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Japan's Geoeconomic Strategy to Secure the Supply of Rare Earth Elements

Yusuf Adi Nugroho*, Primadiana Yunita
Department of International Relations, Universitas Brawijaya, Indonesia

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Corresponding Author:
yusufan0505@student.ub.ac.id

ABSTRACT
The global energy transition has shifted the strategic dependence of industrialized countries away from fossil fuels toward critical minerals, particularly rare earth elements (REE). Japan, the world's largest REE importer, faces a dilemma because China dominates global REE processing, controlling more than 92% of capacity. This study analyzes how Japan secured its REE supply through geoeconomic policy during 2018-2025, using Blackwill and Harris's (2016) framework of seven geoeconomic instruments. The method employed was qualitative descriptive, with a single case study design and document analysis as the primary data collection technique. The findings show that only the investment policy instrument is explicitly documented during the period studied. This investment policy has been carried out through the state institution Japan Organization for Metals and Energy Security (JOGMEC) across three projects: Lynas Rare Earths (Australia), the Lofdal Project (Namibia), and Caremag SAS (France). This study also finds that Japan's investment model is a variant in which the state converts financial capital into contractual claims over strategic supply to manage structural dependence, rather than using it to project power over the recipient country. In addition, Japan's investment policy provides REE supply-chain options outside China's capacity.

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■ INTRODUCTION

The global energy system currently stands at an unprecedented bifurcation point, poised between historical reliance on fossil fuels and an accelerating transition toward clean energy. This dynamic was evident in 2024, when globally added renewable energy capacity reached approximately 700 GW, with renewables and nuclear together accounting for 40% of total global electricity generation for the first time, while renewables alone supplied 32% of that total (IEA, 2025). This shift is also reflected in changing global energy investment patterns. The IEA projects that global energy investment reached a record of approximately USD 3.3 trillion in 2025, with around USD 2.2 trillion allocated to clean energy technology and infrastructure, while investment in oil, natural gas, and coal amounted to only about USD 1.1 trillion (IEA, 2025). These figures show that the global energy transition is marked not only by growing renewable energy capacity, but also by a shift in international capital flows away from fossil energy toward low-emission technology. The energy transition has thus evolved into a process of global economic-political restructuring that is reshaping investment patterns, industrial supply chains, and international energy security configurations.

In a broader context, this restructuring also implies a fundamental change in the material foundations. The transition from fossil fuels to clean energy does not eliminate dependence on natural resources; it shifts it from oil and natural gas to critical minerals such as rare earth elements (REE). REE are a group of 17 metallic elements consisting of 15 lanthanides plus scandium and yttrium, possessing unique physical and chemical properties–magnetic, optical, and catalytic–that cannot be replicated by other elements (USGS, 2025). REE are used in high-tech products such as electric motors, semiconductors, optical fibers, defense technology, and clean-energy innovation products (WPI, 2025). Consequently, high demand for REE in high-tech industrial countries such as Japan, China, South Korea, and the United States is driving a projected 50-60% increase in global demand (IEA, 2025).

Japan, one of the world's leading producers and users of high-technology products, has an enormous need for the 17 rare earth elements (REE) to sustain strategic industries, including permanent magnets,

electronics, electric vehicles, and wind turbines. However, this high level of demand has not been matched by adequate domestic production capacity, as Japan remains heavily dependent on imports. To date, Japan has no commercially operating REE mine, nor sufficient exploration and processing capacity, although the country holds resource potential beneath the waters around Minamitorishima Island (MEXT, 2024). Developing deep-sea REE resources in Japan faces significant economic challenges, as production costs are estimated at approximately USD 50-100/kg REO and may exceed USD 150/kg REO, compared with only USD 10-20/kg REO for mature onshore operations (Wang, 2026). In line with high demand for high-technology-based products, Japan is the world's largest REE importer, accounting for approximately 56.86% of total global imports of REE, scandium, and yttrium in 2023 (GTAIC, 2025). Specifically, Japan's REE supply comes from a geographically diverse yet still China-dominated supply chain, with China remaining the largest supplier of REE compounds and metals for more than a decade (WITS, 2025). The most critical dependence lies precisely in imports of REE metals and their derivatives, which are also still dominated by China, even though these processed products are closer to industrial end products and are more difficult to substitute in the short term (WITS, 2025). In 2024, Japan's import share from China for lanthanum oxide and yttrium oxide exceeded 97%, while for cerium oxide, ferro-cerium, and iron-dysprosium alloys it ranged between 72% and 87% (Saito, 2026). Thus, although Japan has diversified part of its REE imports at the upstream level, its dependence at the most strategic and vulnerable downstream layer remains high.

This vulnerability is also reflected in Japan's annual REE import data. This dataset shows that REE import costs remain highly volatile. During 2020-2022, the import cost of REE metals nearly doubled and is estimated to have disrupted financial planning and industrial production in Japan. Beyond price volatility, Japan is also highly vulnerable to REE import restrictions. The Nomura Research Institute estimates that if REE import restrictions were to last for three months, Japan could lose approximately 660 billion yen, or USD 4.2 billion, and see nominal and real GDP suppressed by 0.11% annually, while over a full year the loss could reach 2.6 trillion yen, with a 0.43% decline in GDP (Kiuchi, 2025).

The impact of this vulnerability extends beyond import costs to affect the structure of Japan's domestic industries that depend on REE. Japan's dependence on REE permeates virtually its entire high-technology manufacturing sector, including general machinery, production machinery, business machinery, electronic components, electrical machinery, information and communication electronic equipment, and transportation equipment. Overall, these industries accounted for approximately 1.2% of Japan's industrial output in 2024, equivalent to around USD 353 billion, underscoring the scale of Japan's exposure to REE supply disruption risk (Saito, 2026).

In addition, Japan's dependence on REE is not generic, but concentrated in the neodymium-iron-boron (NdFeB) permanent-magnet production chain, a critical component for the automotive and electronics sectors.

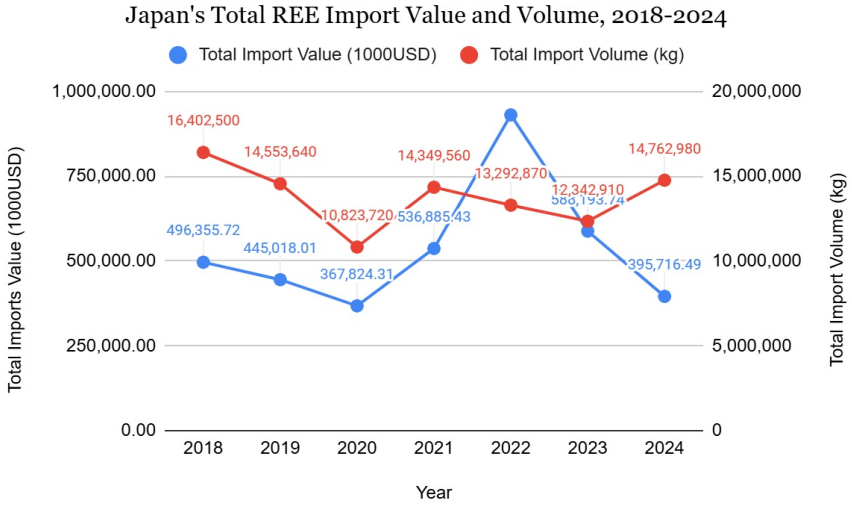

Figure 1. Japan's total ree import value and volume, 2018-2024

Official METI documents confirm that REE, including neodymium, dysprosium, cerium, and lanthanum, are essential materials for rare earth magnets used in electric vehicles, as well as for HDD glass-substrate polishing compounds and automotive exhaust catalysts (METI, 2025). This dependence is technical in nature and cannot easily be substituted in the short term.

Dysprosium and terbium are required as additives for magnets used in electric-vehicle motors, which must maintain their magnetic strength even in high-temperature environments exceeding 100 degrees Celsius (Lamarre, 2024). Consequently, a disruption to the REE supply chain–particularly its heavy rare earths (HREE) segment–has the potential to trigger a domino effect across the automotive and electronics sectors that form the backbone of Japan's manufacturing industry. This further confirms that REE supply security is not merely a matter of commodity scarcity but of industrial competitiveness.

This situation places Japan within a layered structure of REE dependence, in which Japan relies on various countries for raw ore, while at the same time being almost entirely dependent on China for processing capacity, as China controls more than 92% of global REE refining capacity (GQG, 2025; METI, 2024). This dependence creates a dual geoeconomic dilemma: the need for a stable supply of critical minerals to maintain manufacturing-technology superiority collides with the reality of China's dominance across the global mineral chain.

China's 2010 REE export restrictions on Japan marked a turning point, exposing Japan's strategic vulnerability to China's dominance over critical-mineral supply. This vulnerability illustrates what Farrell and Newman (2019) conceptualize as "weaponized interdependence," in which states leverage asymmetric positions within global economic networks to generate strategic advantages. In the Japan–China case, China's dominant position in the REE supply chain created a structural source of economic leverage that could be translated into geopolitical pressure, particularly amid rising bilateral tensions between the two countries. Moreover, within the US-Japan alliance, Japan's relationship with China occupies a geopolitically precarious position susceptible to conflict. This structural condition has driven Japan to develop a strategy to diversify its REE supply chain.

Therefore, this study aims to analyze and explain how Japan has secured its critical mineral supply chain during the 2018-2025 period through geoeconomic instruments and strategies. This study employs the geoeconomics framework proposed by Blackwill and Harris (2016). Blackwill and Harris (2016) define geoeconomics as the use of economic instruments to promote and defend national interests and to produce beneficial geopolitical results, including responding to other states' economic actions that bear on a state's geopolitical objectives. Blackwill and Harris identify seven instruments through which states exercise geoeconomic statecraft: trade policy, investment policy, economic sanctions, cyber instruments, economic assistance, financial and monetary policy, and national policies governing energy and commodities. Research Question:

How has Japan secured its supply of rare earth elements through geoeconomics policy during the 2018-2025 period?

■ METHOD

Research Approach and Data Sources

This study uses a qualitative method with a descriptive approach and a single case study design. The qualitative method was chosen because it focuses on descriptive data collection that emphasizes the interpretation of the meaning of words and language within a natural context in a holistic manner, in which the researcher seeks to understand phenomena from the participants' perspective based on the empirical social reality (Bryman, 2012; Creswell, 2018). The descriptive approach is used because this study seeks to portray the phenomenon in detail by describing the actors, processes, and relationships that emerge within the case without pursuing generalization (Creswell, 2018).

The single case study design was chosen because the case under study has intrinsic value and is well suited to understanding the phenomenon within its context in depth and specificity (Neuman, 2014). This study applies an embedded case study design, as described by Yin (2018), in which a single case contains multiple embedded units of analysis. The three investment projects (Lynas, Lofdal, and Caremag) are not treated as separate cases, but rather as embedded sub-units within the single overarching case of Japan's investment policy instrument. This design is appropriate because all three projects share the same state actor (JOGMEC), the same institutional mandate (Economic Security Promotion Act No. 43 of 2022; International Resource Strategy 2020), and the same strategic objective, diversification of REE supply away from China dominance, thus constituting components of a single coherent geoeconomic strategy rather than independent phenomena. The embedded units allow for within-case variation to be examined

systematically while maintaining analytical focus on the single case (Yin, 2018).

This study focuses on the policies of the Japanese government in securing the rare earth elements (REE) supply chain as an instrument for strengthening the country's strategic position within the structure of the global supply chain, with the unit of analysis being Japan's domestic and external policies aimed at securing supply and diversifying sources so that they are not concentrated in a single country. Substantively, this study is limited to the state-policy dimension and does not examine in depth the technical aspects of mining, individual corporate performance, or environmental and social impacts. Spatially, this study focuses solely on Japan, and temporally it covers the 2018-2025 period.

The data for this study are drawn from three categories of sources. The first category consists of primary official documents, including bilateral agreement texts, official press releases from Japan Oil, Gas and Metals National Corporation (JOGMEC) and the Ministry of Economy, Trade and Industry (METI), and Japanese government legislative documents. The second category consists of peer-reviewed academic literature providing theoretical frameworks and empirical findings from prior research. The third category consists of reports from reputable think tanks and policy research institutions, including the Center for Strategic and International Studies (CSIS), Nomura Research Institute, and the Japan Center for Economic Research.

Document Collection Technique

This study uses documentary research as its primary data-collection technique. This technique was chosen because the object of study, geoeconomic policy, is most authoritatively documented in official documents, bilateral agreements, international-institution reports, and academic literature (Bowen, 2009). Document collection was conducted systematically through three stages.

First, a structured database search was conducted using Google and institutional repositories with the following keyword combinations: “Japan rare earth strategy 2018-2025”, “rare earth supply chain Japan 2018-2025”, “Japan geoeconomic strategy on rare earth elements”, “Japan critical mineral policy”. Second, official document repositories were searched directly, including the METI official website (meti.go.jp), the JOGMEC press release database (jogmec.go.jp/english), the Japanese Law Translation database (japaneselawtranslation.go.jp), and WITS (World Integrated Trade Solution) for trade statistics. Third, snowball document retrieval was applied by tracing references cited in primary documents to identify additional relevant sources.

Document selection was guided by three explicit inclusion criteria: (1) the document must directly address Japan's state-level policy actions or geoeconomic decisions related to REE supply-chain security; (2) the document must fall within the 2018–2025 temporal boundary or provide baseline context for pre-2018 structural conditions; and (3) the document must originate from a verifiable primary or institutional source—official government publications, peer-reviewed journals, or established international organizations.

Documents were screened for evidence of each of the seven instruments by applying the operational criteria that Blackwill and Harris (2016) establish for each category. Instruments were considered not documentable when: (1) no official Japanese government document, international organization report, independent agency publication, or database entry within the 2018–2025 period explicitly referenced the instrument in the context of REE supply security, and (2) no bilateral agreement, press release, or institutional report from METI or JOGMEC referenced the instrument in connection with REE. This criterion was applied systematically across all seven geoeconomic instruments identified by Blackwill and Harris (2016). The exclusion of other instruments thus reflects the results of document-level screening, not an a priori assumption.

Data Analysis

In analyzing the data, this study employed three stages of qualitative data analysis: data reduction, data display, and conclusion drawing and verification, following the interactive model proposed by Miles, Huberman, and Saldaña (2014). To manage and systematize the coding process, this study used Taguette as a qualitative data analysis tool.

At the data reduction stage, all collected documents were imported into Taguette. A hierarchical coding scheme was developed before analysis, structured around the seven geoeconomic instruments identified by Blackwill and Harris (2016): trade policy, investment policy, economic sanctions, cyber, economic assistance, financial and monetary policy, and national policies governing energy and commodities, and their respective indicators.

For each of the seven instruments, a text segment was assigned to a given tag only when

it met all of the following criteria simultaneously satisfied three coding criteria established prior to analysis: first, the text explicitly referenced an economic action taken by the Japanese government or its authorized agencies; second, the action was directed toward securing Japan's REE supply chain; and third, the action corresponded to the operational definition of the instrument as described by Blackwill and Harris (2016).

Text segments that referenced economic activities by private actors without documented state authorization or coordination were excluded from coding. Likewise, text segments that mentioned an instrument only in a descriptive or historical context without documenting its active deployment by Japan within the 2018–2025 study period were coded as absent rather than present. This instrument-by-instrument coding approach allowed the study to systematically assess the presence or absence of documented evidence for each of the seven instruments, rather than assuming from the outset which instruments Japan employs.

At the data display stage, the results of the coding process were organized into a cross-instrument evidence matrix that mapped each of the seven geoeconomic instruments against the documents in which relevant evidence was or was not identified. This display made transparent both the instruments for which documentary evidence was found and those for which no documentation was identified within the study period and document corpus. The evidence matrix formed the basis for the subsequent analytical discussion in the Results and Discussion section.

At the conclusion-drawing and verification stage, findings from the coding matrix were verified through cross-document checking. Each text segment coded as evidence for a given instrument was confirmed against at least one additional document to reduce the risk of misinterpretation or over-reliance on a single source. Where a coding decision depended on a single document without corroboration, this was noted as a limitation of the available evidence.

■ RESULT AND DISCUSSION

This systematic screening across all seven categories produced a key finding at the data reduction stage: five of the seven instruments (economic sanctions, cyber instruments, economic assistance, financial and monetary policy, and national policies governing energy and commodities) yielded no document in the corpus that satisfied all three operational criteria simultaneously within the 2018–2025 period and the REE-specific substantive scope. Economic sanctions and cyber instruments were excluded because Japan holds no documented role as a sanctioning or cyber-offensive actor in REE-related disputes during the period; Japan is structurally positioned as a potential target of commodity coercion rather than its perpetrator. Economic assistance was excluded because the documented cooperation, specifically the JOGMEC-Namibia Scope of Work signed in August 2022, constitutes technical cooperation rather than development assistance accompanied by strategic conditionality, as Blackwill and Harris (2016) require for this instrument.

Financial and monetary policy was excluded because Japan's national stockpiling system, while related to REE security, operates through domestic reserve management rather than through any of the three transmission channels Blackwill and Harris identify for this instrument: currency footprint, low-cost capital mobilization, or influence over other states' borrowing costs. National policies governing energy and commodities were excluded because Japan's stockpiling operates defensively to protect against commodity coercion by others, rather than through control over commodity flows to exert leverage over other states, the defining mechanism of this instrument in Blackwill and Harris's (2016) framework. Trade policy presented the most ambiguous case: the US-Japan Critical Minerals Agreement (2023) constitutes a formal bilateral arrangement but functions primarily as a framework facilitating investment access and supply security rather than as a positive inducement or coercive measure altering the policy behavior of another state, which is the mechanism Blackwill and Harris specify for trade policy. Accordingly, trade policy was coded as insufficiently documented for the REE-specific mechanism within the period studied.

Investment policy was the sole instrument for which multiple documents in the corpus satisfied all three operational criteria: official state-level mechanisms (JOGMEC press releases, METI announcements, bilateral agreements), operating through the specific leverage mechanism Blackwill and Harris identify for this instrument (state-controlled outbound investment through direct conduits), and directed specifically toward securing Japan's REE supply chain. This finding is the product of systematic document screening rather than an a priori assumption, and it is acknowledged that the absence of documented evidence for other instruments reflects, in part, the limitations of publicly accessible official

Table 1. Evidence matrix

Geoeconomic Instrument	Evidence Identified	Assessment	Reason for Classification
Investment Policy	Multiple documents, including from Japan official documents (JOGMEC, METI, ANRE), Corporation repot (Sojitz, Caremag, Lynas, Namibia Critical Minerals), and independently corroborated by Vekasi (2021, 2022) and CSIS (2026),	Documented	Documents satisfy all three operational criteria: state-controlled investment, geopolitical motive, and geopolitical consequences. Consistently corroborated across official and independent academic sources.
Trade Policy	US-Japan Critical Minerals (2023)	Insufficient evidence	The Agreement functions as a framework facilitating investment access and supply-chain security, not as a positive inducement or coercive measure altering another state's behavior as the instrument requires
Economic Sanctions	None Identified	Insufficient evidence	Systematic search found no document (Japan Official nor independent agency or organization) indicating Japan acted as a sanctioning party in relation to REE; Japan has instead been the target, not the user, of coercive measures in this domain.
Cyber	None Identified	Insufficient evidence	Systematic search found no document (Japan official or independent agency or organization) indicating a state-sponsored cyber action directed at REE-related economic mechanisms, by or against Japan.
Economic Assistance	JOGMEC-Namibia Memorandum of Understanding (2022)	Insufficient evidence	The MoU constitutes technical cooperation on resource development, not development aid conditioned on strategic influence as required by the instrument's operational definition.
Financial and Monetary Policy	None identified	Insufficient evidence	Japan's Stockpiling system operates through domestic reserve accumulations rather than the three transmission channels specified by Blackwill and Harris (Currency footprint, low-cost capital mobilization, influence over other states' borrowing costs)
National Policies Governing Energy and Commodities	None identified	Insufficient evidence	Japan's stockpiling is defensive in nature, intended to buffer domestic supply risk, rather than a mechanism for exerting leverage over commodity flows to influence other states, as the instrument requires

documentation rather than constituting a definitive conclusion about the entirety of Japan's geoeconomic strategy.

Investment Policy as an Instrument of Japan's Geoeconomic Strategy in Securing the Rare Earth Elements Supply Chain

From 2018 to 2025, Japan pursued a structured overseas investment strategy through three main investment projects across different geographic regions and complementary segments of the REE supply chain. The first project involved the deepening of Japan's partnership with Lynas Rare Earths, Australia. This partnership is rooted in the establishment of the joint venture Japan Australia Rare Earth (JARE) by the Japan Organization for Metals and Energy Security (JOGMEC) and Sojitz Corporation in 2011 (JOGMEC, 2011). JOGMEC and Sojitz Corporation committed USD 250 million in equity and loans to Lynas, accompanied by an offtake agreement for a minimum of 8,500 tons per year of light rare earths (LRE) for the Japanese market over ten years (JOGMEC, 2011).

This bundling strategy ensures JOGMEC's financial commitment is structurally coupled to Japan's physical access to REE supply. Thus, the state's capital cannot be deployed without simultaneously securing both the supply entitlement and the commercial channel through which that supply reaches Japanese industry. Had equity investment and offtake rights been structured separately, the financial commitment could have proceeded without guaranteeing supply access. In contrast, the offtake commitment could have proceeded without the state's financial de-risking function. The integrated structure eliminates this decoupling risk and reflects what James and Vaaler (2018) identify as the signaling function of state co-investment: the state's financial presence signals credible long-term commitment to the investment relationship, thereby also securing stronger commercial terms, including exclusivity, than purely private capital could negotiate.

At the outset of the study period, JARE and Lynas signed a letter of agreement on 31 March 2022, reflecting a joint commitment to cooperate on future growth opportunities and the development of Japan's REE supply chain (JOGMEC, 2022). This agreement became the foundation for the next step, when on 20 September 2022, JARE announced an additional investment of USD 9 million in Lynas equity, allocated specifically to an additional exploration project at the Mt. Weld mine (JOGMEC, 2022). Japan also provided direct technical support by deploying its experienced geologists and technical professionals to the exploration program (JOGMEC, 2022).

This investment then deepened significantly in March 2023, when JARE announced an additional investment of AUD 200 million in Lynas equity, alongside the signing of a new offtake agreement securing up to 65% of the heavy rare earths (HREE) in the form of dysprosium and terbium produced by Lynas from Mt. Weld feedstock for the Japanese market (JOGMEC, 2023; Sojitz Corporation, 2023). In May 2025, Lynas reached a historic milestone by commercially producing dysprosium oxide at its processing facility in Malaysia, making it the first and only HREE producer operating commercially outside China at the separation stage (Lynas Rare Earths, 2025). In October 2025, Sojitz began importing dysprosium and terbium from that facility, marking the concrete realization of the 2023 offtake agreement that had secured Japan's access to HREE from a non-Chinese source (Sojitz Corporation, 2025).

The second was Japan's investment in the Lofdal Project, Namibia. In January 2020,

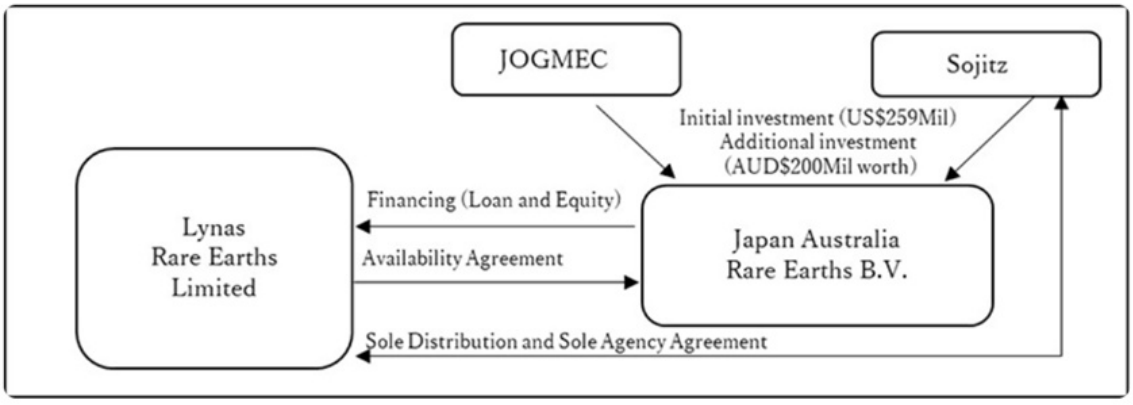

Figure 2. Jogmec-Sojitz business scheme with Lynas Australia

JOGMEC signed a joint venture agreement with Namibia Critical Metals Inc. to jointly explore, develop, exploit, refine, and distribute mineral products from the Lofdal Project (Namibia Critical Metals Inc., 2022). Under this joint venture scheme, JOGMEC could obtain a 50% ownership stake in the project by investing C$20 million in exploration and development, with an option to complete an earn-in and feasibility study (Namibia Critical Metals Inc., 2020).

The earn-in agreement structure was designed in three progressive stages. In Term 1, JOGMEC funded CAD 3 million in non-refundable exploration expenditure through 31 March 2021 without acquiring any ownership stake (Namibia Critical Metals Inc., 2020). This funding was an initial cost to verify the project's potential. In Term 2, JOGMEC contributed an additional CAD 7 million from April 2021 through March 2024 to acquire a 40% interest in the project (Namibia Critical Metals Inc., 2020). In Term 3, JOGMEC had the right to elect to contribute a further CAD 10 million to acquire an additional 10% interest, bringing its total ownership to 50% (Namibia Critical Metals Inc., 2020). In addition, following completion of the earn-in and feasibility study, JOGMEC has the right to purchase an additional 1% ownership stake for C$5,000,000, as well as the first right to fund the entire development of the project through to commercial production, with NCMI retaining a minimum 26% carried interest without needing to contribute its own funds, along with the right to purchase the entire output of the project at market price (Namibia Critical Metals Inc., 2020).

The Lofdal Project holds particular strategic significance as one of the very few HREE deposits outside China focused on dysprosium and terbium (Namibia Critical Metals Inc., 2022). In November 2022, an updated Preliminary Economic Assessment (PEA) showed an after-tax net present value of USD 391 million with an annual IRR of 28 percent, prompting JOGMEC to accelerate funding for a Pre-Feasibility Study (PFS) in 2024 (Namibia Critical Metals Inc., 2024).

The third was Japan's investment in the Caremag project in France. In March 2025, JOGMEC, together with Japanese industrial-gas company Iwatani Corporation, announced a joint investment of up to €110 million in Caremag, an REE-refining project operated by Carester in Lacq, France (JOGMEC, 2025). Unlike Lynas and Lofdal, which are upstream-segment projects (mining and exploration), Caremag operates in the midstream segment of the REE supply chain as a refining and recycling facility rather than a mine. Through the new joint venture Japan France Rare Earths Co., Ltd., the two countries secured a long-term offtake for half of Caremag's HREE oxide output, primarily dysprosium and terbium (JOGMEC, 2025). For Japan, this investment is expected to secure supply equivalent to 20 percent of future domestic HREE demand from non-Chinese sources (METI, 2025).

The choice of a hybrid financing structure in the Caremag investment, combining equity participation with debt financing through JOGMEC alongside a distribution agreement with Iwatani, reflects a structurally rational response to the specific market conditions that characterize standalone rare earth refineries operating outside China. Unlike upstream mining investment in Lynas and Lofdal, where JOGMEC's equity is anchored to the asset value of a mineral deposit, Caremag generates revenue solely from processing third-party feedstock, creating a merchant risk profile that private capital markets are structurally ill-equipped to absorb. Bala and Johnston (2025)

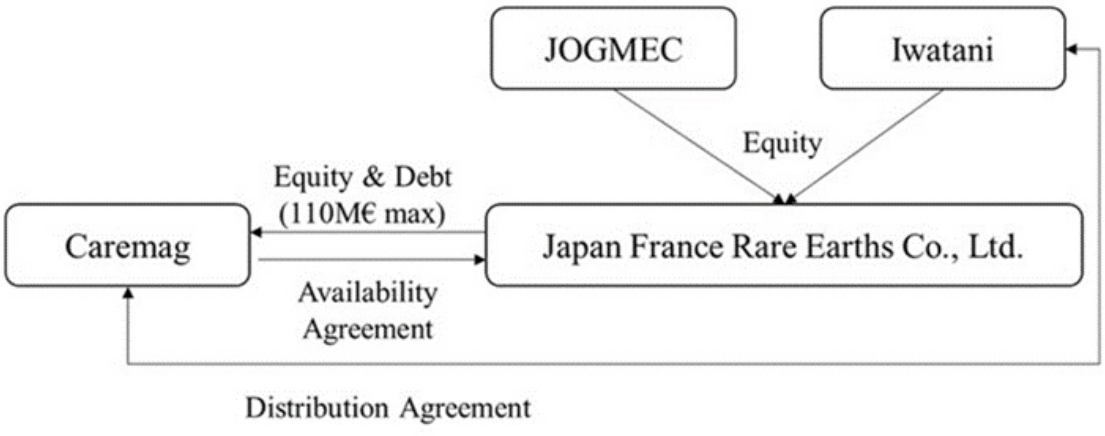

Figure 3. Jogmec-Iwatani business scheme with Caremag, France

Table 2. Cross-subunit variation in Jogmec's investment strategy

Dimension	Lynas-Australia	Lofdal-Namibia	Caremag-France
Supply-chain position	Mining-separated supply	Exploration and future mining	Refining and recycling
Project maturity	Commercial	Exploration/development	Pre-commercial
Financial mechanism	Equity and loans	Progressive earn-in	Equity and Debt
Supply mechanism	Long-term offtake	Ownership and future access	Long-term offtake
Japanese private partner	Sojitz Corporation	Limited during exploration statge	Iwatani Corporation
Strategic function	Immediate alternative supply	Long-term resource option	Midstream diversification
Host economy	Advanced economy	Developing economy	Advanced economy

identify this as a systemic pattern. For materials dependent on complex midstream processing, private investment remains limited, and government intervention is necessary to de-risk early-stage projects; financial support for refining and separation has consistently proven more effective for supply resilience than upstream mining incentives alone.

The comparison across the three embedded sub-units shows that Japan does not use a uniform investment mechanism across overseas REE projects. Instead, JOGMEC adapts the structure of state-backed investment according to project maturity, supply-chain position, and the commercial risk associated with each project.

Lynas represents the most commercially matured model, in which Japanese state-backed financing is directly connected to existing production capacity and long-term offtake agreements. In contrast, the Lofdal project remains in the exploration and development stages, leading JOGMEC to employ a progressive earn-in mechanism through which exploration financing is gradually converted into ownership rights and prospective access to future output. Caremag represents a different configuration because it targets the midstream refining and recycling stage rather than mining, resulting hybrid equity and debt financing structure.

Lynas and Caremag are also the two most commercially mature projects, while Namibia is both the sole developing-country case and the sole early-stage case. With no case combining a developed-country setting with an early-stage project, this study cannot disentangle which factor primarily drives JOGMEC's differentiated approach. The comparison indicates that the distinction between developed and developing host countries alone does not explain variation in JOGMEC's investment strategy. Project maturity and position within the REE supply chain appear to be more directly associated with the type of financing mechanism employed. Despite these differences, all three projects share a common strategic logic: state-backed capital is converted into present or future access to REE supply outside China-centered supply chains.

To understand why these three investments are not merely ordinary commercial transactions, a deeper analysis is required using the geoeconomic framework of Blackwill and Harris (2016), who identify three main indicators of investment policy as a geoeconomic instrument: state-based investment as a direct channel, geopolitical motive within investment agreements, and the resulting geopolitical consequences.

State-Based Investment as a Direct Geoeconomic Channel

Japan's investment-policy instrument for securing REE supply is realized through state control exercised directly via a single body, namely the Japan Organization for Metals and Energy Security (JOGMEC). JOGMEC was established on 29 February 2004 under the Act on the Japan Oil, Gas and Metals National Corporation, enacted on 26 July 2002, by merging the functions of the Japan National Oil Corporation, which had previously been responsible for securing oil and natural gas supply, and the Metal Mining Agency of Japan, which was responsible for ensuring the supply of nonferrous metals and minerals (JOGMEC, n.d.).

Of the three categories of state investment vehicles that Blackwill and Harris (2016) explicitly identify, JOGMEC falls into the category of State-Owned Enterprise. In the academic literature, JOGMEC is consistently classified as a state-owned entity. Vekasi (2022) explicitly describes it as "a state-owned enterprise that provides financial backing" for Japanese companies involved in critical-mineral projects overseas. Müller (2023), writing in the South African Journal of International Affairs, likewise confirms this classification, describing JOGMEC as "a state-

owned company aimed at supporting Japanese companies that are dependent on minerals and metals" through the provision of loans and credit to secure access to minerals and metals, including through offtake agreements. This classification is consistent with the Blackwill and Harris (2016) framework, which identifies SOEs as direct state-owned investment vehicles used for geoeconomic purposes.

JOGMEC's characteristics as an SOE that make it a geoeconomic instrument, in the Blackwill and Harris (2016) sense, are reflected in its financing mechanism. Vekasi (2022) notes that JOGMEC provides financial support across various mineral projects, a level of involvement fundamentally different from purely private investment, since it absorbs risks that the private sector would not bear on its own. Within the Blackwill and Harris (2016) framework, this financing pattern reflects what they term "coordinated, state-financed campaigns", a defining characteristic of state-based investment as a geoeconomic instrument. This corresponds with Lopes Junior et al.'s (2024) finding that government influence over SOEs can shape their investment decisions in support of broader government agendas.

JOGMEC's strategic mandate as a state investment instrument is reinforced by two official policy instruments during the period studied. First, the International Resource Strategy 2020, announced by the Japanese government through METI, explicitly establishes a strengthened stockpiling system for 34 types of rare metals and expands JOGMEC's support for overseas REE refining and separation projects as a key pillar of national mineral policy (ANRE, 2020). Second, the Act on the Promotion of Ensuring National Security through Integrated Implementation of Economic Measures (Act No. 43 of 2022), passed by the Japanese Diet on 11 May 2022, explicitly designates critical minerals as one of the "specified critical products" requiring active state supply-chain protection (Japanese Law Translation, 2022).

More significantly, this law explicitly lists JOGMEC as one of the "stable-supply-support independent administrative agencies" mandated to support the implementation of critical-product supply security (Koyu et al., 2022). This institutionalization is consistent with Şahin Temel's (2025) argument that Japan's Economic Security Promotion Act represents an institutionalized response to strategic dependencies, embedding economic security concerns more firmly within the state's policy framework. This designation legally expands JOGMEC's mandate and provides a stronger legal basis for intensifying its overseas investment during the period studied.

Further concrete evidence of direct state control in REE transactions appears in the JOGMEC-Sojitz-Lynas agreement. Specifically, the transaction could proceed only after obtaining direct approval from Japan's Minister of Economy, Trade and Industry (JOGMEC, 2011). This shows that the investment decision did not stem purely from the business entity's commercial calculations, but required formal political authorization at the cabinet level. Blackwill and Harris (2016) characterize this as a direct state-owned investment instrument controlled by a government-subordinate agency. The same pattern reappears in the Caremag project. JOGMEC states that its financing support was granted with the approval of Japan's Minister of Economy, Trade and Industry, and that this was the first instance of JOGMEC investment support for a stand-alone refinery project following the fiscal year 2020 revision of the JOGMEC Act. This reinforces the argument that the state is directly present in REE investment decisions (JOGMEC, 2025).

Japan's REE investments also display a consistent pattern. This investment model operates through systematic public-private partnerships. Both of the main investments during the 2018-2025 period–Lynas and Caremag–follow this pattern. METI acts as the policymaker, while JOGMEC serves as the implementing institution. Meanwhile, Japanese private companies function as commercial partners that provide market capability. Within this scheme, JOGMEC provides long-term funding and risk guarantees that the private sector generally cannot bear on its own (Vekasi, 2022). This is consistent with the argument advanced by James and Vaaler (2018) that substantial but non-controlling state ownership can reduce investment risk for private co-investors by signaling credible assurance that an investment project's initial terms will be maintained despite fluctuations in host-country policy stability.

In two of the three Japanese REE projects examined, JOGMEC partnered with Japanese private trading companies within the same investment vehicle. Official METI documents confirm that in March 2011, JOGMEC and Sojitz, through their joint vehicle Japan Australia Rare Earth (JARE), signed a loan and investment agreement worth USD 250 million with Lynas Corporation (METI, 2023). A similar pattern occurred in the Caremag project in France. Iwatani Corporation and JOGMEC signed a long-term supply contract related to their investment in Caremag SAS through the joint vehicle Japan France Rare Earths Co.,

Ltd. (METI, 2025). The presence of private actors driving these investments still satisfies the criteria for a direct state investment channel, even though the structure is hybrid. This is because, within the Blackwill and Harris (2016) framework, the determining factor for classification is not the composition of the parties contributing capital, but the authority that issues the orders and authorizations underlying the investment decision.

Geopolitical Motive in Investment Agreements

Blackwill and Harris (2016) state that state-controlled investment is sometimes accompanied by explicit geopolitical conditions. However, Blackwill and Harris (2016) note that when states invest purely on economic grounds, it remains a separate question whether such investment can nonetheless reshape the strategic landscape in certain ways. This distinction is analytically productive for evaluating Japan's REE investment motive, since Japan's official documents do not frame JOGMEC's investments in overtly geopolitical terms. The central question, therefore, is whether the motive underlying these investments is better understood as a geostrategic response to China's dominance, as a market-driven reaction to industrial supply risk, or as a combination of both.

Japan's investment motive is to reduce dependence on Chinese imports and diversify its REE supply chain. The diversification motive found within JOGMEC's investment documents cannot be understood in isolation from the highly concentrated structure of the global REE market. In its official report, the U.S. Department of Energy notes that production concentration within the rare earth magnet supply chain in China increases at every downstream stage, rising from a 58% share of global rare earth mining in 2020 to a 92% share at the magnet-production stage (U.S. Department of Energy, 2022). The report also notes that although neodymium, praseodymium, and dysprosium are now beginning to be produced outside China, access to rare earths remains limited outside that region (U.S. Department of Energy, 2022).

At the level of Japanese national policy, the Agency for Natural Resources and Energy under the Ministry of Economy, Trade and Industry (METI) notes that, based on 2018 data, Japan imported around 60% of its rare earth needs from China, and set out the International Resource Strategy 2020, designed to address the risk of supply disruption arising from this concentration (ANRE, 2020). These data form the structural context underlying every statement of motive found at the level of Japan's investment transactions.

However, a key question in the literature is whether Japan's diversification strategy is best understood as a geostrategic response or a market-driven industrial necessity. Barteková and Kemp (2016) show that Japan's post-2010 response cannot be understood solely through economic dependence or geopolitical rivalry. Rather, Japan's need to preserve the international competitiveness of its high-technology industries became intertwined with geopolitical vulnerability following China's export disruption, creating a strategic imperative to diversify rare earth supplies (Barteková & Kemp, 2016). This interaction between economic and strategic motives provides an important bridge to a geoeconomic interpretation of Japan's subsequent policies. Extending this discussion, Gholz and Hughes (2019) contend that although market adjustment played a central role in reducing Japan's vulnerability after the 2010 REE crisis, coordinated public and private action facilitated these adjustments, with government support complementing firms' investment and innovation in diversifying the REE supply chain.

Schmid's (2019) analysis provides further empirical insight into how Japan translated these economic and strategic concerns into concrete policy measures. Schmid (2019) argues that Japan viewed its dependence on Chinese rare earth supplies as a strategic threat because rare earths underpin a substantial share of the country's high-value manufacturing exports. Consequently, the Japanese government pursued supply diversification by mobilizing JOGMEC to finance overseas rare earth projects and secure long-term supply arrangements outside China (Schmid, 2019). In this context, Vekasi's (2021) analysis is instructive: she argues that Japan's critical minerals strategy occupies a productive middle ground in which industrial policy and geopolitical statecraft are not mutually exclusive, but rather mutually reinforcing—commercial partners are selected precisely because they offer geopolitical diversification, and geopolitical goals are pursued through commercially structured vehicles that reduce the cost and risk to the state.

Taken together, these studies suggest that Japan's rare earth diversification strategy cannot be adequately explained through either commercial or geopolitical motivations alone. Rather, the evidence points to a strategy in which economic instruments are deliberately

employed to achieve strategic objectives while simultaneously sustaining industrial competitiveness.

Japan's investment motive through the JOGMEC model operates differently in terms of its leverage target. Rather than using investment to pressure the recipient government's policy, JOGMEC uses investment to secure contractual claims over the investee company's production output, so that the resulting leverage remains present but shifts its target from government to corporation. The strongest evidence of this pattern is seen in JOGMEC's investment in Lynas Rare Earths in March 2023. Official documents from the Ministry of Economy, Trade and Industry record that this additional investment of AUD 200 million secured a supply contract for up to 65% of dysprosium and terbium from the Mount Weld mine for the Japanese market, equivalent to around 30 percent of Japan's domestic demand for heavy rare earths (METI, 2023). This 65 percent figure shows that JOGMEC was not merely one buyer among many others in the global market, but was negotiating a majority claim over the output of one of the largest heavy rare earth sources outside China.

In addition, the motive underlying this investment is explicitly stated in official JOGMEC documents. JOGMEC states that HREE production within JARE will support a stable HREE supply to Japan by diversifying sources of supply currently concentrated in China (JOGMEC, 2023). An identical statement also appears in Sojitz Corporation's official press release issued on the same date (Sojitz Corporation, 2023). The near-identical wording in two official documents published by both entities indicates that this statement of motive reflects a national strategy to secure the supply chain and reduce dependence on China. JOGMEC further states that this project will make Lynas the first company to produce HREE from mine to finished product with the involvement of a Japanese company (JOGMEC, 2023). This constitutes a claim of market uniqueness that reinforces the context that this investment was directed toward one of very few alternatives available outside China at the time, consistent with the limited access to non-Chinese HREE noted by the DOE (JOGMEC, 2023; U.S. Department of Energy, 2022).

A similar pattern recurs in the Caremag SAS investment in France. METI decided to contribute approximately €100 million through JOGMEC to the heavy rare earth refining project. JOGMEC and Iwatani Corporation signed a long-term supply contract anticipated to meet 20% of Japan's future rare earth demand (METI, 2025). METI also characterizes the project as a new alternative supply project for heavy rare earths, intended to reduce dependence on any single country (METI, 2025). This policy statement confirms that the purpose of this investment is to secure supply access, not to project political influence over the French government. This character is also evident in JOGMEC's investment pattern in Namibia, which has proceeded through phased exploration since January 2020. JOGMEC participated in the Lofdal Project owned by Namibia Critical Metals Inc. by signing a Memorandum of Understanding with Namibia's Ministry of Mines and Energy in August 2022 for supply-chain research cooperation (JOGMEC, 2022).

This investment is not accompanied by direct political conditionality over the recipient government; instead, it focuses on securing physical access to production output through long-term offtake contracts. Nevertheless, this investment still satisfies Blackwill and Harris's (2016) basic criteria for a geoeconomic instrument, since it is driven by interests that extend beyond revenue and profit. The JOGMEC model implies a variant of investment policy within the Blackwill and Harris framework, viewed from the perspective of a structurally resource-dependent state. Japan's strategy through JOGMEC illustrates a model in which a state possessing high manufacturing capacity but lacking domestic resource endowments uses state-based investment not to project power over another state, but to manage its own structural dependence on the state that controls the strategic material supply chain.

Geopolitical Consequences

Blackwill and Harris (2016) state that geoeconomic strategy in the form of investment can produce more explicit geopolitical consequences, such as influence over the recipient state's political behavior (yield influence in the breach). However, Blackwill and Harris (2016) also state that when state-led investment is not geopolitically motivated, it still carries real geopolitical consequences. The effects of such investment can be more subtle and may only be visible in the aggregate, or may even produce unintended effects.

Examination of the three cases of Japanese investment finds no empirical evidence that the investments influenced or produced any change in the recipient states' policy positions or political behavior as a result of the investment. The cooperation established is reciprocal in nature and formalized through

equal cooperative frameworks, rather than through conditionality that restricts the recipient state's policy choices or behavior. Accordingly, the geopolitical consequences of Japan's REE investment operate primarily through a change in the calculus of the investor state's own policy, rather than through leverage over the recipient state. Nevertheless, this investment still produces consequences, although these appear more subtle, consistent with Blackwill and Harris's observation.

First, the most concrete and verifiable consequence of Japan's series of investments is the creation of commercial HREE production capacity outside Chinese control, capacity that previously did not exist in the global market. In May 2025, Lynas Rare Earths commercially produced dysprosium oxide for the first time at its processing facility in Malaysia, making it the first HREE producer to operate commercially outside China at the separation stage (Lynas Rare Earths Ltd., 2025). In its press release, Sojitz Corporation states that Japan has begun importing HREE from Lynas since October 2025 (Sojitz Corporation, 2025).

The geopolitical significance of building this capacity is structural, not merely bilateral. Official documents from Lynas Corporation state that it is the first commercial HREE processing company outside Chinese separation capacity (Lynas Rare Earths Ltd., 2025). Research by Sinclair and Coe (2026) likewise confirms that Lynas remains the only significant source of HREE outside China. Their research also asserts that success in the rare earth industry requires strategic coordination across the mining, processing, and downstream manufacturing stages, a condition only met through long-term state investment, not through market mechanisms alone (Sinclair & Coe, 2026). This capacity-building therefore stands as a long-term consequence, a characteristic consistent with Blackwill and Harris's (2016) argument that the consequences of state investment can be structural and only visible in the aggregate.

The second verifiable consequence is the expansion of Japan's strategic options for accessing HREE, a direct manifestation of Blackwill and Harris's (2016) argument that state investment can "widen the options" available to the investing state. Through investment and offtake agreements with Lynas, Japan has secured access rights covering approximately 30% of current domestic HREE demand (Shinoda, 2026). This option is further reinforced by parallel investment in Lofdal, Namibia, where JOGMEC has the option to acquire up to 50% ownership of the project through USD 23 million in exploration funding (Namibia Critical Metals Inc., 2026). A further option is the investment in Caremag, France, which, through the joint venture Japan France Rare Earths, secures an offtake for 50% of Caremag's HREE output once the facility is fully operational (JOGMEC, 2025).

The strategic options created by this series of investments are physically real—evidenced not by contractual commitment alone, but by commercial delivery that has already taken place. Sojitz Corporation's official press release confirms that the import of dysprosium and terbium from Lynas's Malaysian facility into Japan had already commenced by October 2025 (Sojitz Corporation, 2025). At the same time, neither Sojitz nor Lynas has disclosed the precise volume of this initial shipment, a common practice for commercially sensitive shipment data. This absence of volume-specific disclosure does not undermine the fact that delivery has occurred; rather, it means that the full effect of this delivery on Japan's official import statistics has not yet been independently verifiable at the time of writing.

The strategic options are also targeting the structural bottleneck rather than peripheral upstream stages. The academic literature consistently identifies midstream separation and refining as the critical chokepoint in the REE supply chain. Guo and Wang (2024) confirm that the midstream "involves the separation and smelting of raw materials and deep processing, which has certain technical thresholds and requires complete supporting production facilities," and identify countries as structurally more dependent on Chinese midstream products than on Chinese upstream resources. Japan's JOGMEC investments during 2018–2025 target this midstream stage directly: Lynas's LAMP facility in Malaysia performs oxide separation, and Caremag in France is designed as a refining and recycling facility. Therefore, this strategic option provides Japan with an alternative when supply disruptions occur at the most critical stage of the supply chain involving its primary supplier.

This expansion of strategic options is layered and has not yet been fully realized simultaneously. Lofdal only completed its Pre-Feasibility Study stage in December 2025, while Caremag is targeted to begin commercial operation by the end of 2026 (Namibia Critical Metals, 2026; Carester, 2025). The expansion of strategic options created by this series of investments is progressive in nature. Lynas represents an option that has already been commercially actualized since May 2025, while Lofdal and Caremag are options still in the process of maturing. Therefore, the question of

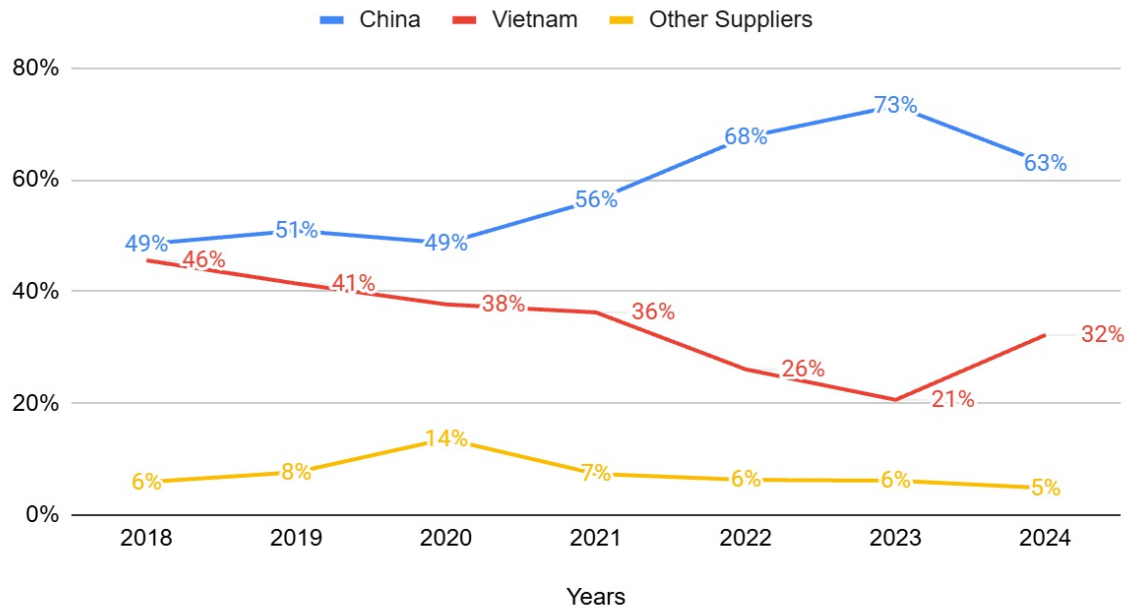

Figure 4. Japan's three largest suppliers of rare earth metals by import volume

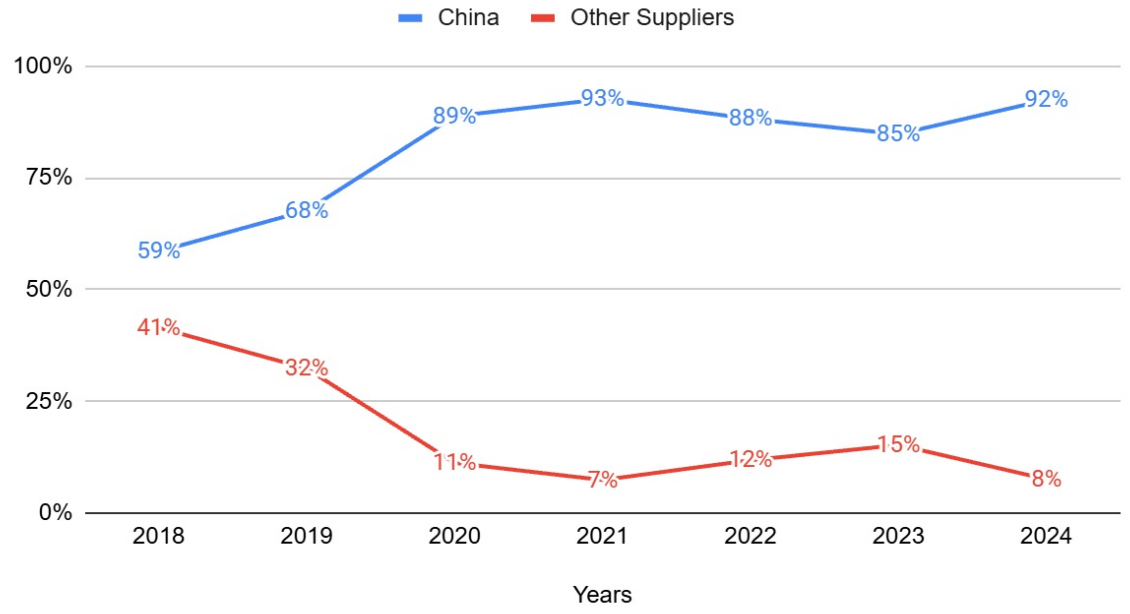

Figure 5. Japan's three largest suppliers of rare earth compounds by import volume

whether this investment will reduce Japan's dependence on Chinese REE imports remains inconclusive.

This is also reflected in data released by the World Integrated Trade Solution (WITS), sourced from UN Comtrade, showing that the volume of Japan's REE metal imports from China remains dominant. This data is reinforced by the Center for Strategic and International Studies, which confirms that in 2024, Japan's REE metal imports from China accounted for 63 percent of Japan's total REE metal imports (CSIS, 2026). These figures show that capacity building and the creation of strategic options have not yet directly altered the pattern of Japan's REE metal and compound trade with China in absolute volume terms during 2018-2024. This gradual "widening of options" is consistent with Blackwill and Harris's (2016) emphasis that the impact of state investment can be cumulative rather than instantaneous. This argument is further

reinforced by Babic (2023), who argues that foreign state-led investment can generate broader systemic consequences that may emerge indirectly and remain less immediately visible than its initial economic or geopolitical objectives.

A third geopolitical consequence appears in the formalization of bilateral cooperation between Japan and the recipient investment countries within official policy frameworks. As Hosoi (2025) demonstrates, Japan's engagement with Africa increasingly became integrated into a more business-oriented policy approach in which METI assumed a greater role in shaping Japan's African policy. This shift reflects the Japanese government's effort to connect economic engagement with broader national policy objectives rather than treating commercial relations as an exclusively private-sector matter.

In Namibia, this broader policy orientation is reflected in the formalization of cooperation on rare earth elements. In August 2023, JOGMEC, accompanying METI Minister Yasutoshi Nishimura on a visit to Namibia, signed a Scope of Work with Namibia's Ministry of Mines and Energy for REE supply-chain research (JOGMEC, 2023). This cooperation builds on a Memorandum of Understanding signed in August 2022 at the Tokyo International Conference on African Development (TICAD 8) forum, which covers cooperation in supply-chain research, exploration-technology training, joint analysis, and field surveys (JOGMEC, 2023). This case shows that JOGMEC's REE investment has also been followed by the formalization of relations at the ministerial policy level, rather than merely as commercial transactions between companies.

■ CONCLUSION

This study shows that Japan secured its supply of the critical mineral rare earth elements (REE) during the 2018-2025 period primarily through the investment-policy instrument as a form of geoeconomic strategy. This finding answers the research question by showing that, of the seven geoeconomic instruments proposed by Blackwill and Harris, only investment policy is explicitly documented and used by Japan to secure its REE supply chain. Japan implements this instrument through the Japan Organization for Metals and Energy Security (JOGMEC), a state-owned enterprise that channels financing, guarantees risk absorption, and builds public-private partnerships across three strategic projects: Lynas in Australia, the Lofdal Project in Namibia, and Caremag in France. Through these investments, Japan has secured long-term offtake contracts, diversified its supply sources away from China, and strengthened supply-chain resilience for its national strategic industries.

The main finding of this study shows that Japan's REE investment is not used as an instrument to influence the recipient state's political behavior, but rather as a defensive strategy to manage structural dependence on China's dominance within the global REE supply chain. The resulting geopolitical consequences primarily include the creation of heavy rare earth production capacity outside China, the expansion of Japan's strategic options for obtaining REE supply through alternative sources, and the strengthening of bilateral cooperation in the critical-minerals sector. Nevertheless, this study also finds that this diversification has not yet directly reduced Japan's level of import dependence on China during the period studied. Therefore, Japan's geoeconomic strategy is more accurately understood as a long-term effort to enhance the resilience of the critical-mineral supply chain through state-based investment, rather than as an instrument for building geopolitical dominance over other states.

The JOGMEC model carries practical implications beyond Japan's own context. For states facing analogous structural dependencies —countries with high-technology manufacturing capacity but lacking domestic critical mineral endowments—Japan's experience suggests several transferable lessons. First, establishing a dedicated state investment vehicle with a clear mandate to absorb market and political risks that the private sector cannot bear is a precondition for effective supply-chain diversification in strategic mineral sectors. Second, the public-private partnership structure—in which a state institution provides risk capital while private trading companies provide market networks and commercial expertise—appears more effective than either pure state investment or pure private market investment alone. Third, long-term commitment is essential: Japan's Lynas investment required over a decade of sustained financing before commercially producing HREE outside China. For economies considering similar strategies, these findings suggest that short-term grant programs or one-off diplomatic agreements are insufficient substitutes for institutionalized, patient capital deployed through a dedicated state investment body with a clear supply-security mandate.

■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the drafting and revision of this manuscript, the author used ChatGPT to improve English grammar, identify inappropriate or unclear word choices, and refine sentence structure. Following the use of the tool, the author reviewed and revised the suggested changes as necessary and accepts full responsibility for the final content of the article.

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