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ECONOMY

OPPORTUNITIES FOR LATIN AMERICA'S MINING SECTOR AMID THE GREEN REVOLUTION'S GEOPOLITICAL STRUGGLE

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Index

1.

INTRODUCTION

Latin America has played a pivotal role in global mineral extraction, consistently serving as a primary supplier of raw materials to industrialized nations. The Spanish arrived in 1492 in territories later called America. Although these initial 'discovery' missions were aimed at finding shorter trade routes to Asia, the large reservoirs of silver and gold they encountered soon diverted their attention. The extraction of wealth from these lands became the primary objective of the Spanish presence, focusing on exploiting all available resources (Acemoglu & Robinson, 2012). By the 16th century, silver and gold mining had firmly anchored Latin America's integration into the global economy. Countries like Bolivia, Mexico, and Peru emerged as key players in the silver trade, while Brazil became renowned for its gold mines. The discovery of vast copper, iron, and tin reserves in the 19th and 20th centuries further solidified the region's role as a major exporter of raw minerals. This expansion, driven largely by foreign investment—particularly from Europe and the United States—left multinational corporations in control of much of the extraction and export processes.

This long-standing dependence on resource extraction created a pattern of economic vulnerability, where exports were prioritized over domestic industrialization, leaving the region exposed to external market fluctuations and exploitation (Furtado, 1971; Dos Santos, 1972; Cardoso & Faletto, 1979; Prebisch, 1950; Sachs & Warner, 1995; Auty, R. M; Burchardt & Dietz, 2014; McKay, 2017). Primary-commodity dependence has been a defining feature of Latin America's political economy since its integration into the global market. In the case of South America, the situation is particularly acute given that it "possesses some of the largest mineral deposits in the planet" (Altomonte et al., 2013: 7). Scholars have extensively analyzed this phenomenon under the concept of *extractivism*[1], defined as "a development model based on the extraction and appropriation of nature, which feeds a scarcely diversified productive network and is highly dependent on an international insertion as suppliers of raw materials" (Gudynas, 2009: 188).

This dependency has stifled economic diversification, leaving the region with a relatively small and inefficient industrial base. As a result, many Latin American industries are characterized by low technological intensity, limiting their ability to compete in high-tech sectors on the global stage. This stands in stark contrast to regions like East Asia, where strategic industrial policies and substantial investments in research and development have facilitated a transition to more diversified and technologically advanced economies (Rodrik, 2006; Cimoli et al., 2006). Despite various attempts at industrialization and economic reform, structural constraints and limited access to advanced technology continue to hinder Latin America's potential for sustainable and inclusive growth.

However, the increasing global demand for minerals—driven by the transition to renewable energy sources—presents a significant opportunity for Latin America to attract foreign investment and elevate its position in the global economy. The region remains a critical source of minerals like copper, lithium, and nickel, which are indispensable for modern industries. The key challenge now is not only to continue producing and exporting these traditional minerals, which have been the backbone of Latin America's export economy for centuries, but also to develop new minerals that have surged in demand due to the energy transition.

Specifically, the global shift towards renewable energy and low-carbon technologies offers substantial opportunities for developing economies to enhance their participation in global value chains (GVCs) (Dollar, 2017; González, Jaramillo, & Montenegro, 2024; Carr-Wilson, Pattanayak & Weinthal, 2024). As demand grows for minerals critical to renewable energy infrastructure and technologies—such as lithium, cobalt, and copper—Latin America is well-positioned to play an increasingly significant role in GVCs by exporting these materials for use in electric vehicles, solar panels, and batteries. Still, to fully capitalize on these opportunities, Latin American countries must go beyond merely exporting raw materials and engage in higher-value activities within the supply chain, such as processing and manufacturing. Strategic policy frameworks, international partnerships,

1 Following experts such as Maristella Svampa (2013, 2019), Alberto Acosta (2018), and Eduardo Gudynas (2009, 2011, 2012), three key characteristics are common to most countries that adopt this model: (1) large-scale exploitation of natural resources, (2) an export-oriented economy, and (3) low levels of processing, resulting in products with low added value.

and investments in industrial upgrading are essential to prevent the pitfalls of resource dependency while fostering sustainable economic growth. For example, Africa's potential to supply cobalt for electric vehicle batteries, alongside China's substantial investment in the region, illustrates how global power dynamics can create both opportunities and challenges for developing economies aiming to integrate into GVCs (Altenburg et al., 2016).

Given these considerations, this paper seeks to explore the opportunities for Latin America's mining sector amid rising global demand for minerals driven by the transition to renewable energy. This analysis is based on trade data from UN Comtrade, as reported by the World Integrated Trade Solutions platform of the World Bank. The paper is divided into two parts. The first part seeks to understand Latin America and the Caribbean's (LAC) position in global trade of minerals and other materials, which are highly important for the energy transition. It aims to identify the region's strengths—particularly its dominant export products. The second part focuses on the geopolitical competition for raw materials, a competition expected to intensify as demand for minerals linked to the energy transition continues to grow. This section will be divided into two parts. First it analyzes the imports of the U.S., the European Union, and China to understand their true dependence on raw materials. Second, based on this analysis, it examines the current purchases from LAC by each of these powers to reveal their vulnerabilities in sourcing these commodities.

For a comprehensive analysis, this assessment will focus on three chapters of the Harmonized System[2]: Chapters 25, 26, and 28, which include different types of mineral and chemical products essential for global trade. Chapter 26 covers "Ores, Slag, and Ash," including raw mineral materials like iron ore, copper ore, and other metal concentrates, as well as residues from smelting and refining processes. These materials are critical for metal production and are fundamental to industries like steel manufacturing and metallurgy. Chapter 25, "Salt; Sulfur; Earths and Stone; Plastering Materials, Lime, and Cement," includes non-metallic minerals used in construction, agriculture, and various industrial processes. This includes materials like natural sands, chalk, and gypsum, which are essential for infrastructure and agricultural applications. Chapter 28 addresses "Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals, of Rare-Earth Metals, of Radioactive Elements, or of Isotopes," and includes a wide range of chemical substances used in industrial processes, from basic chemicals like sulfuric acid to more specialized compounds such as rare earth elements. These chemicals play a crucial role in the production of fertilizers, electronics, and renewable energy technologies, underscoring their strategic importance within the broader context of the global energy transition and technological advancements.
Regarding data, unless otherwise specified, all graphs and tables are created by the author using information from UN Comtrade.

2 The Harmonized System (HS) is a globally recognized system for classifying traded goods using a standardized naming and numbering approach. Developed and maintained by the World Customs Organization (WCO), the system categorizes products with a six-digit code that is consistent across all countries. At the 2-digit level, it organizes goods into 99 chapters, each representing a specific product category: live animals and animal products (Chapters 1-5), vegetable products (Chapters 6-15), foodstuffs (Chapters 16-24), minerals (Chapters 25-26), fuels (Chapter 27), chemicals (Chapters 28-38), plastics and rubber (Chapters 39-40), hides and skins (Chapters 41-43), wood (Chapters 44-49), textiles and clothing (Chapters 50-63), footwear (Chapters 64-67), stone and glass (Chapters 68-71), metals (Chapters 72-83), machinery and electronic equipment (Chapters 84-85), transport equipment (Chapters 86-89), and miscellaneous (Chapters 90-99).

2.

LAC'S STRENGTHS IN MINERAL EXPORTS

Given Latin America's rich mining history, the region plays a crucial role in the global mineral supply chain, particularly in minerals vital for the energy transition. This section aims to describe the region's position relative to other competing regions, detailing specific products where LAC holds a significant advantage.

Chapter 26: Ores, Slag, and Ash

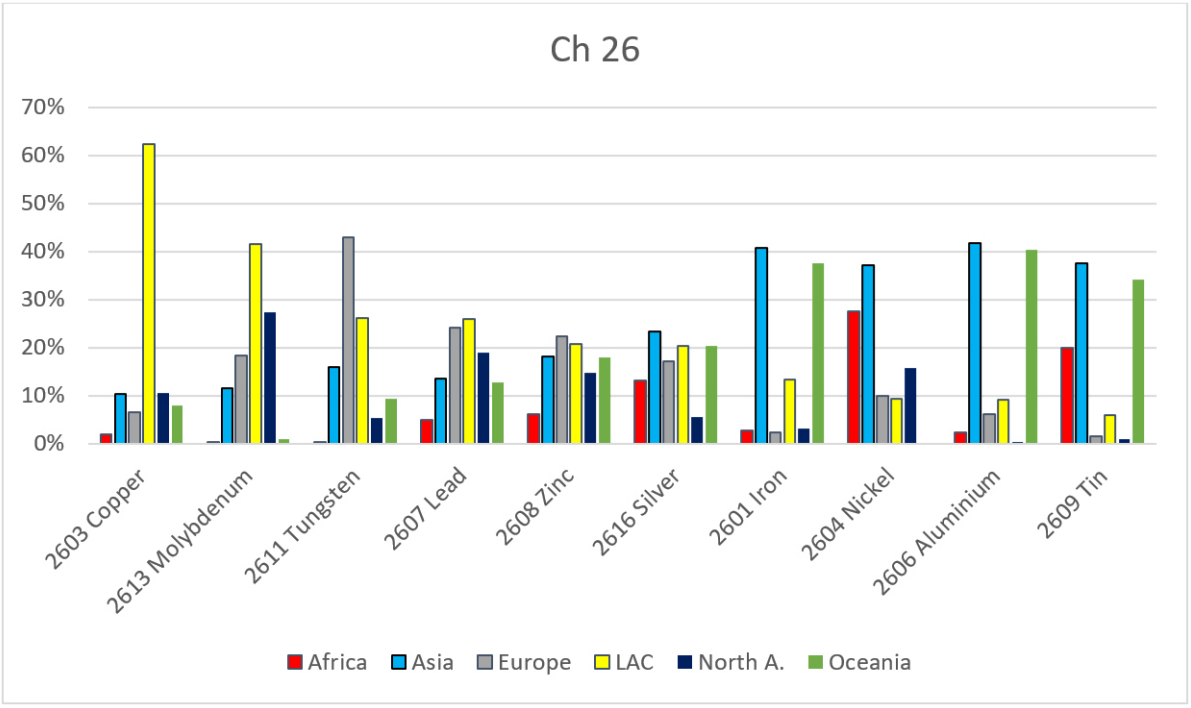
The first part of this analysis covers raw mineral substances and their residues from smelting or refining metals, all of which are grouped under Chapter 26 of the Harmonized System[3]. Figure 1 demonstrates that LAC is a global leader in copper production (HS 2603). Specifically, as Figure 2 illustrates, two countries alone contribute more than 50% of the total copper exports. Copper is crucial for the energy transition due to its exceptional electrical conductivity, making it indispensable in renewable energy systems like wind turbines, solar panels, and electric vehicles (Gielen, 2021). Its durability and capacity for efficient energy transmission are vital for the expansion of sustainable infrastructure and the electrification of transportation, both essential in reducing carbon emissions (Elshkaki et al., 2016). In addition, molybdenum (HS 2613) is another key metal with high importance for the energy transition. Known for its strength, resistance to corrosion, and ability to withstand extreme temperatures, molybdenum is essential for various renewable energy technologies. It is particularly valuable in steel alloys and catalysts, which enhance the efficiency of hydrogen production, a crucial element in green energy solutions (Wang et al., 2023). Chile and Peru together account for 40% of global molybdenum exports (Figure 2).

LAC also holds moderate strength in the production of four other minerals: tungsten (25%), lead (24%), zinc (21%), and silver (20%). Tungsten (HS 2611) is crucial for energy transition technologies due to its high melting point and strength, making it ideal for use in electrical contacts and turbines. Lead (HS 2607) plays a vital role in energy storage, especially in lead-acid batteries, which are widely used in renewable energy systems (Gielen, 2021). Zinc (HS 2608) is essential for galvanizing steel and is increasingly employed in energy storage applications, such as zinc-air batteries. Meanwhile, silver's exceptional electrical conductivity makes it indispensable for photovoltaic cells used in solar energy production (Gallo et al., 2016).

As shown in Figure 1, besides copper, LAC faces stiff competition in several areas, particularly from regions such as Asia, Europe, North America, and sometimes Oceania. For molybdenum, North America and China present strong competition due to their advanced mining technologies and resource abundance. China also leads in tungsten, benefiting from vast reserves and a well-established refining industry. While Mexico is a dominant player in silver production (HS 2616), it faces competition from Asia and Europe, which have advanced mining and processing capabilities. The production of zinc, lead, and nickel (HS 2604) is dominated by North America and Asia, where advanced industrial infrastructure and technological capacity allow for maximized output. Australia, with its rich bauxite deposits, has a competitive edge in aluminum (HS 2606) production, while Southeast Asia, particularly Indonesia and Malaysia, leads in tin production due to abundant reserves and large-scale production capacity. These regions often benefit from superior technology, economies of scale, and a more stable investment climate, which pose significant challenges to LAC's competitive position in the global market.

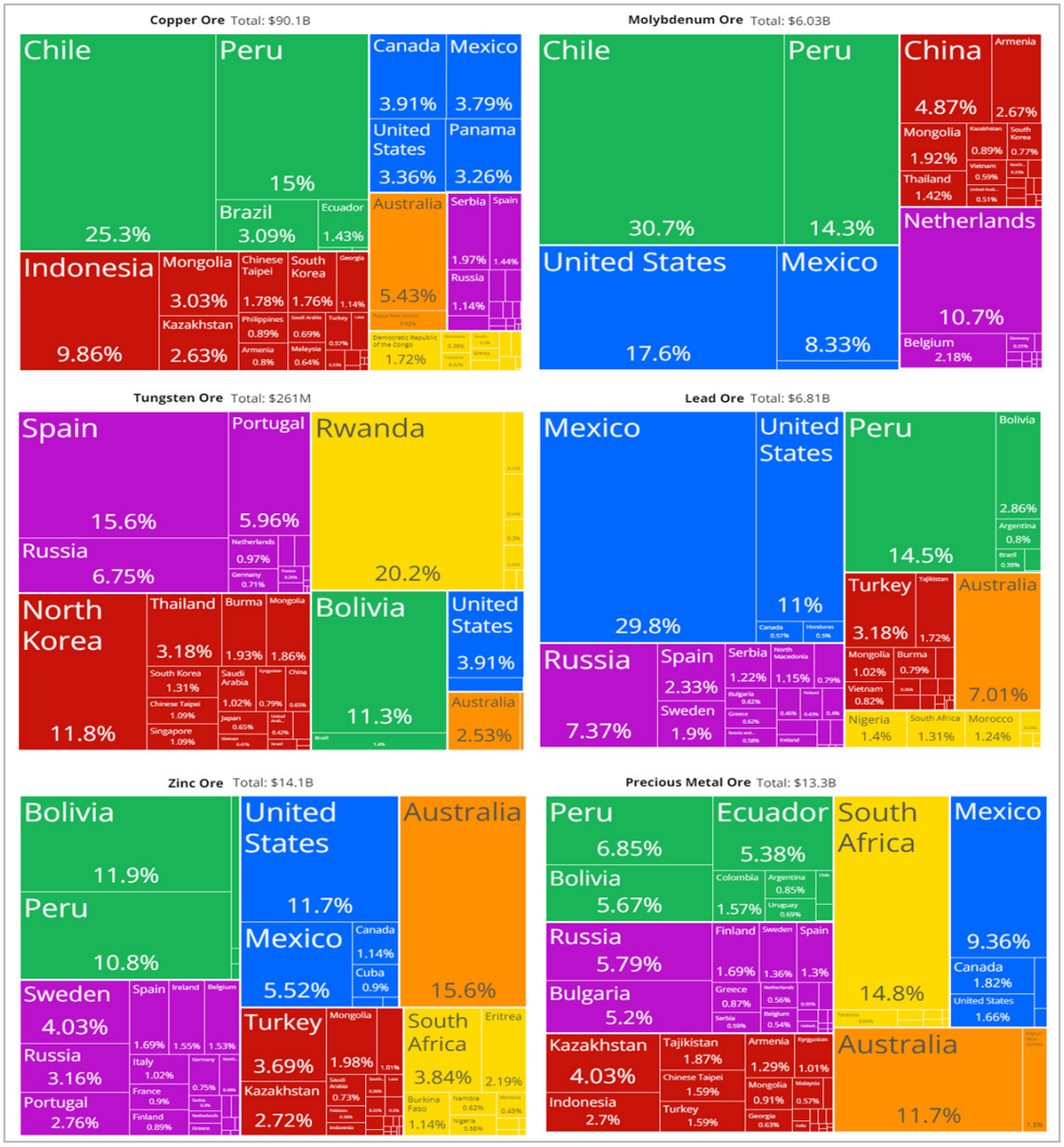
3 Throughout this chapter, any reference to minerals under Chapter 26 specifically pertains to ores and concentrates.

Figure 1.
Most important LAC mineral exports (Chapter 26 HS), with competing regions, in percentage, averaged from 2019 to 2023.



Bolivia is a significant player in the global export of minerals classified under Chapter 26 HS, particularly due to its rich deposits of tin, silver, and zinc (Espinoza, 2010). As the following table shows, Bolivia ranks among the world's leading tin producers, with extraction centered in the Huanuni and Colquiri mines, both managed by the state-owned mining company COMIBOL, and exported through other state entities like EM Vinto, a smelting company (Cordoba, 2022). In addition to tin, Bolivia is also one of the top global producers of silver, with significant operations managed by multinational firms such as Sumitomo Corporation, which operates the San Cristóbal mine, one of the largest silver-zinc-lead deposits worldwide. Bolivia's main competitors in the global market include countries like Peru and China for zinc and silver, and Indonesia and Malaysia for tin. Major importers of Bolivian minerals include China, which is the largest buyer of tin, and South Korea, which is a significant buyer of silver and zinc concentrates.

Figure 2.
Exports of selected minerals, Chapter 26 HS, 2022, per value, in percentage



Source: Observatory of Economic Complexity (www.oec.world)

Chapter 25: Salt, Sulfur, Earths and Stone; Plastering, Lime, and Cement

In contrast to its strong position in metallic minerals and metals under Chapter 26 HS, LAC holds a relatively modest position in the global export market for non-metallic minerals categorized under Chapter 25 HS. Figure 3 shows two products in which LAC exhibits particular strength: 1) Asbestos (HS 2524), primarily from Brazil, which is significant for construction and industrial uses. 2) Natural Borates (HS 2528), with major reserves in Bolivia, Argentina, and Chile, which are essential for applications in glass, ceramics, and detergents, providing LAC with a competitive edge in these specialized markets.

Additionally, as Figure 3 illustrates, there are other key products such as feldspar (HS 2529), kaolin (HS 2507), quartz (HS 2506), and magnesium carbonate (HS 2519), whose exports from LAC remain lower, barely reaching 10%. These minerals face strong competition from Europe and Asia, regions that dominate the global market. Europe's advanced industrial infrastructure and Asia's cost-effective labor and production processes allow these regions to maintain a competitive edge over Latin America. The disparity between LAC's abundant natural resources and its lower levels of industrialization contributes to its relative weaknesses in producing and exporting processed non-metallic minerals.

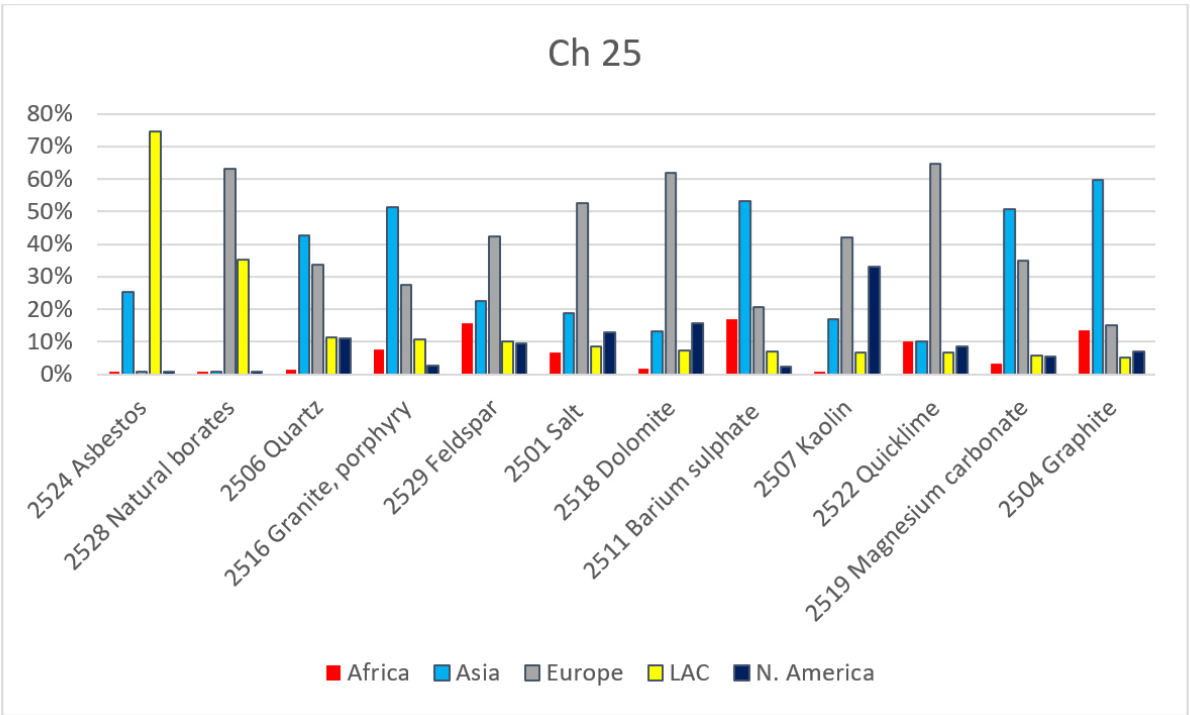
Moreover, LAC's dependence on raw material extraction, without significant downstream industrial development, limits its role in higher-value segments of the global market (Ciccantell & Patten, 2016). Multinational corporations operating in the region tend to focus on extracting and exporting raw materials, which are then processed elsewhere, particularly in more industrialized regions such as Europe and Asia. These corporations often capitalize on LAC's natural resource wealth, while profits and technological advancements are transferred back to their home countries. For example, European firms dominate the export of feldspar and kaolin due to their superior technological infrastructure, whereas LAC countries remain primarily extractors rather than producers of processed minerals. This dynamic underscore the need for LAC to invest in industrial capacity if the region aims to move up the value chain in non-metallic mineral exports.

owned COMIBOL, alongside private enterprises like Quiborax and KAZ Minerals, play a key role in extracting and exporting these minerals. For Salt (HS 2501), Bolivia is emerging as a significant player thanks to its large reserves in the Uyuni Salt Flat, although it still faces competition from Mexico and Chile, both of which have more established infrastructure and access to international markets.

Chapter 28: Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals, Rare-Earth Metals, Radioactive Elements, or Isotopes

Finally, Latin America holds a diverse yet mixed position in the global market for chemicals and inorganic compounds under Chapter 28 HS. As shown in Figure 4, LAC has relatively few exports in this category compared to other regions, largely due to the region's limited capital and technological

Figure 3.
Most important LAC exports of salt, sulfur, stones, plastering materials, lime, and cement (Chapter 25 HS), with competing regions, in percentage, averaged from 2019 to 2023.



Bolivia's role in non-metallic minerals under Chapter 25 HS is somewhat limited, but the nation holds a strong position in natural borates due to its substantial reserves and geographical advantage. Bolivia is one of the leading global exporters borates, primarily sourced from the Uyuni and Pastos Grandes salt flats, which are also rich in lithium (Chong, Pueyo & Demergasso, 2000). Bolivia competes with Argentina and Chile in the borate market, both of which are major producers in the so-called *Lithium Triangle* (Fornillo & Gamba, 2019). Bolivia's borates are mainly exported to countries such as the United States and Brazil, where they are used in glass manufacturing, ceramics, and detergents. State-

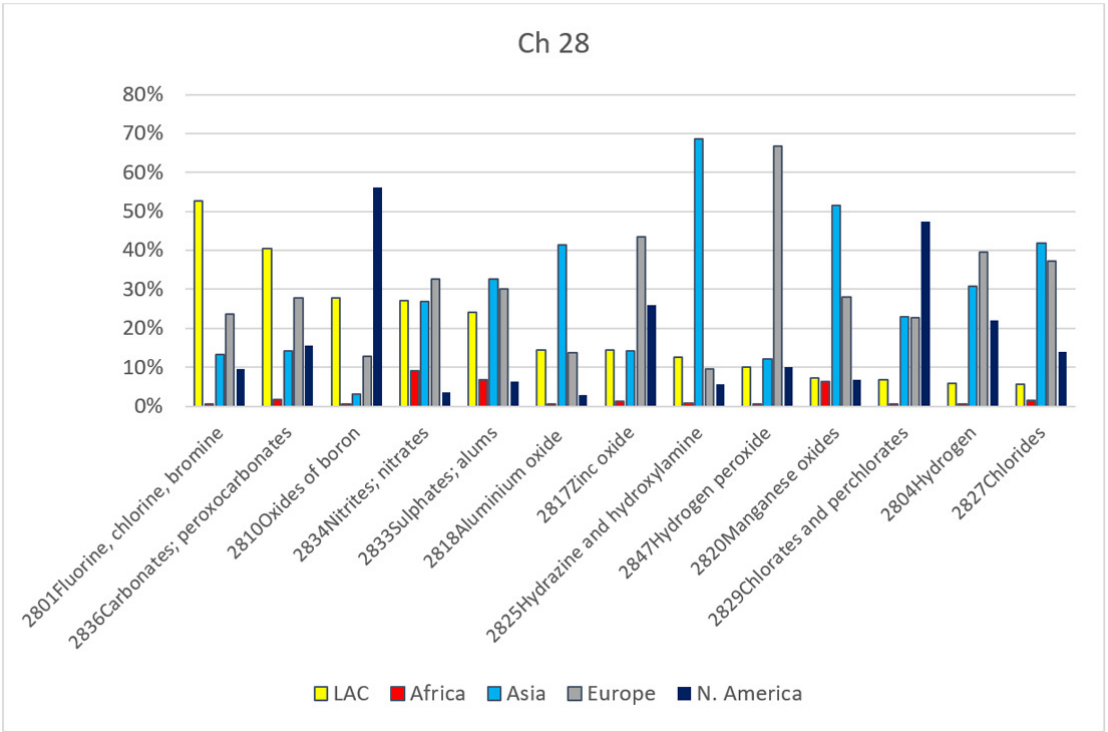
capabilities0 (Calzada Olvera, 2022). These products often require advanced chemical processing, high technological expertise, and significant capital investment to produce high-value-added chemicals such as rare earth compounds, sophisticated chemical precursors, and specialized industrial gases (Masera, 2022). Regions like North America, Europe, and East Asia, with their strong industrial bases, well-established research and development infrastructure, and high levels of technological innovation, are better equipped to compete in this market (Gaspari & Cirne de Toledo, 2021). Latin American economies, as discussed throughout the book, have traditionally focused more on extracting and exporting raw materials and primary commodities.

Based on this, Figure 4 highlights LAC's competitive strengths compared to other regions such as Africa, Asia, Europe, and North America. It is important to note that, out of 50 products listed under Chapter 28, the region has significant exports in only 13 of them. These significant exports are defined as products that account for at least 5% of the global total. Specifically, LAC demonstrates a strong presence in the export of certain products like fluorine, chlorine, and bromine (HS 2801), as well as carbonates (HS 2836), where its export share is relatively high. This strong performance is largely driven by countries such as Mexico and Chile, which possess significant reserves of these minerals. For example, Mexico is a leading exporter of fluorine compounds due to its abundant natural reserves of fluorite, a key raw material for these products. Meanwhile, Chile plays a prominent role in exporting lithium carbonates, critical for producing lithium-ion batteries used in electric vehicles and energy storage systems.

In comparison to other regions, LAC's competitive advantage in these products is bolstered by its rich mineral endowments and established mining infrastructure. For instance, the graph indicates that while Africa and Asia have diverse export profiles, they do not dominate specific products as LAC does with carbonates and certain halogens. Additionally, the export of manganese oxides (HS 2820) and nitrates/nitrites (HS 2834) is notable in Latin America, with Bolivia emerging as a key player in the production of these chemicals. Bolivia's substantial natural reserves of borates, coupled with its growing capacity for lithium production, are essential for its export strength in these categories. This regional specialization in high-demand products places LAC in a strategically advantageous position, especially as global demand for these inputs rises due to their critical role in green technologies and the global energy transition.

Bolivia's strengths in the export of minerals under Chapter 28 HS are primarily centered on its abundant natural resources and its emerging production capabilities in chemicals such as boron and lithium derivatives. As discussed in other chapters, Bolivia holds significant reserves of lithium, particularly in the Salar de Uyuni, positioning the country as a key future player in lithium carbonate production, essential for manufacturing batteries used in electric vehicles and energy storage systems. However, compared to its main competitors like Chile and Argentina, which have more advanced extraction and processing technologies, Bolivia's contribution to global exports remains limited. Specifically, as will be deepened in the specific chapter about this mineral, while Bolivia possesses some of the world's largest lithium reserves in its salt flats, no large-scale production projects are currently in operation.

Figure 4.
Most important LAC exports of Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals, of Rare-earth Metals, of Radioactive Elements, or Isotopes, (Chapter 28 HS) with competing regions, in percentage, averaged from 2019 to 2023.



3.

THE GEOPOLITICAL STRUGGLE FOR LAC

3.1 Mineral Imports by the Competing World Powers

As explained in Chapter 1, the geopolitical struggle between China and the West has amplified the strategic importance of raw materials from the Global South. The steady and reliable supply of critical minerals is essential for industrial nations to enhance efficiency in industry and advance technological developments, as these resources are integral to the production of not only heavy industry but also advanced electronics and high-performance machinery. Moreover, the energy transition has further intensified this demand, as several minerals face surging demand due to their critical role in the energy transition, as elaborated in several chapters.. In addition, China has emerged as the world's largest manufacturer, with a significant advantage in renewable energy production, accompanied by an aggressive policy to secure natural resources from the Global South since the early 21st century.

Chapter 26

As Figure 5 illustrates, China overwhelmingly dominates global imports of most minerals under Chapter 26 HS. This Figure shows the mineral import patterns of three major industrial powers—China, the EU, and the US—highlighting their varying degrees of dependency on specific minerals. China leads imports for nearly all the minerals displayed, accounting for over 80% of global imports in materials such as chromium, aluminum, manganese, nickel, and cobalt.

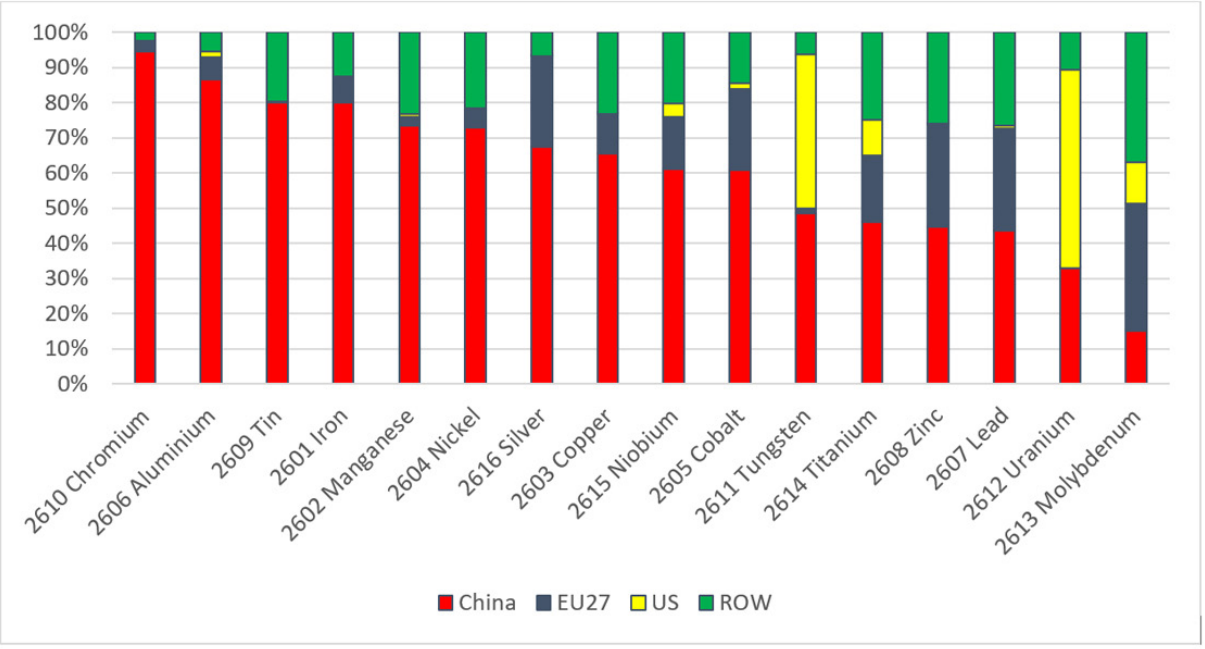
In contrast, the EU27 and the US have comparatively smaller shares of global mineral imports, with the EU showing moderate import levels for specific minerals like copper, cobalt (HS 2605), and uranium. Although the green revolution, as discussed earlier, has brought about a series of policies by the EU and the US aimed at strengthening their manufacturing capabilities, particularly in renewable energy technologies, these powers face significant challenges in securing stable supplies of raw materials from the Global South. Critical minerals, essential for producing batteries, wind turbines, and solar panels, underscore the vulnerability of these economies in achieving their green energy goals without reliable access to these resources. Figure 5 shows that while the US has a lesser dependence on mineral imports, the EU relies heavily on them but has a weaker position compared to China, which dominates imports, acquiring nearly 90% in some cases. shows that while the US has a lesser dependence on mineral imports, the EU relies heavily on them but has a weaker position compared to China, which dominates imports, acquiring nearly. The US demonstrates significant reliance only in areas such as titanium and uranium, with a lesser role in other mineral imports.

This disparity highlights China's dominant position in securing raw materials essential for advanced manufacturing and energy technologies, both of which are critical for the ongoing energy transition. The shift away from fossil fuels demands vast quantities of these minerals to support renewable energy infrastructure, positioning China at a strategic advantage. Meanwhile, the EU and the US must address their supply chain vulnerabilities to remain competitive in the global energy transition race.

Regarding regional reliance, each power depends on different regions for their mineral imports, reflecting both geographic proximity and strategic partnerships[4]. China sources most of its minerals from Africa (35%) and Asia (34%), followed by Latin America and the Caribbean (LAC) at 18%, reflecting its strong influence in developing regions. The EU, on the other hand, relies heavily on Europe for 37% of its imports, followed by Africa (24%) and LAC (19%), showing a more regionalized approach to securing raw materials. The US, with a more diversified sourcing strategy, imports the majority of its minerals from LAC (27%), with significant portions from North America, Europe, and Africa (18% each), and a smaller share from Asia (14%). These dependencies highlight the different strategies each power uses to meet the mineral demands of the energy transition, balancing efficiency, geopolitical alliances, and supply chain security.

4 The complete data can be found in Annex 2.

Figure 5.
World mineral imports (Chapter 26 HS), sorted by China, 2023, in percentage.



In addition, Figure 5 highlights several products that are central to the energy transition and technological advancement, where China holds a significantly stronger position than the other powers:

1. **Nickel (HS 2604):** Nickel is crucial for producing high-performance batteries used in electric vehicles (EVs) and energy storage systems. "According to the Global Battery Alliance, the demand for Class 1 nickel for battery precursor will increase 24-fold between 2018 and 2030". China dominates global nickel imports, securing raw materials for its rapidly growing EV industry. The EU and the US also have substantial needs for nickel as they expand EV production capacities and aim to reduce carbon emissions. This growing demand, coupled with limited global suppliers, makes nickel a focal point of geopolitical competition.
2. **Cobalt (HS 2605):** Cobalt is essential for lithium-ion batteries, particularly in EVs and portable electronics (Bahini, Mushtaq & Bahoo, 2024). China's heavy reliance on cobalt imports, mainly from the Democratic Republic of Congo, gives it a strategic advantage in controlling the supply chain. The EU and the US, though less dependent, are actively seeking alternative sources and developing recycling technologies to mitigate this reliance. The race to secure cobalt supplies and reduce dependency on China could heighten competition for new mining projects and innovations in battery chemistry.
3. **Lithium (HS 2610, implied but not separately shown):** Lithium is a critical component in rechargeable batteries for EVs and renewable energy storage (see Sandra Sanchez's chapter in this book). Although not explicitly depicted in the graph, growing global demand for lithium has led to significant investments in lithium-rich regions like Latin America and Australia. China, the EU, and the US are all vying for control of these resources, recognizing their strategic importance for energy storage and technological advancement. As EV adoption increases, this competition is expected to intensify.
4. **Rare Earth Elements (implied through categories like HS 2617):** Rare earth elements are indispensable for high-tech applications such as wind turbines, electric motors, and advanced electronics (Depraiter & Goutte, 2023). China currently dominates both the mining and processing of rare earths, posing a significant strategic challenge for the EU and the US. Both regions are heavily dependent on Chinese imports of these materials, leading to efforts to develop alternative sources, invest in domestic processing capabilities, and innovate to reduce reliance.
5. **Aluminum (HS 2606):** Aluminum is essential for lightweight structures in EVs, aerospace, and renewable energy infrastructure like solar panels and wind turbines. The graph shows significant import shares for both China and the EU, highlighting their dependence on this metal. The US also requires substantial amounts of aluminum,

but limited domestic production necessitates imports. As demand for lightweight and energy-efficient materials grows, securing a stable supply of aluminum will become increasingly critical, especially amid trade disputes and tariffs.

6. **Tungsten (HS 2611):** Tungsten is vital for advanced manufacturing and defense applications due to its high melting point and density. China dominates tungsten production and exports, while the US and EU import significant quantities to support their high-tech industries. This dependency creates a strategic vulnerability, prompting efforts to diversify supply sources and invest in alternative materials.

Chapter 25

Figure 6 illustrates the import patterns for critical raw materials used in various industries among China, the EU, and the US, highlighting their differing dependencies and needs. China leads in importing minerals like quartz, graphite, and feldspar, which are vital for its electronics, ceramics, and renewable energy sectors. These imports reflect China's focus on maintaining its global leadership in high-tech manufacturing and green technology. The EU, with substantial imports of natural graphite, mica, and kaolin, highlights its industrial strength in advanced materials, automotive manufacturing, and construction. In contras the US exhibits significant reliance on gypsum, pumice, and limestone flux, driven by its large-scale infrastructure projects, construction demands, and energy production needs. These distinct import patterns reflect the differing industrial priorities of each region and their approaches to enhancing efficiency and sustainability during the energy transition. While China continues to focus on sustaining its dominance in high-tech manufacturing, the EU seeks to maintain its competitive advantage in automotive and aerospace industries, and the US places emphasis on building resilient infrastructure and energy systems to support future growth.

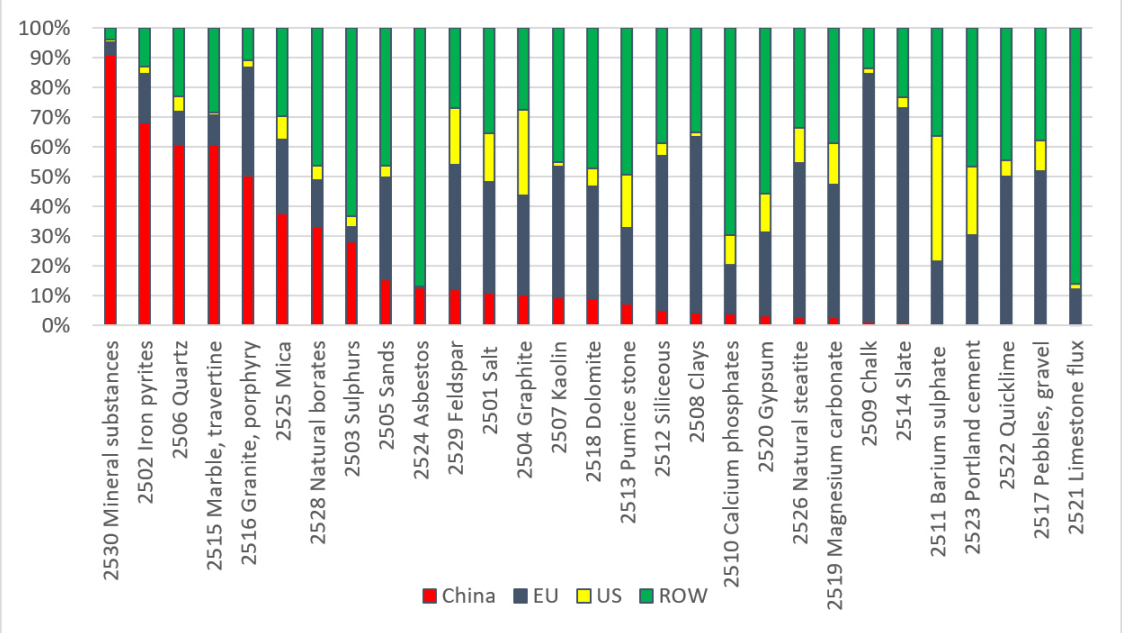
The products that show the greatest potential for geopolitical contention are as follows (Gielen, 2021; Church & Crawford, 2020; Owen, 2023):

- **Graphite (HS 2504):** Essential for producing batteries, particularly for electric vehicles (EVs) and renewable energy storage systems, graphite is heavily relied upon by China, the EU, and the US.
- **Quartz (HS 2506):** Widely used in electronics, semiconductors, and solar panel production, quartz plays a crucial role in the energy transition. China's dominance in importing quartz suggests potential conflicts as the US and EU seek to strengthen their renewable energy capacities.
- **Kaolin (HS 2507):** Integral to the production of paper, ceramics, and certain high-tech materials, kaolin is vital for industries such as aerospace and electronics. The EU and China are particularly reliant on kaolin imports, creating competition for supply in these strategic sectors.
- **Gypsum (HS 2520):** Essential for construction materials, particularly in the production of drywall and cement, the US and the EU show considerable demand for gypsum imports. This demand is expected to rise as infrastructure projects expand alongside sustainability initiatives.
- **Barytes (HS 2511):** Predominantly utilized in oil and gas drilling, barytes also play a crucial role in green technology applications, including paints and plastics. This mineral is significant for both traditional energy sectors and emerging industries focused on sustainability. All three global powers—China, the EU, and the US—rely on imports of barytes, which could lead to heightened competition as they shift towards renewable energy while still ensuring the security of traditional energy sources.
- **Siliceous Fossil Meals (HS 2513):** This product is widely used in filtering applications and serves as an additive in various industries, including agriculture and construction. The reliance of both the US and the EU on imports of siliceous fossil meals suggests potential competition as these powers strive to build resilient supply chains, particularly in the context of the energy transition.

Regarding regional reliance[5], the US imports products from this chapter equally from four key regions: North America, Europe, Asia, and LAC. In contrast, the EU predominantly sources these imports from Europe (74%) and Asia (13%), with only 4% coming from LAC. Meanwhile, China primarily imports from Asia (43%), followed by Europe (25%) and Africa (25%).

5 The complete data can be found in Annex 2.

Figure 6.
World imports of Chapter 25 HS (Salts; sulfur; earths and stone; plastering materials, lime, and cement), sorted by China, in percentage, 2023.



Chapter 28

The graph illustrates the global distribution of Chapter 28 imports, which include inorganic chemicals, by China, the EU, and the US. China leads in importing key inputs such as carbonates, sulfates, and hydrogen, reflecting its extensive industrial base and advanced manufacturing capabilities. This demand is driven by the need to support large-scale production in industries ranging from electronics to renewable energy technologies, such as solar panels and batteries. In contrast, the EU and the US display a more balanced distribution of imports, particularly high-purity chemical products like nitrates and rare metal compounds, which are essential for advanced technological applications such as aerospace, pharmaceuticals, and high-end manufacturing. This indicates their focus on high-value-added industries and a lesser dependence on basic raw materials due to more advanced recycling and resource efficiency technologies.

Geopolitical competition is expected to escalate over products critical to the energy transition, such as rare earth compounds, manganese oxides, and other strategic minerals. These resources are crucial for producing electric vehicle batteries, wind turbines, and other green technologies. As the graph shows, both the US and the EU heavily import these materials, which China also relies on but dominates in production and processing. This dependence exposes strategic vulnerabilities for the US and EU, motivating them to diversify their supply chains and reduce reliance on China. Meanwhile, China's efforts to secure consistent access to these resources may lead to investments in or acquisitions of foreign mining operations, particularly in Latin America and Africa, where most of these critical resources are located. Consequently, ensuring a stable supply of these materials will be a focal point in geopolitical competition, potentially shaping trade relations and strategic alliances globally.

Based on this analysis, the specific products vital to the energy transition (Depraiter & Goutte, 2023; Gielen, 2021; Church & Crawford, 2020; Owen, 2023) include:

- **Rare Earth Compounds (HS 2845):** Essential for producing high-performance magnets used in electric vehicles, wind turbines, and various electronic devices. China controls the majority of the global supply and processing capacity, making it a key player. Both the US and the EU have strategic interests in securing alternative sources to reduce dependency on China, which has previously restricted exports of these materials for political leverage.
- **Manganese Oxides (HS 2814):** Critical for battery production, particularly for electric vehicles and energy storage systems. Competition is expected to intensify as demand for batteries increases with the global shift toward electric vehicles and renewable energy. The US and EU are investing in battery technology and manufacturing, which heightens their need for a secure manganese supply.
- **Cobalt Chlorides (HS 2823) and Nickel Oxides (HS 2820):** Vital for lithium-ion batteries, especially in electric vehicles and portable electronics. The US

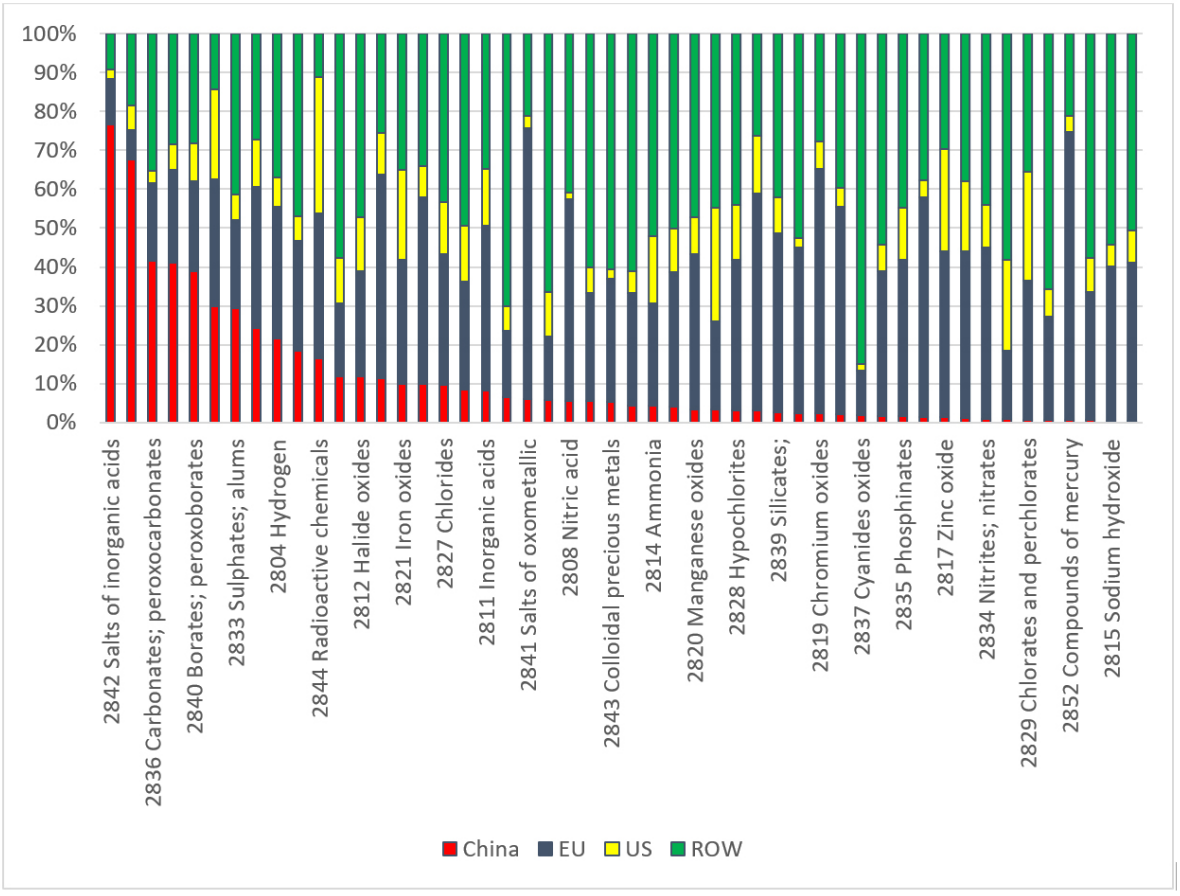
and EU have limited domestic resources, driving them to secure supplies through partnerships and investments in regions like Africa and South America. China's proactive approach in acquiring mining rights and processing facilities in these regions increases competition.

- **Hydrogen (HS 2804):** As the world transitions toward a hydrogen-based economy for clean energy, securing stable and cost-effective hydrogen sources is essential. China is ramping up its hydrogen production capabilities, while the US and EU are developing strategies to lead in green hydrogen technologies. Competition will likely center on efficient production methods, technological leadership, and infrastructure development.

Regarding geographical reliance, the import patterns of Chapter 28 products reveal distinct regional dependencies for the US, China, and the EU, highlighting their strategic trade preferences[6]. The US primarily imports from the Americas (35%) and Europe (29%), with minimal reliance on Africa and Oceania. However, some chemical compounds are only available from Asia, which accounts for 33% of total imports. This suggests a preference for sourcing from regions with established trade agreements and geopolitical stability, while acknowledging the difficulty of diversifying away from Asia for certain products. China, on the other hand, sources over half of its Chapter 28 imports from Asia, taking advantage of regional supply chains and geographic proximity, followed by Europe and Latin America. This reflects China's strategy of maintaining a diversified supply chain, reducing dependence on distant and potentially volatile regions like Africa and Oceania. The EU, meanwhile, exhibits strong intra-regional trade, with over two-thirds of its imports coming from within Europe, followed by Asia (16%), indicating a reliance on close, reliable partners for critical inputs. Like the US and China, the EU also shows minimal dependence on Africa and Oceania, underscoring a broader trend among these powers to prioritize stable trade networks for importing essential chemical products.

Figure 7.

World imports of Chapter 28 HS (Inorganic chemicals; organic or inorganic compounds of precious metals, rare-earth metals, radioactive elements, or isotopes), sorted by China, in percentage, 2023.



6 The complete data can be found in Annex 2.

3.2 The Dispute Over LAC

As outlined earlier, data on mineral exports corroborates that LAC plays a crucial role in the global supply of raw materials, especially as competition among industrialized nations intensifies and the energy transition accelerates. The region is a leading exporter of critical minerals, such as lithium, copper, and nickel, which are essential for renewable energy technologies and electric vehicle production. This section examines the specific interests that China, the EU, and the US have in the region.

Chapter 26

Figure 8 shows that global powers exhibit significant dependence on Latin American raw materials, with the extent of reliance varying by mineral. For the US, LAC is a vital supplier, with extremely high dependency on molybdenum (97%), nickel (93%), iron (61%), and aluminum (60%), as well as considerable reliance on tungsten (46%) and silver (43%). These minerals are essential to US industries, particularly steel and high-performance alloys, which are critical for manufacturing and defense. This reliance is driven by factors such as geological scarcity within the US, strategies to secure stable supply chains, and the critical role these minerals play in the energy transition (He, 2018). The US has heavily invested in mining operations in Chile and Brazil, supported by diplomatic efforts to ensure a steady supply of resources. This dependency is further shaped by the strategic goal of diversifying supply chains to reduce reliance on geopolitical competitors, especially China. Historically, this relationship dates back to the Monroe Doctrine and was reinforced during World War II but weakened after the 1990s. Recent strategies like "friend-shoring" and "near-shoring," driven by competition with China, prompted the US to seek stronger partnerships with LAC (Agramont, 2024).

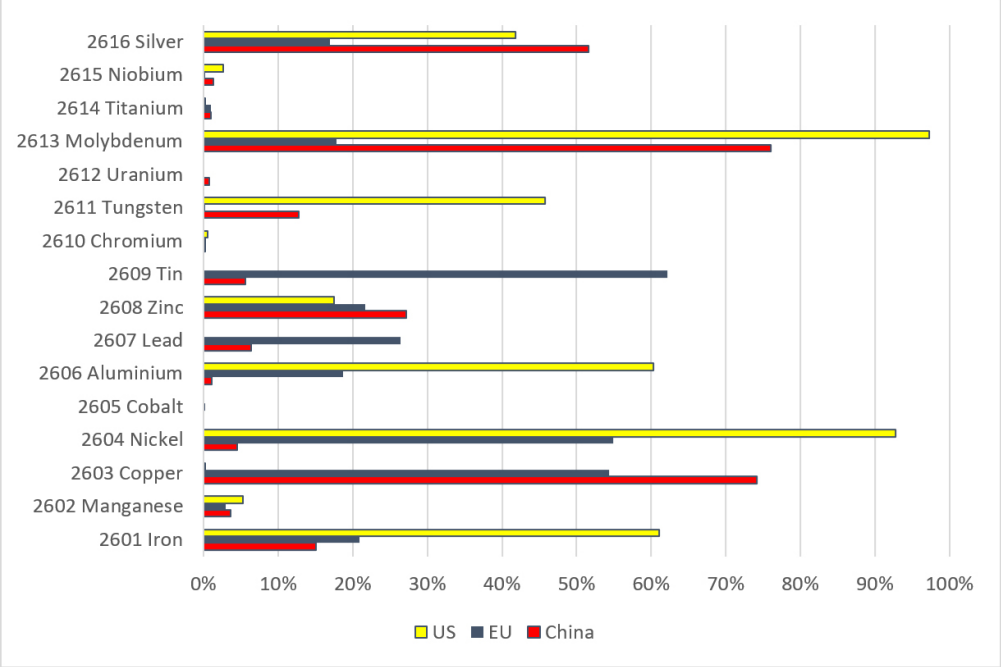
The EU also demonstrates high dependence on LAC for minerals such as nickel (55%), copper (54%), and tin (62%), reflecting the region's role significance in sustaining the EU's automotive, electronics, and energy sectors. The EU's reliance on these key minerals parallels that of the US, driven by limited domestic production and shared geopolitical interests. Additionally, stringent environmental regulations within Europe restrict mining activities (Regueiro & Alonso-Jimenez, 2021). Africa remains a key partner for the EU for manganese, titanium, niobium, and silver, while Asia is crucial for tungsten. Europe continues to be the largest source for minerals like cobalt (95%) and uranium (96%).

China, while a global leader in mining, still heavily depends on LAC for copper (74%), molybdenum (76%), and silver (52%). Chinese companies have strategically invested in mining projects across the region, particularly in Peru, to secure these resources and support its vast industrial base.

The relatively low imports of other minerals in Chapter 26 HS by the US, EU, and China suggest that these powers either have sufficient domestic supplies or have established alternative sources, such as Africa or Australia, reducing their dependence on LAC for these specific resources[7]. Cobalt, a

Figure 8.

Imports of minerals (Chapter 26 HS) from LAC by China, the EU, and the US, 2023, in percentage.



7 The complete data can be found in Annex 2.

key mineral for the energy transition, is primarily imported from Europe by both the US and the EU, while China sources it exclusively from Africa. Niobium and titanium are predominantly imported by all three powers from Africa, followed by Asia and Oceania. Chromium, another critical mineral, is largely dominated by Africa, and the three powers rely heavily on this region for their imports.

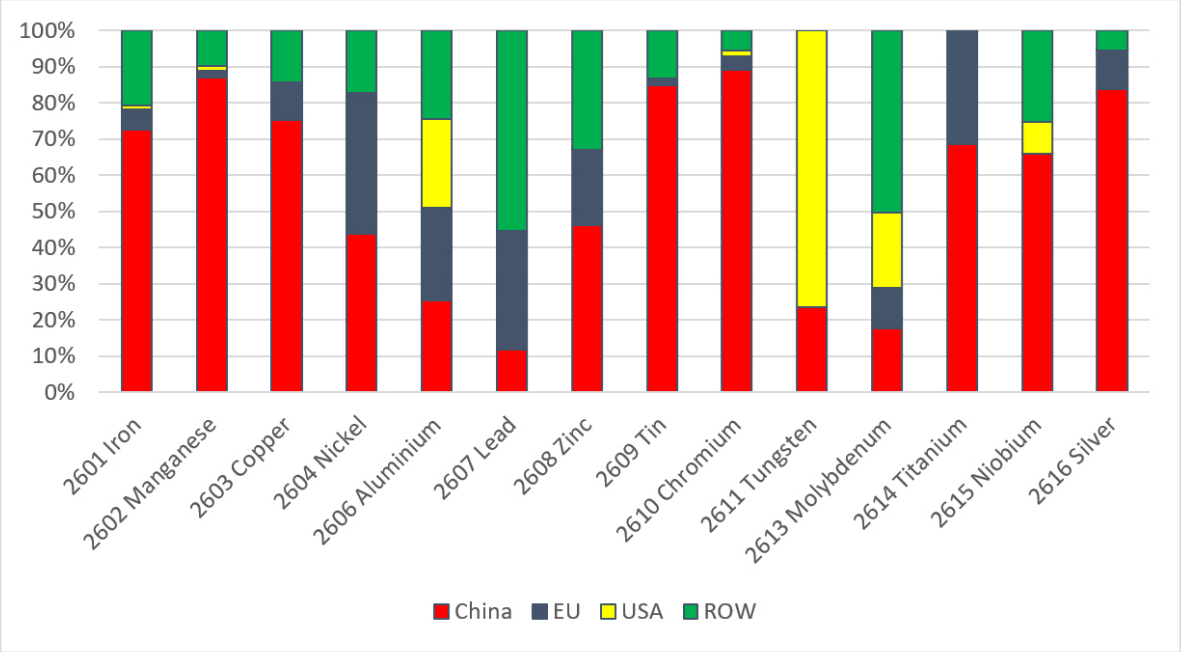
Given this context, it is crucial to highlight the specific products with significant potential for geopolitical competition between China, the US, and the EU. These minerals are critical for high-tech industries, energy transitions, and defense sectors, where reliance on LAC is high and strategic competition is intensifying. Key minerals include:

1. **Copper (HS 2603):** China imports 74% and the EU 54% of their copper from LAC, making it essential for electrical infrastructure, renewable energy, and electric vehicles. Although the US does not import copper from LAC in large quantities, it remains a major consumer. Securing diversified and stable copper supply chains is crucial. LAC's dominance in global copper production, particularly from Chile and Peru, makes it a focal point for investments and diplomatic competition as these powers seek long-term supply security.
2. **Nickel (HS 2604):** The EU (55%) and the US (93%) heavily depend on LAC for nickel, which is indispensable for producing stainless steel and batteries for electric vehicles. As demand for electric vehicles rises, securing nickel supplies becomes a strategic priority. China's growing investment in Indonesian nickel production is intensifying competition, for this mineral, and LAC's nickel reserves are becoming an increasingly important point of geopolitical interest.
3. **Molybdenum (HS 2613):** The US (97%) and China (76%) are heavily reliant on LAC for molybdenum, which is essential for strengthening steel alloys and providing corrosion resistance, making it critical for the aerospace, defense, and energy sectors. Chile's concentration of molybdenum production makes it a strategic asset, with competition for investment and supply chain control likely to intensify.
4. **Silver (HS 2616):** LAC is a key supplier of silver for China (52%), the US (42%), and the EU (17%). Mexico and Peru are significant producers of this mineral. Silver's role in electronics, solar panels, and industrial applications makes it an increasingly valuable resource as technological advancements and renewable energy adoption accelerate. Securing silver supplies is becoming a critical concern for these powers.
5. **Tin (HS 2609):** The EU (62%) is highly dependent on LAC for tin, which is essential for electronics soldering. While China has significant domestic production, limited global reserves and increasing demand for electronics could lead to heightened competition over tin supplies, particularly as the EU seeks to reduce its dependence on non-European sources.

To gain a more robust understanding of LAC's position, it is essential to consider how much of LAC's mineral exports have already been secured by these powers. Figure 9 illustrates that China holds the leading position LAC in several key minerals, such as iron, manganese, copper, and nickel, reflecting its substantial investment in mining projects and infrastructure in the region. This dominance is strategic, as China aims to secure stable supplies of critical resources for its vast industrial base and reduce its dependency on external markets. Chinese investments in Peru's mining sector have surged significantly over the past two decades, positioning China as one of the largest foreign investors in the country's extractive industries. By 2020, Chinese companies accounted for nearly 25% of Peru's mining investments, with a focus on copper, iron, and other critical minerals required for China's industrial and energy transition demands (Kotschwar et al., 2012). Notable investments include the acquisition of the Toromocho copper mine by Chinalco and the Las Bambas copper mine —one of the world's largest— operated by China's MMG (Agramont, 2024). These ventures have cemented Peru's status as the second-largest global producer of copper, which is critical for electric vehicles and renewable energy infrastructure. China's involvement in Peru's mining sector is driven not only by the need for raw materials but also as part of a strategic effort to diversify its supply chains amid increasing global competition for critical minerals (Ray et al., 2021).

The EU also holds significant stakes in LAC minerals such as nickel, zinc, and lead, driven by high demand for these inputs in the automotive and manufacturing sectors. European companies, including Glencore and Anglo American, have made substantial mining investments in LAC, ensuring a steady supply of these materials. The US, by contrast, shows a prominent presence in aluminum and molybdenum exports from LAC, reflecting its reliance on these minerals for aerospace and high-tech industries. Limited domestic production of these resources makes LAC a crucial supplier for the US.

Figure 9.
LAC mineral exports (Chapter 26 HS) by selected importers, 2023, in percentage.



Source: data from UN-Commtrade

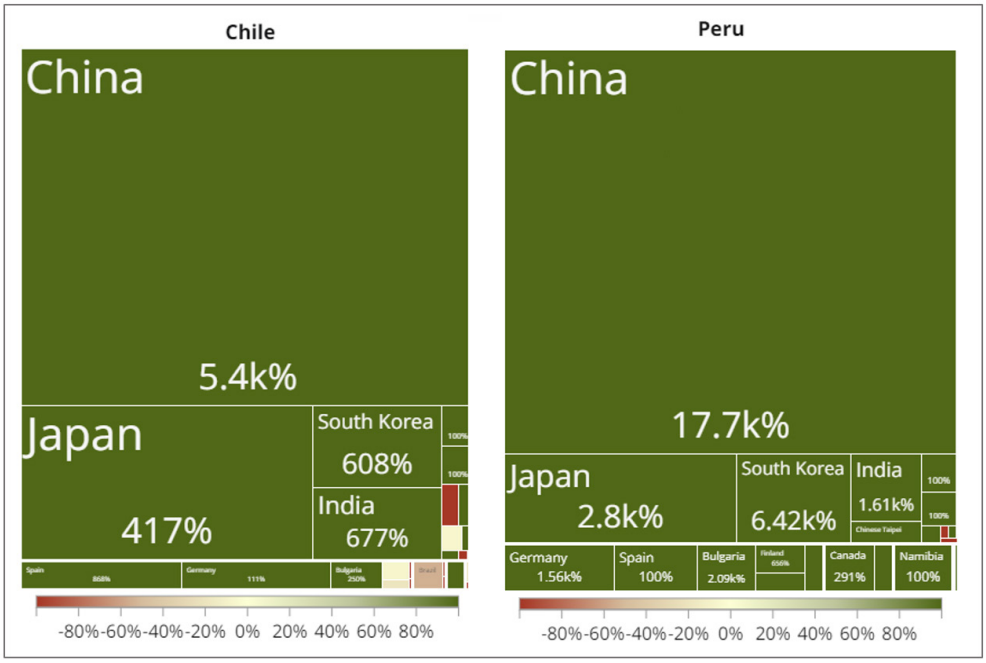
By combining data from both graphs—depicting the dependence of global powers on LAC minerals (Figure 8) and the actual share of these minerals in LAC exports (Figure 9)—the key takeaway is China's dominant position. China has secured a leading role by locking in imports of essential minerals like copper, molybdenum, iron, tin, and silver, which are also critical for industries in the EU and the US, particularly in high-tech production and the energy transition.

China's success in securing these minerals stems from its massive investments since the early 21st century, under its "Go-Out" policy, driven by an increasing demand for raw materials. Between 2000 and 2020, Chinese investments in Latin American mining exceeded $25 billion, with a focus on Peru, Chile, and Brazil. Major projects include the 2014 acquisition of the Las Bambas copper mine in Peru for $7 billion by China's MMG and significant stakes in Chilean lithium companies, aimed at securing resources for electric vehicle batteries.

Funding for these projects comes primarily from Chinese state-owned enterprises (SOEs) such as Chinalco, Minmetals, and Sinohydro, with support from state banks like the China Development Bank and the Export-Import Bank of China. These institutions provide low-interest loans and credit lines to back large-scale mining operations, positioning China as a central player in Latin America's extractive industries. This investment strategy not only ensures China's supply of raw materials for its manufacturing and technology sectors but also strengthens its geopolitical influence in the region through resource diplomacy.

Copper serves as a prime example of this strategic focus. As previously discussed, Chile and Peru are the world's largest exporters of copper. Recognizing its dependency, China has made significant efforts to secure supply. As Figure 10 illustrates, since 2013 China has increased its copper imports by 5,400% from Chile and by 17,000% from Peru. As a result, China has become the most significant partner for copper from these countries, surpassing traditional partners like Japan and South Korea.

Figure 10.
Exports of Copper (HS 2603) from Chile and Peru, per partner, growth rate 2013-2022, per value.



Source: Observatory of Economic Complexity (www.oec.world)

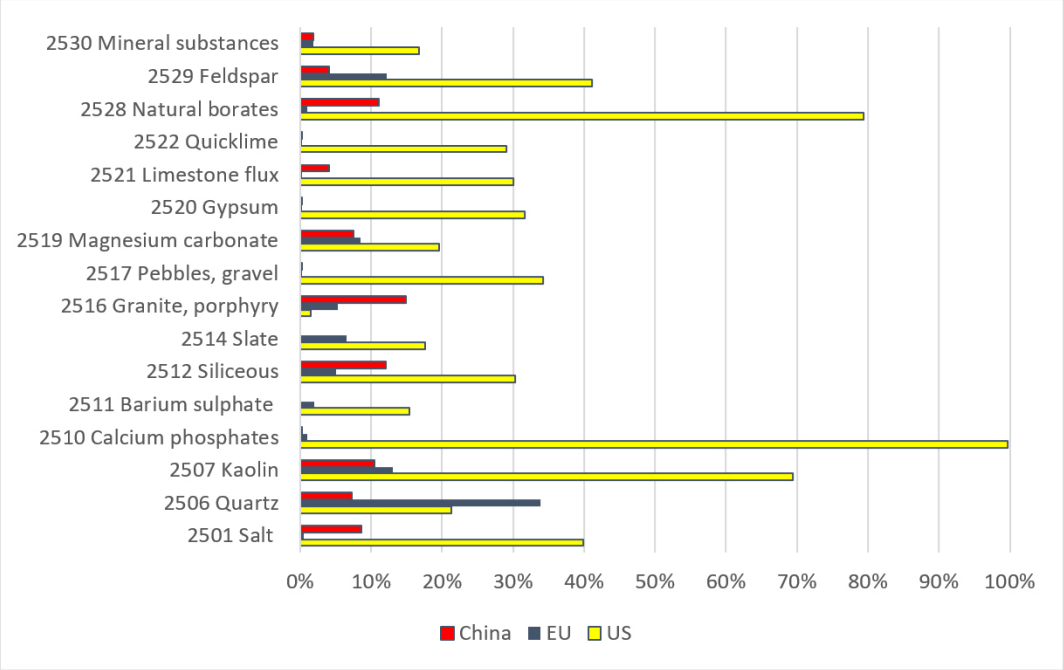
Chapter 25

Unlike the strong connections in traditional mining sectors, trade in Chapter 25 products is relatively limited. Of the 29 products categorized under Chapter 25, significant trade flows are observed in only 16 of them. Figure 10 highlights that the United States stands out as the only major power with a high dependence on LAC for these products. This reliance is due to factors such as resource scarcity, geographic proximity, and industrial demand. Minerals like feldspar (HS 2529) and kaolin (HS 2507) are essential for industries like ceramics, glass production, and paper manufacturing. Additionally, natural borates (HS 2528) and calcium phosphates (HS 2510) are crucial for agricultural fertilizers and other industrial applications. Latin America, with its abundant reserves, is a key supplier, especially as the US lacks sufficient domestic production to meet the growing demand for these essential minerals. The energy transition further amplifies this reliance by increasing the need for materials used in renewable technologies and construction.

In contrast, China and the EU exhibit relatively low dependence on Latin American products under Chapter 25. For both regions, most of these imports constitute less than 10% of their total imports. China's significant imports include granite (HS 2516), siliceous (HS 2512), and natural borates (HS 2528), all crucial for industries like glass, ceramics, and detergents, aligning with China's vast industrial base. However, China's lower dependence compared to the US and EU is due to its rich domestic reserves of many of these materials and its ability to secure alternative supplies from Asia and Africa.

The EU, meanwhile, demonstrates moderate reliance on Latin America minerals such as quartz (HS 2506), magnesium carbonate (HS 2519), and limestone flux (HS 2521). These minerals are vital for industries like glass production, chemicals, and steelmaking. Quartz, for instance, is a key component in the EU's electronics and solar panel industries. The EU's limited engagement with Latin America in this sector, as previously mentioned, stems largely from its ability to source most of these products within Europe. Furthermore, the EU's stringent environmental standards and preference for high-quality raw materials may also influence its demand for specific products from Latin America.

Figure 11.
Imports of Chapter 25 HS from LAC by China, the EU, and the US, 2023, in percentage.



Based on the data and Figure 11, the key takeaway is that while the US is the only major power with significant dependence on Latin American minerals, it has successfully secured its imports from the region. The US is currently the top destination for Latin American exports of barium sulfate, limestone flux, gypsum, pebbles, feldspar, and salt. Meanwhile, the EU and China show limited interest in these minerals, focusing primarily on high-quality, specialized raw materials critical for advanced manufacturing. Although China is not as reliant on Latin American Chapter 25 minerals as the US, it selectively imports minerals that are essential for its technological and industrial development, including granite and quartz. Quartz, in particular, is the only mineral where competition between China and the EU might intensify.

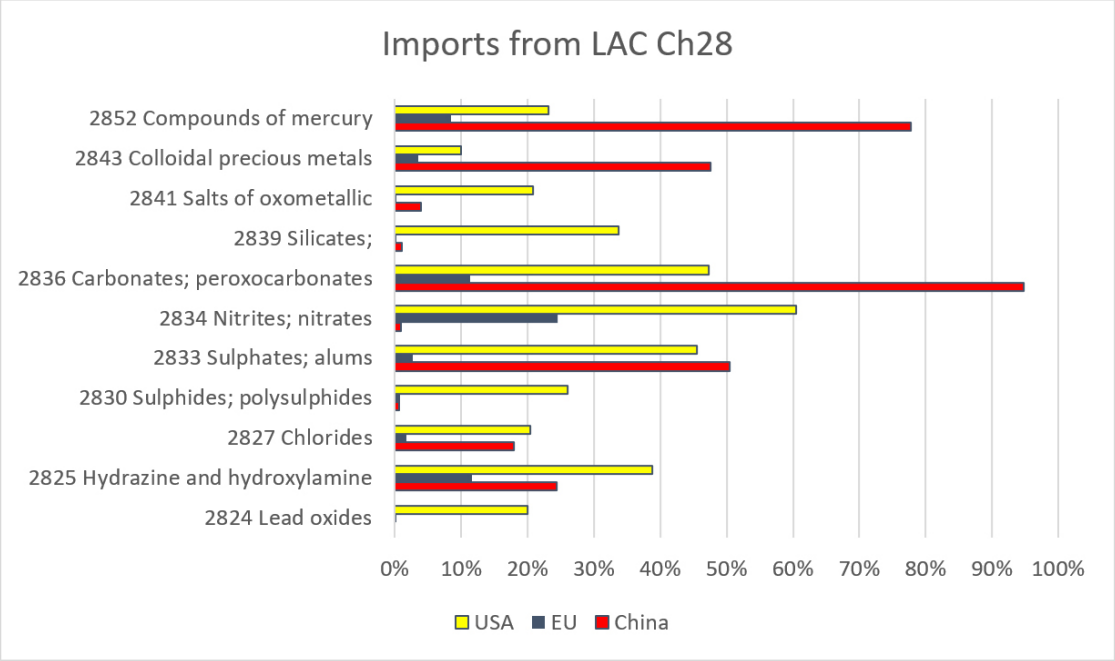
The distinct import patterns of the US, China, and the EU for Chapter 25 products reflect their unique industrial needs and strategic priorities. These patterns shape their demand for Latin American mineral resources and underscore the region's varying importance to each power in global supply chains and geopolitical competition. While the US remains the only power with notable dependence on a range of products, it has also effectively secured its imports. In contrast, lower import levels by China and the EU suggest minimal risk of strategic competition over these resources.

Chapter 28

As outlined in the earlier sections of this chapter, the analysis of Chapter 28, which deals with inorganic chemicals, highlights that Latin America's exports in this category are limited. The region remains a net importer of advanced chemicals from more industrialized nations that have the technological and financial capacity to dominate this sector. Of the 50 products classified under Chapter 28, only 11 are found to have significant import activity from Latin America by China, the EU, and the US.

Latin American and Caribbean (LAC) exports under Chapter 28 play a relatively minor role in global trade, with the region remaining dependent on imports of these advanced chemicals from more industrially developed countries that have the technological and financial capacity to dominate this sector. However, China shows a notable dependency on LAC for certain key chemicals, particularly carbonates and peroxocarbonates (HS 2836), as well as compounds of mercury (HS 2825). More than 75% China's imports of these products come from LAC, posing a potential strategic vulnerability. These chemicals are essential for industries such as glass manufacturing and environmental technologies. Nevertheless, China's significant domestic production of several related sub-products helps mitigate this risk. Additionally, China imports substantial quantities of colloidal precious metals (HS 2843) and nitrites/nitrates (HS 2834), which are critical for electronics, catalysts, and the chemical industry. This makes its supply chains vulnerable to disruptions in LAC exports. Of these products, carbonates present a unique area for geopolitical competition, as the US also shows considerable reliance on this mineral.

Figure 12.
Imports of Chapter 28 HS from LAC by China, the EU, and the US, 2023, in percentage.



The EU and the US, on the other hand, demonstrate a more diversified dependency profile for chemicals from LAC. For instance, the EU holds significant shares in the imports of sulphates and alums (HS 2833) and lead oxides (HS 2824), both of which are vital for applications such as water treatment and battery production. The US relies heavily on silicates (HS 2839) and oxometallic salts (HS 2841), essential for construction and specialized manufacturing processes.

Figure 13 illustrates that each of these powers dominates the import of specific products with varying degrees of reliance on inorganic chemicals from LAC. China holds a dominant share in products like carbonates and peroxocarbonates (HS 2836) and nitrites/nitrates (HS 2834), securing over 50% of LAC's exports in these categories. These chemicals are vital for China's industrial and environmental sectors, aligning with its broader strategy of maintaining stable supply chains for its vast industrial base. Furthermore, these materials are critical to the energy transition, particularly in producing batteries for electric vehicles and energy storage systems. This focus is in line with China's strategic goal to lead the global electric vehicle (EV) market and renewable energy technologies, as consistent access to these resources is crucial for sustaining its supply chains. Nitrites and nitrates (HS 2834) are also crucial for industrial processes such as fertilizer production, which are essential for sustainable agricultural practices and achieving environmental goals.

The EU, with significant shares in sulphates and alums (HS 2833) and silicates (HS 2839), relies on these imports for use in renewable energy technologies, including solar panels and advanced glass manufacturing for energy-efficient infrastructure. This demand is largely driven by the EU's Green Deal, which aims to achieve carbon neutrality by 2050, requiring substantial quantities of these raw materials for clean energy production. The US, which imports significant amounts of hydrazine and hydroxylamine (HS 2825) and oxometallic salts (HS 2841), uses these chemicals in high-tech industries and aerospace applications. These materials are critical for developing new energy technologies and reducing carbon emissions in aviation.

In summary, while LAC's role in global Chapter 28 trade is limited, it remains crucial for certain key products where the region can leverage its natural resource wealth. Although LAC does not dominate global trade in high-value-added chemicals, it serves as an important supplier of essential inputs for industrial processes in the US, EU, and China. This dependence varies by product: China relies more on bulk chemicals, the EU on specialized industrial inputs, and the US on critical high-tech chemicals.

4.

CONCLUSIONS

Latin America plays a strategically significant yet underutilized role in the energy transition due to its dominance in global trade of minerals and metal ores (Chapter 26 of the Harmonized System). The region's strengths lie in its vast reserves of critical minerals such as copper, molybdenum, nickel, and lithium, which are essential for renewable energy technologies like electric vehicles and battery storage. This positions Latin America as a key supplier of high-demand resources necessary for the global energy transition.

However, Latin America's more limited role in the energy transition, especially with regard to Chapters 25 and 28 of the Harmonized System, stems from its lower participation in the global trade of non-metallic minerals and inorganic chemicals. Materials like salt, borates, and certain chemicals are crucial for manufacturing technologies tied to renewable energy, such as batteries and solar panels. The region's lower export volumes in these categories highlight its insufficient industrial capacity and lack of investment in high-value-added processing, which limits its impact on global supply chains vital to the green energy transition. As a result, Latin America's potential to capitalize on the growing demand for energy-transition minerals remains underexploited, limiting its economic opportunities in this emerging sector.

In terms of improving the region's international positioning, the energy transition is expected to increase investments in a wide range of minerals from the Global South. Yet, despite its resource wealth, Latin America faces significant challenges in realizing its full potential due to economic, technological, and structural barriers. The region's reliance on raw material extraction, without significant downstream industrial development, has prevented it from moving up the value chain and contributing to the production of higher-value-added products.

Moreover, competition from more technologically advanced regions such as North America, Europe, and Asia, which possess stronger industrial bases, superior technological infrastructure, and more stable investment environments, further limits Latin America's competitiveness in both the mining and chemical industries.

To overcome these challenges and fully seize the opportunities presented by the energy transition, Latin America must invest in its industrial capacity, technological development, and policy frameworks that promote value-added production and innovation. Such efforts are essential for the region to strengthen its position in global trade of critical minerals and chemicals, ensuring it plays a more central role in the future of sustainable energy and industrialization.

Additionally, data analysis points to several minerals with significant potential for geopolitical competition between China, the EU, and the US in the context of the energy transition. These include minerals critical for advanced manufacturing, energy storage, and renewable energy technologies, such as nickel, cobalt, lithium, rare earth elements, aluminum, tungsten, and various inorganic compounds used in battery production and green technologies.

China's dominance in importing and processing minerals such as rare earths, manganese oxides, and nickel highlights its strategic control over supply chains critical for electric vehicles and renewable energy infrastructure. This has prompted the EU and the US to seek alternative sources and invest in domestic production and processing capabilities to reduce their reliance on China. The growing demand for these critical minerals, spurred by the energy transition, has intensified competition, with both Western powers and China vying for secure access to resources in regions like Latin America and Africa. Latin America, in particular, holds a pivotal position due to its abundant reserves of copper, lithium, and other essential minerals, making it a focal point of strategic interest for all sides.

This competition for resources is likely to reshape global trade dynamics and geopolitical alliances as each power seeks to secure the materials essential for achieving technological dominance and sustainable energy goals. The struggle underscores the broader geopolitical ramifications of the energy transition, where securing critical mineral supply chains is just as crucial as developing the technologies themselves.

5.

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EXECUTIVE SUMMARY

Latin America has played a pivotal role in global mineral extraction, consistently serving as a primary supplier of raw materials to industrialized nations. This long-standing dependence on resource extraction created a pattern of economic vulnerability, where exports were prioritized over domestic industrialization, leaving the region exposed to external market fluctuations and exploitation.

However, the increasing global demand for minerals—driven by the transition to renewable energy sources—presents a significant opportunity for Latin America to attract foreign investment and elevate its position in the global economy. The region remains a critical source of minerals like copper, lithium, and nickel, which are indispensable for modern industries. The key challenge now is not only to continue producing and exporting these traditional minerals, which have been the backbone of Latin America's export economy for centuries, but also to develop new minerals that have surged in demand due to the energy transition.

Specifically, the global shift towards renewable energy and low-carbon technologies offers substantial opportunities for developing economies to enhance their participation in global value chains (GVCs). As demand grows for minerals critical to renewable energy infrastructure and technologies—such as lithium, cobalt, and copper—Latin America is well-positioned to play an increasingly significant role in GVCs by exporting these materials for use in electric vehicles, solar panels, and batteries.

Then, the aim of the current paper is to explore the opportunities for Latin America's mining sector amid rising global demand for minerals driven by the transition to renewable energy.

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