state capitalism championed by China (Alami et al., 2022; Babić et al., 2020), which includes attempts to redefine global supply chains and create new trading partnerships (Kolben & Rioux, 2023; Linsi, 2022; Malkin & He, 2023).

We use the balance of power theory to examine these issues in the context of critical minerals and hegemonic rivalry. The theory suggests that a hegemonic power, when it perceives a threat to its position, will seek to restore balance through domestic policies and external alliances (Gilpin, 1981; Walt, 1985; Waltz, 1979). Internal balancing relies on domestic policies to improve a country's position against rivals, while external balancing entails collaboration with allies and partners through coordinated policies (Roberts et al., 2019; Schweller, 2016).

As China's power over a specific economic sector, such as critical minerals, expands and the US becomes increasingly dependent on China in this sector, the perceived threat to the US also increases. This vulnerability is captured in the theory of weaponized interdependence, which suggests that countries can leverage their market power and bilateral dependencies to extract benefits from power imbalances when they exert dominant control over specific nodes (Farrell & Newman, 2019). Farrell and Newman (2019) illustrate how US centrality in financial nodes and networks allows it to weaponize its financial dominance, but the idea can be extended to other sectors such as oil (Detomasi, 2022), and other countries such as China that can use their centrality in different sectors to weaponize parts of the network where they dominate, such as by restricting US access to critical mineral resources.

Thus, we anticipate that an incumbent power will take balancing measures against its rival to address the perceived threats and mitigate the associated risks (Walt, 1985). Moreover, balancing strategies are increasingly geoeconomic in nature, relying on economic policies to support national interests against competing states (Ikenberry & Nexon, 2019; Malkin & He, 2023; Weinhardt et al., 2022). Domestic policies, such as curbs on imports/exports, imposition of tariffs, and adoption of ISMs, are geoeconomic tools that can be designed to restrict a country's economic relations with a rival state in selected industries (Roberts et al., 2019). Governments can supplement these measures with industrial policies promoting selected industrial sectors. Industrial policies have been used as a response to disruptive technological changes and, in the Western economies, to the rise of China (Aiginger & Rodrik, 2020). Roberts et al. (2019) note that countries adopting these policies use national security rhetoric to justify growing interventionism in the economy. External policies focus on alliance-building to reshape economic relationships both between oneself and one's allies and between allies and the rival state (Roberts et al., 2019). In several cases, the US has used external balancing by urging its alliances to ban Huawei from its 5G technology (Roberts et al., 2019), while also employing geopolitically motivated friend-shoring, linking supply chains among allied nations (Vivoda, 2023).

Below, we apply the balance of power theory to explore how the hegemonic power, the US, responds to the dominance of Chinese firms, largely SOEs, in critical mineral supply chains by employing internal and external balancing strategies to pursue geoeconomic objectives.

3. Existing Power Relations in the Critical Mineral Sector: Dependence on China and National Security Considerations of the US

Critical minerals, deemed “strategic resources,” are concentrated in specific geographical regions and prone to resource competition driven by geopolitical and strategic objectives as states seek resource security and economic security (Le Billon, 2004; Shiquan & Deyi, 2023). As the world embarks on the next industrial revolution and a clean energy transition, critical minerals such as lithium, cobalt, and nickel that are essential in the production of rechargeable batteries for electric vehicles and for renewable energy generation will increasingly be in demand (Castillo & Purdy, 2022). Securing critical mineral supply chains is thus considered a “non-traditional national security” challenge, given their importance in supporting industrial systems necessary for addressing climate change (Shiquan & Deyi, 2023). In this case, a concentrated control of critical minerals in a single country considered a rival to the US is seen as a national security threat. Despite the need for global collaboration in alleviating the global climate crisis, the rise of national security rhetoric restricts collaboration in strategic sectors like critical minerals.

China is a dominant player in critical minerals. China dominates global supply chains for several critical minerals, especially in the processing stage (Castillo & Purdy, 2022). Based on 2019 data, China produced around 60% of the world’s lithium, over 60% of graphite, and processed over 90% of rare earth elements and around 50% to 70% of lithium and cobalt (International Energy Agency, 2023). Furthermore, China increasingly acts as a “one-stop shop” to finance, produce, and refine critical minerals, especially in developing countries, through its Belt and Road Initiative (Kalantzakos, 2020). This consolidation strengthens China’s ability to set global prices, restrict access to resources, and use minerals as political leverage. Of particular concern is the potential for weaponization, as evidenced by China’s past actions, such as restricting exports of rare earth elements during a dispute with Japan in 2010 and threatening to limit critical mineral supplies to the US during the 2019 trade war (Bordoff & O’Sullivan, 2023). China’s decision in 2023 to tighten export restrictions on gallium and germanium (Ministry of Commerce of the People’s Republic of China, 2023) further reinforced the fears about China’s ability to control critical mineral supply chains (“China’s curb on metal exports,” 2023).

China’s ability to weaponize critical mineral supplies is bolstered by the predominant presence of SOEs among major players in the country’s critical mineral sector. The SOEs play a key role in both supplying the global critical mineral market and making substantial investments in critical mineral sectors in various countries, including both advanced and developing economies. Notably, in 2019, nine Chinese companies ranked among the top 40 global mining companies by market capitalization, with eight of them being SOEs (PwC, 2020). Chinese SOEs are active participants in the mining sector, accounting for around 76% of China’s total investment in mining worldwide from 2005 to 2023 (Figure 1). Furthermore, more than 75% of Chinese acquisitions in the energy and metal sectors of developed countries from 2013 to 2021 were made by SOEs. In addition to SOEs, the Chinese state may exert influence over private firms through financial incentives or data sharing when firms are seen as strategically important, even in the absence of formal state ownership (Milhaupt & Zheng, 2015; Shapiro & Globberman, 2012). These firms are commonly referred to as state-influenced enterprises. The extent of their presence in the extractive sectors is difficult to determine, but their existence suggests an even stronger influence of the Chinese government in the sector.

China’s high degree of control over supply chains of certain critical minerals has been perceived as a threat to US national security. Such concerns are highlighted by the Biden administration in its *100-Day Review*

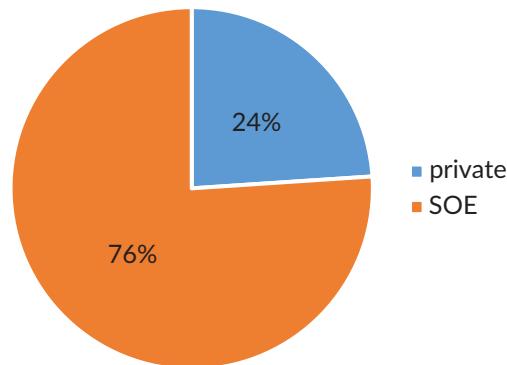


Figure 1. Chinese mining investment abroad private firms vs. SOEs, 2005–2023. Source: American Enterprise Institute (2024).

report, which emphasizes the concentration of critical mineral supplies and processing in a single nation and the dependence on potential adversaries, such as China, as primary risk factors (The White House, 2021a, 2022a). Studies suggest that the US relies on China for over 50% of its critical mineral imports (National Mining Association, 2023). Considering the expanding capabilities of China in critical minerals and the US’ dependency on China in these sectors, the US may seek to prevent being vulnerable to weaponized networks by adopting counterbalancing and de-risking measures, as further discussed below.

4. Applying the Balance of Power Framework to US Policymaking in Critical Minerals

We examine the internal and external geoeconomic balancing strategies of the US to increase its relative power in critical minerals. We develop a two-by-two matrix to characterize these strategies (Table 1). Internal balancing strategies are focused on domestic policies, while external balancing relies on alliance-building to support common strategic objectives. The US can pursue internal balancing through policies designed to strengthen the domestic production of critical minerals or weaken China’s capabilities

Table 1. A balance of power perspective to understand the US’ critical mineral strategies in an age of geopolitical rivalry.

US strategies to improve its power over the rival country (China)	Strategic goals Strengthen the US' and alliance partners' capabilities	Weaken the rival country's (China's) capabilities
Internal balancing: Domestic strategies	Policies in the US to support the development of domestic critical mineral sectors.	Restrictive FDI policies that limit Chinese firms’ investments in critical mineral industries in the US.
External balancing: Alliance-building	Alliance-building to promote trade and FDI in critical minerals between the US and allied countries.	Promote the adoption of restrictive FDI policies by alliance partners to limit Chinese firms’ critical mineral investments in allied countries, similar to those in the US, and coordinate policies with alliance partners on critical minerals.

by restricting its access to critical minerals in the US. The US can also engage in external balancing by either building alliance infrastructure to promote trade and foreign direct investment (FDI) with alliance partners or nudging alliance partners to adopt restrictive policies akin to those in the US, thus weakening China's access to critical minerals in the US allies.

As noted earlier, we assess the US' external balancing strategy by analyzing its collaboration with its FVEY alliance partners. These countries not only share an intelligence infrastructure and common institutions but are also either rich in critical minerals or host some of the world's largest mining companies. These characteristics not only enhance their appeal as important partners for the US in building alternative supply chains but also suggest that they may share US concerns over China's dominance in critical mineral supply chains and be interested in developing competitive mineral sectors themselves. These shared interests may drive them to work with the US to counterbalance China's dominance in this sector. Based on critical mineral production for 2021, Canada, Australia, and the US ranked as the major critical mineral producers among the FVEY countries (Figure 2), with Australia accounting for 48% of global lithium production and Canada for 31% of global potash production (Figure 3). Despite Chinese investment in Australia declining since 2013 and in Canada since 2019, these two countries remain among the top five destinations for Chinese SOE acquisitions in the mining sectors from 2013 to 2023 (American Enterprise Institute, 2024),

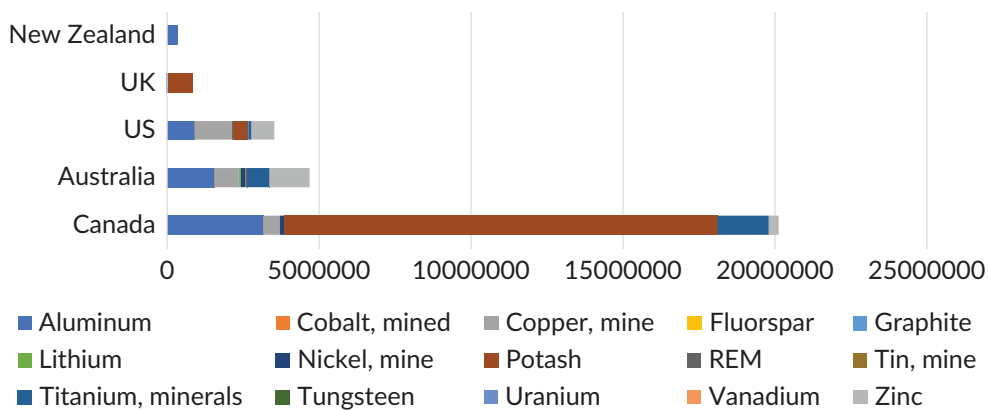


Figure 2. Critical mineral production, 2021. Source: Minerals UK (2024).

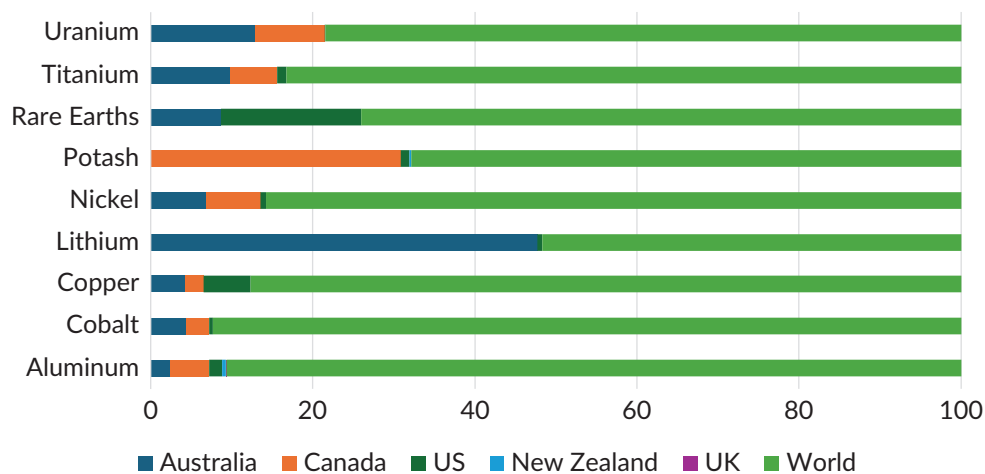


Figure 3. Share of critical mineral production (selected minerals) compared to global production, 2020. Source: Canada Energy Regulator (2023).

suggesting that Australia and Canada may be concerned about national security implications of these acquisitions. The UK, though not itself a resource-based economy, lists some of the largest mining companies in the world (BHP, Rio Tinto, and Glencore) on the London Stock Exchange. Although New Zealand has the potential to develop its critical minerals resources, it will not be discussed in detail in our analysis as it is currently in the process of developing its critical mineral list (New Zealand Government, 2024) and has not yet adopted policy measures to influence investment in the critical minerals sector.

5. Analysis and Findings

Our data includes four sets of relevant critical mineral policies and strategies adopted by the FVEY countries. First, we use the International Energy Agency's Critical Minerals Policy Tracker to identify 31 critical mineral policies, which are identified as "strategic plans" under the agency's policy classifications. Second, we gather relevant trade and investment policies, along with the state's industrial policies on critical minerals, from the New Industrial Policy Observatory dataset (Global Trade Alert, 2024). Third, we gather critical mineral agreements released by the FVEY countries (Table 2). Lastly, we collect ISMs released by the FVEY countries with particular attention to critical mineral passages.

For our analysis, we begin by closely reviewing US documents to understand their declared intent and determine whether their main goal was indeed to de-risk and counterbalance China's dominance, while also identifying specific internal and external balancing strategies adopted by the US in critical minerals. To achieve this, we review passages that contain keywords such as geopolitical concerns, national security, China, SOEs, anti-competitiveness, market intervention, and variations thereof. We use the same approach to review documents from the FVEY allies of the US, identifying their goals and actions, particularly in agreements with the US. We also compare the policies of FVEY countries and their evolution over time to identify any policy alignment in specific domains (such as ISMs). Below, we present evidence for each of the four US strategies classified in Table 1.

5.1. Internal Balancing: Domestic Strategies in the US to Strengthen Domestic Critical Mineral Industry

Under this strategy, the US adopts policies to strengthen the domestic critical mineral sector and reduce its dependence on China. Increasingly concerned about its import reliance on China, the US has updated its Strategic and Critical Mineral Stockpiling Act (The White House, 2021b), developed a set of subsidies to support domestic climate-related industries, including critical minerals, such as the Inflation Reduction Act (The White House, 2022b, 2022c), and is considering other options, such as the Buy American Act, to support the critical minerals industry (The White House, 2022d; US Department of Energy, 2021). The Strategic and Critical Minerals Stockpile Act of 1979 and its updates over time have been important in defining the US approach to critical minerals supply chain security (Bardi et al., 2016; Jordan et al., 1979; Shiquan & Deyi, 2023).

Based on data from the New Industrial Policy Observatory dataset, the US has adopted 43 trade-distorting policies relevant to the critical mineral sector (Global Trade Alert, 2024). Comparing these US trade-distorting policies on critical minerals, including tariffs, tax breaks, financial support, and public procurement policies, with those of other countries indicates that the US alone accounts for over a quarter (27%) of all such measures adopted globally from 2020 to 2023 (Figure 4). The Inflation Reduction Act, for example, can be considered

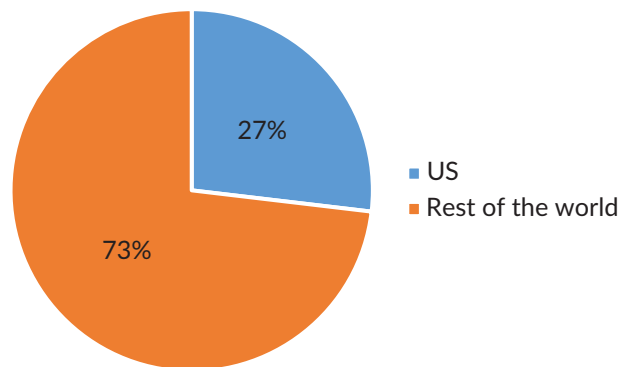


Figure 4. Critical mineral trade distortive measures, January 2020–November 2023. Source: Global Trade Alert (2024).

one of the US' trade-distorting strategies to safeguard its critical mineral supply chain. The US tends to adopt more restrictive trade policies in critical minerals than other countries, with three times as many restrictive policies as the second-largest adopter, India. Additionally, New Industrial Policy Observatory data shows that the US cites national security and geopolitical concerns as primary reasons for its tariff policies on critical minerals. The evidence illustrates the hegemon's desire to attain self-sufficiency given limited domestic critical mineral resources and high dependence on China.

5.2. Internal Balancing: Restrictive Policies to Weaken China's Access to Critical Minerals in the US

Countries may weaken a rival's capabilities by adopting restrictive investment policies to prevent the rival from benefiting from critical mineral exploration and capability development in their territories. These policies, known as ISMs, are designed to preempt investments deemed harmful to national security (Bauerle Danzman & Meunier, 2021) and can impede a rival's access to critical mineral resources and capabilities within their borders. The US adopts a two-pronged approach by designating critical minerals as strategic assets and identifying SOEs and China as entities of special concern, thus subjecting Chinese investments in critical minerals in the US to rigorous investment reviews. Specifically, since the adoption of the Foreign Investment and National Security Act in 2007, the US has closely scrutinized FDI by SOEs and, with the adoption of the Foreign Investment Risk Review Modernization Act in 2018, the US has heightened regulatory oversight over investment from China in strategic sectors (Government of USA, 2007, 2018). As of 2022, under Biden's Executive Order 14083, the scope of the Committee on Foreign Investment in the United States (CFIUS) reviews expanded to include critical minerals (Government of USA, 2022). These restrictive ISMs adopted by the hegemonic power indicate not only a desire to protect domestic sectors but also to restrict a rival country's capacities by limiting its access to critical minerals projects in the US.

5.3. External Balancing: Alliance-Building to Strengthen Critical Mineral Industry in the US and Allied Countries

The US seeks to partner with allies to secure safe access to critical minerals or use alliance networks to mobilize financial resources through trade and investment for the development of domestic critical minerals. US Executive Order 14017 outlines the importance of collaborating with allied and partner countries to secure critical minerals (Executive Office of the President of the US, 2021). To execute this order, the

Department of Energy seeks to partner with the US allies in developing critical mineral supply chains (US Department of Energy, 2021). Notably, the US envisions establishing closer trade and investment linkages with Australia and Canada to diversify its dependence on Chinese-sourced critical minerals (Government of USA, 2021).

The success of the alliance-building strategy of the US, however, depends on whether alliance partners share similar concerns and are willing to work with the US to develop such minilateral alliances. In the case of critical minerals, Australia, Canada, and the UK emphasize their desire to reduce dependence on China as it may undermine their economic and national security (Australian Government, 2022b, 2023; Government of Canada, 2022c; Government of UK, 2022; Government of USA, 2021). Australia and Canada also brand themselves as trusted and reliable suppliers, seeking to partner with allied or “like-minded” partners to develop their domestic resources by inviting allies to invest or sign trade deals (Australian Government, 2022b; Government of Canada, 2022c).

We find evidence in Table 2 that the US has established close collaborations with Australia and Canada to enhance the security of the critical mineral supply chain by promoting two-way trade and investment. Through these agreements, the US is championing collaboration with allies to uphold trade laws to “address adverse impacts of market-distorting foreign trade conduct” (Government of USA, 2021). By promoting two-way investment and trade, the allies seek to develop a critical mineral supply chain outside of countries that may use market distortion, such as export controls, therefore safeguarding the US’ access to minerals essential for its economy.

We also find evidence in Table 2 that the US supports bilateral and multilateral collaboration on standard setting, including ESG standards, based on international agreements with its allies. The US, as a hegemon, has historically used trade policies to shield its domestic industries and support other countries to maintain its global dominance (Hopewell, 2021; Kim, 2018). However, these trade frameworks have the potential to differentiate private firms from SOEs, as some SOEs are perceived to have subpar ESG practices. Recognizing the importance of standard-setting, the US Department of Energy has taken a “leadership role in supporting establishing industrial standards” on critical minerals in “coordination with international allies” (US Department of Energy, 2021). Relatedly, the Canadian critical mineral strategy envisions “regulatory harmonization” with the partner countries (Government of Canada, 2022c). Similarly, Australia’s critical mineral strategy emphasizes the importance of ensuring consistency in regulations and standards (Australian Government, 2022b). By creating a parallel supply chain infrastructure united by common standards, the US and its allies may be able to counterbalance the dominant position held by Chinese SOEs in the critical mineral sector.

While the US and the UK have not formalized a partnership to bolster critical mineral supplies, the UK acknowledges that “[c]oncentrated control of resources creates a risk of economic statecraft” (Government of UK, 2022) and that China may “weaponize” supply chains, reflecting on the 2010 incident when China reduced the export quota on rare earth elements causing prices to increase rapidly, to extract political leverage over them (Government of UK, 2022; UK House of Commons, 2023). In alignment with the US, the UK has established collaborations with Australia and Canada to seek investment opportunities in those countries and diversify their dependence on Chinese-sourced critical minerals (Government of UK, 2022). Thus, the US and the UK share common objectives of reducing reliance on China and mutual interests in

working with alliance partners to strengthen their own or allies' critical resource capabilities.

Table 2. Agreements between the US and its FVEY partners related to critical minerals. Source: International Energy Agency (2024).

Year initiated	US partner	Document name	Focus	Agreement type
2022	Australia	Australia–United States Net-Zero Technology Acceleration Partnership	Supply chain cooperation in critical minerals; diversify sources of critical minerals with a focus on production, processing, and manufacturing capacity.	Partnership promoting trade, investment, and commercial linkages on net-zero technology acceleration.
2023	Australia	Australia–United States Climate, Critical Minerals and Clean Energy Transformation Compact	Establish the Australia–United States Taskforce on Critical Minerals; diversify supply chains; secure, stable, sustainable, responsive, and responsible global access to critical minerals; “development of a shared energy industrial base” for critical minerals; information-sharing; identify risks and market distortions; collaboration on critical minerals through Quad.	Framework to enhance bilateral cooperation on climate and clean energy, including cooperation on investment and standard setting.
2020	Canada	Canada–US Joint Action Plan on Critical Minerals Collaboration	Improving critical mineral supply security by increasing two-way investment, information sharing, joint initiatives, and collaboration in multilateral fora.	Collaboration; Joint Action Plan focusing on investment and initiatives at the bilateral and multilateral levels.

5.4. External Balancing: Alliance-Building to Weaken China's Capabilities in Critical Minerals

External balancing to weaken a rival's power in critical mineral supply chains involves coordinated actions among alliance partners to weaken a rival country's capability to access the critical mineral sector. The Foreign Investment Risk Review Modernization Act of 2018 mandates the CFIUS to establish a formal process for sharing information with allies regarding specific technologies and disseminating best practices. This Act also urges the US president to engage in international outreach to allies to promote processes like CFIUS (Government of USA, 2018). Thus, since 2018, the US has intensified efforts to encourage its allies to adopt ISMs similar to those in the US and provided incentives, such as CFIUS review exceptions for certain investments from these allies (Li et al., 2024). In the areas of critical technologies, infrastructure, and data,

research demonstrates a substantial degree of policy convergence between the US and its FVEY allies, as these allies have either introduced or strengthened their national security reviews on FDI in these sectors in their countries since 2020. In 2022 and 2023, the US granted the FVEY partners exception status under CFIUS, underscoring the alignment of their ISMs with those of the US (Li et al., 2024).

Critical minerals policies have become an area where national security concerns over inbound FDI in the US and its allied countries are increasingly converging, and coordination in monitoring FDI patterns is increasing. The US continues to encourage allies to update their ISMs following the US model, including in the areas of critical supply chains (Government of USA, 2022). Australia's Treasurer noted willingness to collaborate with "key international partners" when monitoring FDI patterns in critical minerals (Watkins & Nowotny-Walsh, 2022). We also find that Canada and Australia adopted stringent ISMs on FDI in critical minerals, similar to those of the US. Canada has not only classified critical minerals as sensitive industries vital to national security but also restricted SOE investment in this sector. Since the release of Canada's 2022 guidance on SOE investment in critical minerals, SOEs are allowed to invest in Canadian critical minerals only on an "exceptional basis," which acts as a strong signal discouraging foreign SOE investment in Canada's critical minerals (Government of Canada, 2022a, 2022b). Furthermore, the Canadian guidance also applies to private firms influenced by the government from unfriendly countries, suggesting heightened regulatory scrutiny over FDI from both SOEs and state-influenced enterprises in Canadian critical minerals (Government of Canada, 2022b).

Australia also places limits on investment by foreign SOEs by requiring all SOEs to notify the government about making their investment as of 2019 (Australian Government, 2019), and, in 2022, has explicitly noted that any FDI in critical minerals is a reviewable national security action (Australian Government, 2022a). Australia's Treasurer noted that Australia will be "more assertive" when assessing FDI in critical minerals and determining if it is in the national interest of Australia to proceed with the investment (Watkins & Nowotny-Walsh, 2022).

The UK has not placed formal restrictions specific to foreign SOE investments or FDI in critical minerals. However, the UK passed the National Security and Investment Act in 2022, and, in 2023, it issued guidance on notifying the government about FDI in 17 sensitive areas. This includes advanced materials encompassing critical minerals (Government of UK, 2024). Moreover, the UK notes that China's use of state intervention and subsidies to expand domestic production and acquire assets abroad with the help of SOEs is jeopardizing the supply security of critical minerals (Government of UK, 2023). Thus, the National Security and Investment Act can increase regulatory scrutiny over FDI in critical minerals, particularly by Chinese SOEs.

6. Conclusion

Our study uses the balance of power theory to understand different geoeconomic policies that the US employs to de-risk and counterbalance a rising rival state (China) in the context of critical minerals. Specifically, we examine the US' development of domestic policies and external alliances to improve domestic and allied capabilities or weaken the rival's capabilities in critical minerals. By analyzing critical mineral strategies and FDI policies, we find that, domestically, the US has implemented industry policies to boost domestic critical mineral production and restrictive FDI policies that increase regulatory scrutiny over foreign investments in critical minerals, particularly by Chinese SOEs. Externally, the US has established

partnerships with Australia and Canada for critical mineral security and diversification. This highlights how geopolitical competition drives the US to collaborate with like-minded partners to reconfigure supply chains.

Our study also reveals that Canada, Australia, and the UK share US concerns on critical mineral dependence on China and have ISMs that could be used to review investments by Chinese enterprises, especially by SOEs, in critical mineral sectors. Notably, Canada has taken a stringent approach by explicitly restricting FDI by SOEs and requesting three Chinese SOEs to divest from critical mineral projects. These results suggest that a country's concerns regarding dependence on China's critical mineral companies and its aspirations to develop a competitive critical mineral industry can affect its security and strategic considerations, which, in turn, facilitates policy convergence with the US.

Our analysis contributes to the discussion of de-risking in supply chains and alliance-building in the increasingly realism-laden world order driven by the US–China rivalry. Our study focuses on the role of the FVEY alliance partners when examining the US' external balancing strategies in countering China's dominance in critical minerals. Future research could expand upon this by exploring the involvement of other US allies, such as the EU and Japan, to examine the extent of partnerships and whether these countries adopt similar ISMs as those in the US. Future studies should also examine if New Zealand follows the lead of the US in securitizing the critical mineral sector. Additionally, while ISMs in our study are about regulating inbound FDI, future studies could explore additional policy tools that the US might utilize, such as regulatory measures enabling the US to regulate firm behavior overseas through extraterritorial control. Evidence suggests that the US has disciplined non-US companies investing abroad (Crippa, 2021), as seen in the intervention in China's proposed acquisition of Axitron in Germany ("China criticizes U.S.," 2016). Future research could explore the feasibility of using extraterritoriality to regulate international investment activities of non-US firms, particularly those headquartered or operating in the US.

Furthermore, it is worth investigating the effectiveness of the US' domestic and international strategies in diversifying the control of production and processing away from China. There is potential to develop and process new resources in FVEY countries, especially in Canada and Australia, for certain minerals such as cobalt and lithium. As of 2022, Canada accounted for 4% of global cobalt production, and Australia accounted for 47% of the global lithium extraction and 9% of rare earth elements (International Energy Agency, 2023). From 2023 to 2030, Australia is projected to account for 11% of global planned refining projects for lithium, and Canada and Australia together are expected to represent 57% of planned refining projects for cobalt (International Energy Agency, 2023).

These possibilities are promoted under the current critical mineral strategies, but it is too early to gauge their success. Building an alternative supply chain is particularly challenging, given that mining is a cyclical industry highly sensitive to price fluctuations related to demand and supply (Kiladze, 2024). Moreover, the extraction and production of certain critical minerals (e.g., cobalt, nickel) are primarily in developing economies in Africa, Latin America, and Southeast Asia (e.g., the Democratic Republic of Congo, Chile, and Indonesia; International Energy Agency, 2023), many of which seek to preserve their ability to balance the influence of external powers to maintain some degree of policy discretion. In these countries, Chinese firms may have advantages in investing, given their extensive knowledge and experience in conducting business in developing countries, as well as the potential government support through the Belt and Road Initiative (Kalantzakos, 2020). Future research should consider these complexities when measuring the impact of

critical mineral strategies and ISMs on the effectiveness of developing an alternative FVEY-led supply chain for critical minerals.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

Data of the American Enterprise Institute is available here: <https://www.aei.org/china-global-investment-tracker>

Data of the Global Trade Alert is available here: https://www.globaltradealert.org/data_extraction

Data of the International Energy Agency regarding the Critical Minerals Policy Tracker is available here: <https://www.iea.org/policies/?country%5b0%5d=United%20States&type%5b0%5d=International%20collaboration&type%5b1%5d=Minerals%20security%20mechanism&topic%5b0%5d=Critical%20Minerals>

Data regarding the critical minerals production can be checked at the World Mineral Statistics Data: <https://www2.bgs.ac.uk/mineralsuk/statistics/wms.cfc?method=searchWMS>

Data regarding the critical mineral production shares by countries is available on the Canada Energy Regulator website: <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2023/market-snapshot-critical-minerals-key-global-energy-transition.html>

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