FAIR FINANCE ASIA

UNEARTHING THE HIDDEN COSTS:

SOCIAL AND ENVIRONMENTAL CONSIDERATIONS IN ASIA'S TRANSITION MINERALS MINING AND SUPPLY CHAINS

DECEMBER 2024

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ResponsiBank Indonesia

FairFinanceGuide Japan

FairFinance Philippines

RESEARCH PARTNER

Profundo

SUPPORTED BY

Sweden Sverige

ABOUT THIS REPORT

This report, commissioned by Fair Finance Asia (FFA), investigates the supply chain relationships between two nickel mines in Indonesia, one mine in the Philippines and seven electric vehicles (EVs) global brands linked with financial institutions based in Japan and the Association of Southeast Asian Nations (ASEAN) countries. The report presents a detailed description of the type of financing considered, its sources and how the identified financing is attributed to each financial institution involved in the deal.

This report considers data and documents published before 10 December 2024.

This report is intended to provide data-driven evidence to contribute to the public debate on sustainable finance for just energy transition in Asia, with a focus on transition mineral mining.

For more information on this report, please contact *info@fairfinanceasia.org.*

ABOUT FAIR FINANCE ASIA

FFA is a regional network of Asian civil society organizations committed to ensuring that the business decisions and funding strategies of financial institutions in the region respect the social and environmental well-being of the communities in which they operate. Civil society coalitions from 10 countries are part of the FFA network: Bangladesh, Cambodia, India, Indonesia, Japan, Lao PDR, Pakistan, the Philippines, Thailand, and Vietnam. To learn more about FFA, visit: *www.fairfinanceasia.org*.

ABOUT PROFUNDO

With profound research and advice, Profundo aims to make a practical contribution to a sustainable world and social justice. Quality comes first, aiming at the needs of our clients. Thematically we focus on commodity chains, the financial sector, and corporate social responsibility. More information on Profundo can be found at *www.profundo.nl.*

RESEARCH PARTNERSHIP

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Front cover page: Workers clogged the street while on their way to work during the working shift at Indonesia Weda Bay Industrial Park (IWIP) in Central Halmahera, North Maluku, Indonesia, August 12, 2024. Photo by Garry Lotulung, a freelance photojournalist and documentary photographer based in Jakarta specialising in stories about the human condition, social change, and environmental crises.

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ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
BHRRC	Business and Human Rights Resource Centre
CBNC	Coral Bay Nickel Corporation
CSO	Civil Society Organization
EV	Electric Vehicle
GM	General Motors
HPAL	High-Pressure Acid Leaching
IWIP	PT Indonesia Weda Bay Industrial Park
JV	Joint Venture
MIND ID	PT Mineral Industri Indonesia
MoU	Memorandum of Understanding
MPSA	Mineral Production Sharing Agreement
NAC	Nickel Asia Corporation
NCA	Nickel-Cobalt-Aluminium
NGO	Non-governmental Organisations
PTVI	PT Vale Indonesia
REPT	Rept Battero Energy
RKEF	Rotary Kiln-Electric Furnace
RTNMC	Rio Tuba Nickel Mining Corporation
SMBC	Sumitomo Mitsui Banking Corporation
SMM	Sumitomo Metal Mining
THPAL	Taganito HPAL Nickel Corporation
VBM	Vale Base Metals
VCL	Vale Canada Limited
VW	Volkswagen
WBN	Weda Pay Nickel
WMT	Wet Metric Ton

EXECUTIVE SUMMARY

Nickel is in high demand globally as a key mineral for the energy transition. However, the environmental and social impacts of nickel mining have created serious sustainability concerns.

This research investigates supply chain relationships between two nickel mines in Indonesia and one mine in the Philippines, and the use of nickel in the manufacturing of electric vehicles (EVs) by global companies. It looks at indications for current as well as future supply chain exposure. The research highlights the need to identify, mitigate, and address human rights and environmental risks and impacts in the respective supply chains of these nickel mines. There are distinct impacts in all processing stages, including upstream (extraction/mining), midstream (processing and refining the minerals), and downstream (battery manufacturing and sales). The most serious harms usually occur in and around mining sites, or the upstream stage of the value chain. There are also increasingly serious impacts on communities in the smelting and processing stage (midstream), usually because of high levels of pollution and weak environmental safeguards.[1, 2, 3, 4]

The findings suggest indirect supply chain links between the three nickel mines and several American, European, and Asian EV manufacturers. Some of these connections are due to existing product flows, while others are linked to projects under construction or planned for the coming years. Seven of these EV manufacturers have been selected for additional analysis of their financial relationships.

In terms of the credit financing provided to the selected companies, this research finds that financial institutions based in Japan and the Association of Southeast Asian Nations (ASEAN) region have provided between USD 5 million and 6 million yearly to the companies in scope. Most of this financing has been in the form of loans (as opposed to the underwriting of shares and bonds) primarily to the Ford Motor Company, which has received 60% of total financing. The research finds that most of the financing was provided by Japanese financial institutions such as Mizuho Financial, Mitsubishi UFJ Financial, and the Sumitomo Mitsui Banking Corporation (SMBC) Group.

Finally, this research finds that the seven selected companies have received more than $100 billion in investment financing, primarily through shareholdings. Toyota Motor Corporation received more than 80% of all investment financing. The main investors were Japanese financial institutions such as the Government Pension Investment Fund, Nippon Life Insurance, and Sumitomo Mitsui Trust, which collectively provided more than $50 billion.

INTRODUCTION

Nickel is one of the key minerals needed for the energy transition, which is driving continuous growth in global demand. Indonesia dominates the global market with around half of global nickel output,[5] followed by the Philippines. In recent years, Indonesia has banned exports of raw nickel materials in an attempt to transform itself from an exporter into a leading player in the global nickel value chain. Midstream and downstream customers are being encouraged to invest in value-adding industries such as refining and battery manufacturing, and Chinese investments in nickel processing have been a driving force of Indonesia's industry expansion.[6]

In 2019, President Joko Widodo declared the development of a domestic electric vehicle (EV) industry a national priority. Indonesia has abundant reserves of both nickel[7] and cobalt – metals required for EV and battery technologies – and nickel production has increased more than fivefold since 2017,[8] with the country producing 1.6 metric tons (mt) of nickel in 2022.[9] That same year, Indonesia became the second-largest cobalt producer in Asia, overtaking established producers like Australia and the Philippines. In 2021, the state-owned consortium Indonesia Battery Corporation (IBC) was established to strengthen Indonesia's position in the global EV value chain as a leading battery supplier and regional market leader.[10]

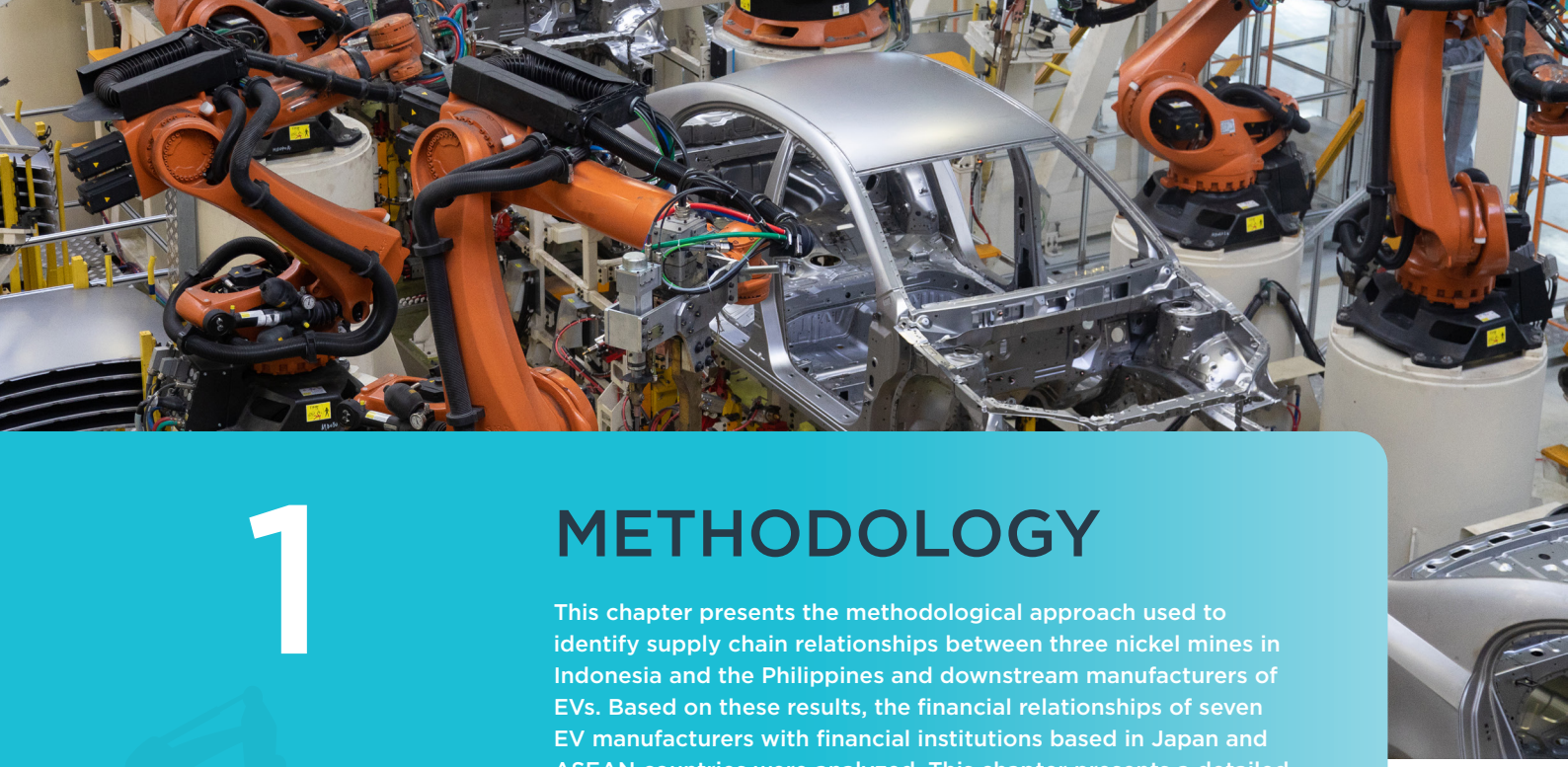
Globally, mining companies are merging, buying subsidiary companies, and participating in joint ventures (JVs) with smelters and refiners,[11] cathode precursor manufacturers, and battery manufacturers. This is creating a more integrated transition minerals value chain between the upstream, midstream, and downstream stages.

In the past few years, automobile and battery companies, including Ford Motor Corporation, Hyundai Motor Group,[12] and Volkswagen (VW),[13] have announced agreements and strategic partnerships with mines, chemical manufacturers, and processing plants.[14]

These developments represent a historic shift in the responsibility and due diligence practices of downstream manufacturers. Rather than focusing on supply chain due diligence through industry schemes and audit programs, manufacturers are becoming more directly involved at the mine and refinery level. This means that battery manufacturer investors are playing a more active role in – and have greater responsibility for – identifying, mitigating, and addressing human rights and environmental harms across all stages of the value chain. Financial institutions and investors can help ensure that rights-based considerations are integrated across their policies and practices, avoiding material financial, operational, and reputational risks.

This report maps nickel flows from three mines in Indonesia and the Philippines and aims to connect them to downstream manufacturers of EVs. Based on the findings of the supply chain analysis, seven EV manufacturers with relevant exposure were selected for analysis of their relationships with Japanese and ASEAN-based[15] financial institutions.

The report begins by explaining the methodology used to conduct the research (chapter 1). The findings from the supply chain analysis are explained in chapter 2, followed by the results of the financial analysis in chapter 3.



1 METHODOLOGY

This chapter presents the methodological approach used to identify supply chain relationships between three nickel mines in Indonesia and the Philippines and downstream manufacturers of EVs. Based on these results, the financial relationships of seven EV manufacturers with financial institutions based in Japan and ASEAN countries were analyzed. This chapter presents a detailed description of the type of financing considered, its sources, and how the financing is tied to each financial institution. Finally, the limitations of the methodology are presented, including the reasons for these limitations and the measures taken to reduce their impact on the results.

1.1. Scope of the research

The research focused on three nickel mines in Southeast Asia:

- PT Vale Sorowako mine (Indonesia)
- PT Weda Bay Nickel mine (Indonesia)
- Nickel Asia Corporation (NAC) Rio Tuba mine (Philippines)

1.2. Supply chain research

The supply chain research aimed to identify supply chain links between the three nickel mines and global EV manufacturers, focusing on the last three years (2022, 2023, and 2024). The analysis draws on a range of information sources, including publications by the mining companies, their major shareholders, and leading global EV manufacturers and their suppliers, as well as shipment data, industry media, and other relevant resources.

- The annual reports and websites of the mining companies, their owners, clients, and related companies were widely screened for information on possible supply chain links. Press releases about investments, agreements, and suppliers' awards sometimes provided useful additional information.
- Shipping records based on customs reports were analyzed for selected trading routes.
- Links mentioned in media sources, such as reports of government officials announcing new investments, were cross-checked with company documents and websites.

It is important to note that relationships across the supply chain, from upstream mining to downstream car manufacturing, involve several processing stages, which increases the complexity of tracing the connections. Based on the results of the mapping, seven EV manufacturers were selected for financial analysis. The main criteria considered in this selection were:

- Robustness of the information sources
- Geographic coverage (i.e., links with several of the mines)
- Existing supply chain relationships (versus expected future relationships)

1.3. Financial research methodology

1.3.1. Data sources

This research used different sources to collect and retrieve the financial information on the financiers of equity and liabilities for the selected companies. Refinitiv and Bloomberg databases were used to retrieve most of the information on the loans, bonds, and shares issued by the selected companies. However, because these databases do not capture all bilateral financing, other sources were used as well, including the project finance database IJGlobal, annual reports, financial statements, company registries, and media archives. Section includes details on the type of financing considered in the research. Section describes how the contributions of different financial institutions are distributed between the recipients of specific financing transactions.

1.3.2. Types of financing

Financial institutions can finance a company in two main ways. They can either provide loans and underwriting services to the company or acquire the shares and bonds issued by the company. In the first scenario, financial institutions, especially commercial banks, can provide credit to a company by providing loans and underwriting the issuance of shares and bonds. In the second scenario, financial institutions, especially investment banks and pension funds, can invest in the equity and debt of a company by holding their shares and bonds. ANNEX 1 outlines the different types of financing (credit financing and investment financing), how they were researched, and the implications for the study.

1.3.3. Financing contributions of financial institutions

- **Loans and underwriting services**
  In the case of syndicated loans and underwritings of bond and share issuances, the contributions of individual financial institutions are presented to the greatest extent possible, as they are recorded by and retrieved from financial databases, company filings, or media publications. However, in many cases, only the total value of a loan, bond, or share issuance is known, with no further information on the amount or percentage of the loan or issuance contributed by each financial institution. Consequently, in such cases, the amount committed by each financial institution to the loan or issuance was estimated.

  Profundo has developed a methodology to estimate the contributions of financial institutions based on available information. This methodology can be found in ANNEX 2.

- **Shares and bond holdings**
  The market value, number of shares, and number of bonds held by financial institutions are all reported in the financial databases used in the research. Hence, no estimates have been calculated to determine the individual contributions of financial institutions.

1.4. Data limitations

1.4.1. Supply chain research

The findings of the supply chain research are impacted by the fact that none of the EV manufacturers provide full transparency on their supply chain relationships. In response to inquiries by non-governmental organizations (NGOs) in recent years, the approached manufacturers have cited business confidentiality. Sourcing geographies are more likely to be mentioned, and Indonesia is often mentioned due to its important role as a nickel producer. Selected parts suppliers can, at times, be identified from company reporting or media articles. Only Tesla mentions some nickel suppliers in its 2023 impact report.

For the selected mines, more information on expected future supplier relationships for processing projects under development is available than data on existing relationships. This is due to the ongoing development and expansion of capacities and processing facilities and the interest of EV manufacturers in tapping into these resources.

It is also important to consider that the likely current and future relationships identified in the research are indirect due to the different processing stages for the final product. One or more additional supply chain stages mean that,

in several cases, it is likely but not certain that EV manufacturers are (or will be) exposed to nickel from a mine, as supply chain relationships are usually not exclusive.

1.4.2. Financial research

As mentioned earlier, this research used the Refinitiv, Bloomberg, and IJGlobal databases, as well as company reports such as financial statements, annual reports, company registries, and media archives. Still, there were several limitations in the financing and investment data.

- **Loans**
  Information from the financial databases primarily includes syndicated lending (i.e., two or more financial institutions providing a loan to one company). Usually, the financial databases do not have data on bilateral lending (i.e., loans arranged between one bank and one company). Bilateral funding was researched to the greatest extent possible using company reports, company registries, and media archives, among others. However, these sources have gaps in the data. For instance, many companies do not disclose their bankers and loan deals, or not in sufficient detail to include them in the analysis. This is the result, among others, of different requirements between jurisdictions and whether the company is listed on the stock exchange.

- **Bonds and shareholdings**
  The financial databases used in the research collect data on bonds and shareholdings from fund filings, company reports, and stock exchanges. As a result, data on share and bond holdings is generally better from asset managers and the asset management arms of insurance companies and banking groups. Other financial institutions, such as pension funds and insurance companies that do not offer asset management activities, are not required to publish their investment portfolios. Those who publish their portfolios are not always covered by the financial databases. Profundo maintains a database of pension fund portfolio disclosures that are updated quarterly or at least once a year, depending on how often the pension fund discloses its portfolios.

  Another limitation of the share and bond holdings data is that, as described at the end of section , the positions held in bonds and shares are easily and constantly changing. Consequently, the bonds and shareholders identified in the research may have changed (bonds or shares may have been bought or sold) or the composition of investment portfolios may have changed.

2 SUPPLY CHAIN RESEARCH FINDINGS

The findings of the mineral flow analysis of three nickel mines in Indonesia and the Philippines suggest connections to several global EV companies. The findings are explained in detail in the following sections.

2.1. PT Vale Sorowako mine (Indonesia)

2.1.1. About the mine

The Sorowako mine is part of the Indonesian company PT Vale Indonesia (PTVI), which is mainly active in laterite nickel ore mining and processing it into nickel matte. The company is headquartered in Jakarta, with an office in Makassar and a processing plant in Sorowako (both in South Sulawesi).[16]

PTVI's largest shareholders are state-owned PT Mineral Industri Indonesia (MIND ID, 34%) and Vale Canada (VCL, a wholly-owned subsidiary of Canadian Vale Base Metals (VBM), which in turn is a subsidiary of Brazilian mining company Vale S.A., 33.88%). **Sumitomo Metal Mining** (SMM) holds a 11.48% share. MIND ID, VCL, and SMM, jointly control PTVI. The remainder of the shares are publicly held.[17] PTVI's nickel ore mining mainly takes place in an open pit mine located in Sorowako (South Sulawesi).[18] PTVI also develops nickel mining and processing in Bahadopi (Central Sulawesi) and Pomalaa and Sua (Southeast Sulawesi).[19] As of 2023, the company's operations cover a total of 118,017 ha, 60% of which are linked to Sorowako (70,566 ha).[20]

Excavators gather soil containing nickel ore at a mining site operated by PT Hengjaya Mineralindo on October 26, 2023 in Morowali, Central Sulawesi, Indonesia. Photo: Garry Lotulung.

PTVI produced a total of 13.5 million mt of nickel ore in 2023.[21] The nickel matte processing plant is in Sorowako, manufacturing an intermediate product used in the production of refined nickel (with an average content of 78% nickel, 1%–2% cobalt, and 20%–21% sulfur). The company's smelter has a daily production capacity of 180–216 tons of nickel matte.[22] Nickel matte production reached 70,728 mt in 2023 (60,090 mt in 2022).[23] The total sales value of nickel matte was $1.2 billion in 2023 (also $1.2 billion in 2022).[24]

PTVI has long-term sales agreements with VCL and SMM,[25] with VCL having the right to 80% of nickel matte production and SMM to 20% of production.[26] As stated by SMM, it *"[...] has the right and obligation to purchase 20% of the agreed annual production from PTVI's Sorowako mine."*[27]

Excavators gather soil containing nickel ore at a mining site operated by PT Hengjaya Mineralindo on October 26, 2023 in Morowali, Central Sulawesi, Indonesia. Photo: Garry Lotulung.

Box 1: The communities around the Sorowako mine

PTVI and Vale S.A. have a human rights policy that promotes freedom of association,[28] the right to peaceful assembly, and the prevention of threats to human rights and environmental defenders. However, according to multiple accounts, there is a gap between policy and practice. This is backed by research by NGOs WALHI, also known as Friends of the Earth (FoE) Indonesia,[29] and its regional network WALHI South Sulawesi, FoE Japan,[30,31] the Business and Human Rights Resource Centre (BHRRC);[32] by CNN as part of its "*As Equals*"[33] series on gender inequality; and by the personal anecdotes of pepper farmers.

For example, in March 2022, Hasma and her husband took part in a demonstration by pepper farmers in Loeha to express concerns about Vale's drilling activities on their land. In 2023, BHRRC[34] and FoE Japan[35] found that a total of seven individuals were arrested and detained in connection with the March 2022 demonstrations. They called on Vale and PTVI to address the allegations and the financial and mental harm caused by the detention. In September 2023, Vale responded, maintaining that it followed all laws and regulations. It claimed that the seven demonstrators were arrested for damaging PTVI property. In response to allegations of environmental harm, PTVI claimed it followed relevant standards.[36]

According to Hasma, the event prompted the women in the community to establish the Women's Pepper Farming Cooperative of the Loeha district in East Luwu Regency, South Sulawesi. She is the chairperson and leader of the cooperative. Through the organization, the women hope to collectively strengthen community-led protection of forests, their rights, and their pepper farms. Thousands of village residents rely on pepper farming for their livelihood and employment. In CNN's article, Hasma said, *"This is our only source of life: pepper and land. If that is taken away, then we will have no other income."*

The Women's Pepper Farming Association is a subdivision of the long-standing Loeha farmers' movement, organized by local and migrant farmers in the region against the expansion of mining within the Loeha and Tanah Mhalia block. The farmers' movement and Indonesian and international civil society organizations (CSOs) organized a united delegation to advocate for farmers' rights at the Ministry for Environment and the Brazilian, Japanese, and Norwegian embassies in Jakarta in October 2023.[37]

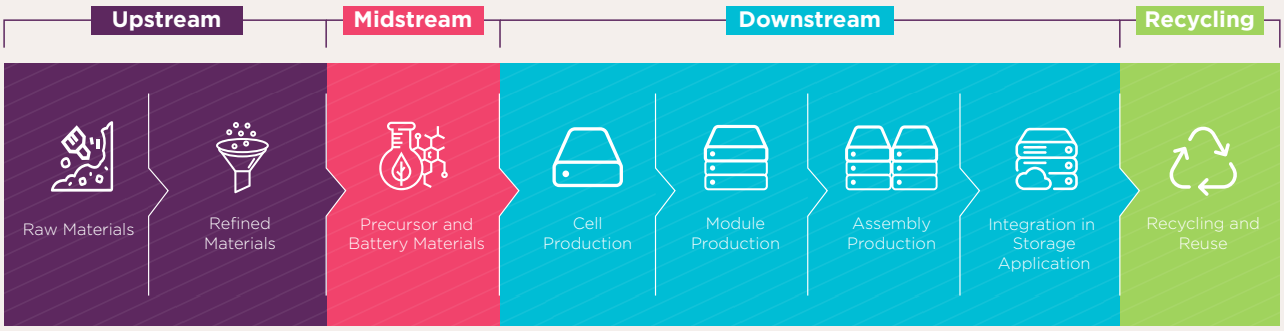
Reports of farmers in nearby towns and villages being forced to sell their lands to the company for mining exploration and drilling have sown fear throughout the community. The drilling activities not only threaten their livelihood, but also present serious environmental concerns and threats to their habitat and right to a healthy environment.

Amin, the regional director of WALHI South Sulawesi,[38] highlights that technologies and processes that have negative human rights and environmental impacts in their supply chains – in this case the nickel supply chain for EV batteries – cannot be considered green, environmentally friendly, and/or sustainable.

Members of the Loeha Women's Pepper Farming Cooperative drinking sweet Sulawesi coffee in the cooperative headquarters after a long day of tending to their peppercorn, coffee, and clove crops. Photo: Richard Kent, Research Consultant for Fair Finance Asia.

2.1.2. Midstream and downstream supply chain links

Figure 1 Stages of the battery value chain



Source: A Roadmap for Canada's Battery Value Chain Building a national strategy for critical minerals and green battery metals. (n.d.). Retrieved December 18, 2024, from *https://transitionaccelerator.ca/wp-content/uploads/2023/05/A-Roadmap-for-Canadas-Battery-Value-Chain_FULL.pdf*

Vale Canada (VCL)

Headquartered in Toronto, Canada, VBM is one of the world's largest producers of sourced nickel, copper, cobalt, and platinum group metals. Its subsidiary, VCL, produces critical minerals for EVs and renewable energy in Canada, the UK, Brazil, Japan, and Indonesia.[39] There is a clear link with PTVI, as 80% of nickel matte from the Sorowako mine is sold to VCL.[40]

Vale expects *"[...] that the global demand for nickel will increase by 44% by 2023, compared to demand in 2022, reaching 6.2 million metric tons. By this, our nickel production volume is projected to surpass the current value of 175,000 metric tons per year to more than 230,000 metric tons, with the most growth expected in Indonesia and Canada."*[41]

Ford

In 2022, car maker **Ford Motor Company** announced the signing of a non-binding Memorandum of Understanding (MoU) with VCL, *"[...] to explore potential opportunities across the EV value chain".*[42] The link with VCL may expose

Ford to nickel from the Sorowako mine based on VCL's supplies from Sorowako.[43]

General Motors

In November 2022, **General Motors** (GM) and VCL signed a long-term agreement for the supply of battery-grade nickel from VCL's proposed plant in Quebec. The agreement refers to an annual supply of battery-grade nickel sulfate of an equivalent of 25,000 mt of contained nickel. First deliveries are expected in the second half of 2026.[44] Available information on the agreement does not allow conclusions to be drawn on the origin of the nickel, but due to the link between PTVI and VCL, the car manufacturer may be exposed to nickel from Sorowako.

Sumitomo Metal Mining

SMM is a Japanese mining, processing, and battery materials manufacturer, including gold, copper, nickel, cobalt, and other minerals. It has established an in-house nickel supply chain from mineral ore to battery materials, including mines, smelters (the smelting and refining of low-grade nickel oxide ore using the high-pressure acid leaching, or HPAL, technology), refiners (processing into nickel sulfate from intermediates), and battery materials production (cathode material for batteries).[45]

There is a clear link with Sorowako via SMM's stake in **PTVI** and 20% of nickel matte produced by PTVI sold to SMM.[46] PTVI supplies nickel matte and nickel ore to SMM's Niihama Nickel Refinery (Japan). *"Niihama Nickel Refinery produces electrolytic nickel using nickel matte (of about 75–80% purity) sourced from PT Vale Indonesia Tbk."*[47] This refinery produces nickel sulfate and nickel chloride, which are processed into battery materials and nickel powder in SMM's Isoura plant. Niihama Refinery also directly supplies customers with electrolytic nickel.[48]

SMM plans to expand the production capacity of cathode materials for secondary batteries for EVs in Besshi District (where the Niihama Nickel Refinery and Isoura Plant are located, among other operations) and the Harima Refinery, valued at JPY 35.5 billion.[49]

Older SMM statements and more recent media articles point to **Panasonic Corporation** and **Toyota Motor Corporation** as customers.[50] Panasonic, which accounts for around 10% of global EV battery output,[51] supplies NCA cathode materials for lithium-ion batteries used in **Tesla** EVs.[52] Moreover, Panasonic is linked to **Mazda Motor Corporation** and **Subaru Corporation** (see below).

Zhejiang Huayou Cobalt

Zhejiang Huayou Cobalt Co (Huayou) is headquartered in Tongxiang and listed on the Shanghai Stock Exchange. The company manufactures lithium-ion battery materials and new cobalt materials. It has five business sectors, including new energy industry, new material industry, Indonesia nickel industry, Africa resource industry, and recycling industry.[53] The company has around 20 subsidiaries in Indonesia,[54] where it produces MPH (mixed hydroxide precipitate, a nickel and cobalt-containing intermediate product), nickel matte, and nickel iron.[55] Huayou established a *"new energy lithium battery cathode material company"*, a joint venture (JV) with **LG Chem** in 2018, and signed a cooperation agreement with **Tsingshan Industry** in the same year to *"start the development of nickel and cobalt resources in Indonesia"*.[56]

In 2023, **PTVI** signed a definitive cooperation agreement with **Huayou** for the construction of a nickel processing facility with HPAL technology to process limonite nickel ore in the Sorowako Block. The facility is expected to be finalized by 2026 and to produce up to 60,000 mt of nickel per year.[57,58] According to an August 2023 Argus Media article, a formal feedstock supply agreement with PTVI for the supply of limonite from PTVI's Sorowako mine was expected once the feasibility study was completed.[59] Several recent sources suggest that EV manufacturer **Stellantis** is in talks with the consortium to join as a partner.[60]

Huayou aims to realize *"the idea of controlling the resources upstream, developing the markets downstream"* and presents two development projects of nickel in Indonesia on its website: the Huayou HPAL Hydrometallurgical project in **Sorowako** (Sulawesi) and the Indonesia Weda Bay Industrial Park (IWIP) in Halmahera (see Chapter 2).[61] According to a presentation by Indonesia's Minister of Investment in March 2024, PTVI's Sorowako HPAL nickel smelter project involves cooperation with various EV manufacturers and their suppliers, including **POSCO**, **LG Chem**, **Ford**, and **Volkswagen** (VW).[62]

Huayou mentions in its 2023 annual report that it entered the supply chain of Japanese carmakers and expanded its activities related to EV supply chains in European and US markets. The company states that its "*main products have covered the global power battery brand enterprises such as LGES, CATL, Volkswagen Gotion, EVE Energy, AESC and WELION New Energy"* and are "*widely used*" in EVs by **Tesla**, **BMW**, **Stellantis**, **NIO**, **VW**, **Hyundai Kia**, and

Ford.[63] It could not be confirmed whether the existing relationships also involve nickel from the Sorowako mine, however, the HPAL project may expose these Huayou clients to the Sorowako mine once it begins operating.

Tesla

SMM announced in 2018 that it would focus on two main customers for its battery materials: Toyota and **Panasonic**, with Panasonic mentioned at the time as a supplier to **Tesla**.[64] Battery supply chain links between Panasonic and Tesla were reported as early as 2013.[65]

Shipment data suggests that **Panasonic** shipped lithium-ion batteries from Japan to **Tesla** in the US with a total volume of around 53,000 mt between January 2022 and August 2024.[66] Despite Tesla's switch from nickel-based batteries to lithium iron phosphate (LFP) batteries for its standard-range EVs,[67] its Master Plan foresees that nickel-based batteries will be included in Model S/X, Cybertruck and Semi Heavy, while LFP batteries will be used in Model 3/Y and Semi Light.[68] Therefore, a considerable part of Tesla vehicles will still contain nickel-based batteries, although less than before. This is also confirmed by recent reports about next-generation EV battery sets produced by Panasonic for Tesla.[69] Due to SMM's direct link with PTVI and its apparent supply chain relationship with Panasonic, Tesla may be exposed to nickel from Sorowako.

In 2023, Tesla reported that 13% of its nickel came from Indonesia.[70] The company disclosed the names of six nickel suppliers (mines and refiners) in its 2023 impact report.[71] Both **Huayou Indonesia** and **Huayou China** are mentioned as direct suppliers (refiners).[72] Considering Huayou's cooperation with PTVI on the Sorowako HPAL, this may expose Tesla to the Sorowako mine via Huayou in the future.

Toyota

An SMM press release from March 2020 confirmed its relationship with **Toyota**, to which SMM supplied lithium nickel manganese cobalt (NMC) oxide as cathode material for lithium-ion batteries used in the **Toyota** Yaris model.[73]

Until March 2024, Panasonic was in a battery joint venture with Toyota called Primearth EV Energy. As of October 1, 2024, Primearth is a wholly-owned Toyota subsidiary renamed Toyota Battery.[74]

Another indication is SMM's announcement of the construction of recycling plants for lithium-ion batteries in March 2024 for which it, among others, concluded a partnership agreement with Toyota, suggesting an ongoing supplier relationship.[75] Moreover, SMM and Toyota received a patent on secondary battery and lithium-ion secondary battery development in June 2024.[76] Due to these supply chain relationships and SMM's direct link with PTVI, Toyota may be exposed to nickel from Sorowako.

Mazda

On September 6, 2024, Panasonic Energy and **Mazda Motor Corporation** (Mazda) announced a collaboration to supply lithium-ion batteries for Mazda's EVs, to be introduced in 2027. Their joint plan is to expand battery production to establish a stable supply of batteries.[77] The link with Panasonic may expose Mazda to nickel supplies from the Sorowako mine in the future.

Subaru

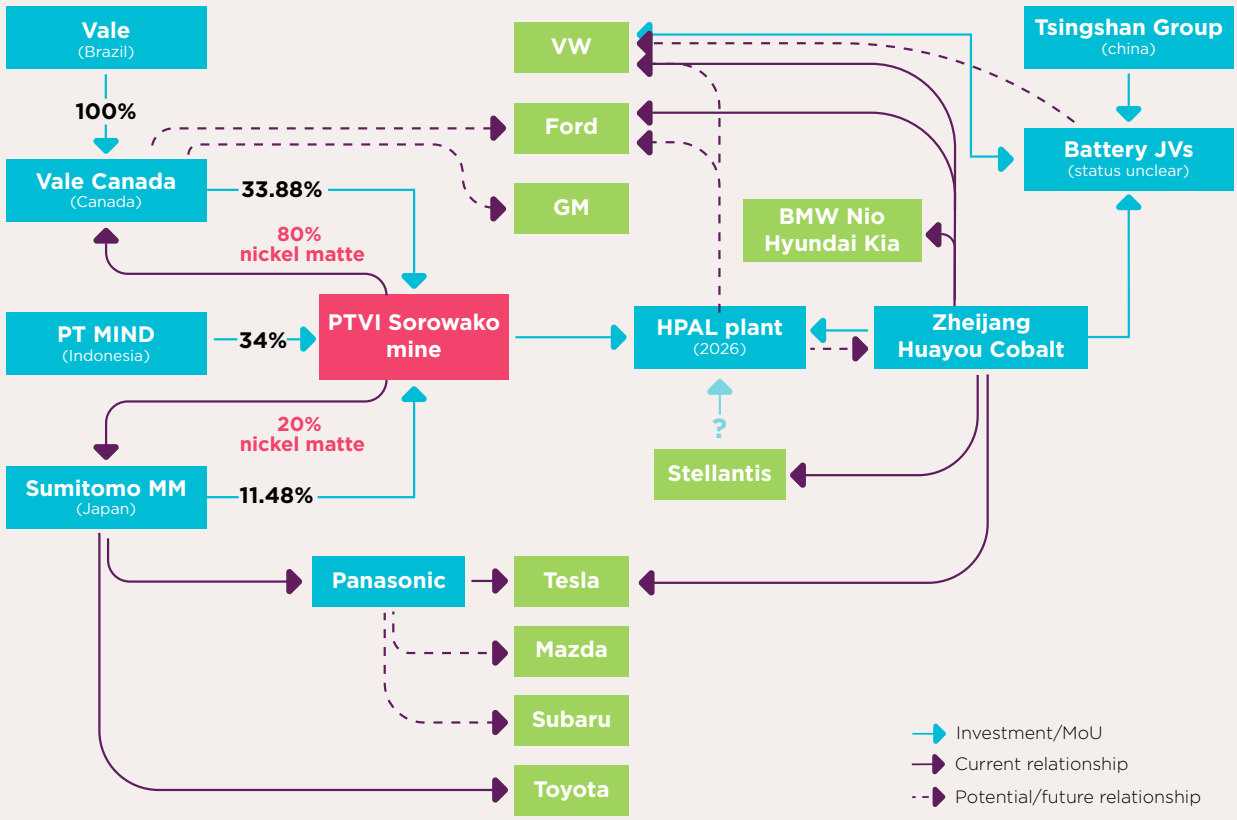
On September 6, 2024, Panasonic Energy and **Subaru Corporation** (Subaru) announced a partnership to supply lithium-ion batteries for Subaru's EVs, which will be introduced in the latter half of the 2020s. For this purpose, the companies will jointly establish a new battery factory in Oizumi, Gunma Prefecture, Japan. Panasonic will supply the batteries as of 2027.[78] The link with Panasonic may expose Subaru to nickel supplies from the Sorowako mine in the future.

Volkswagen (VW)

VW Group includes 10 car brands: Volkswagen (VW), VW Commercial Vehicles, Škoda, Seat, Cupra, Audi, Lamborghini, Bentley, Porsche, and Ducati.[79] The carmaker does not disclose its suppliers but states that *"[f]or the Volkswagen Group, EV batteries are by far the largest field where nickel is required, and we did not directly source any nickel for this use in 2023. Our main sourcing countries for nickel are Australia, China, Papua New Guinea,* ***Indonesia*** *and New Caledonia (France)."*[80] According to S&P, VW today sources about 95% of its nickel from Indonesia.[81] Considering the role of the Sorowako nickel mine in the Indonesian sector, this may expose VW to the mine. VW did not provide details on its nickel suppliers when asked for a statement in response to Mighty Earth's 2024 report on nickel mining in Indonesia, citing business confidentiality.[82]

In March 2022, VW China signed two MoUs with **Huayou Cobalt** and **Tsingshan Group** for the creation of two JVs that will aim to strengthen Chinese battery value chains and secure raw materials. In addition to an Indonesian upstream JV for nickel and cobalt battery raw materials, the agreement also includes a downstream JV with Huayou in Guangxi (China) for the refining of nickel and cobalt sulfates, precursor, and cathode material production.[83] Considering Huayou's cooperation with PTVI in the Sorowako HPAL facility, these business relationships may expose VW to nickel from the Sorowako mine in the future.

Figure 2 Potential current and future supply chain exposure to PT Vale Sorowako

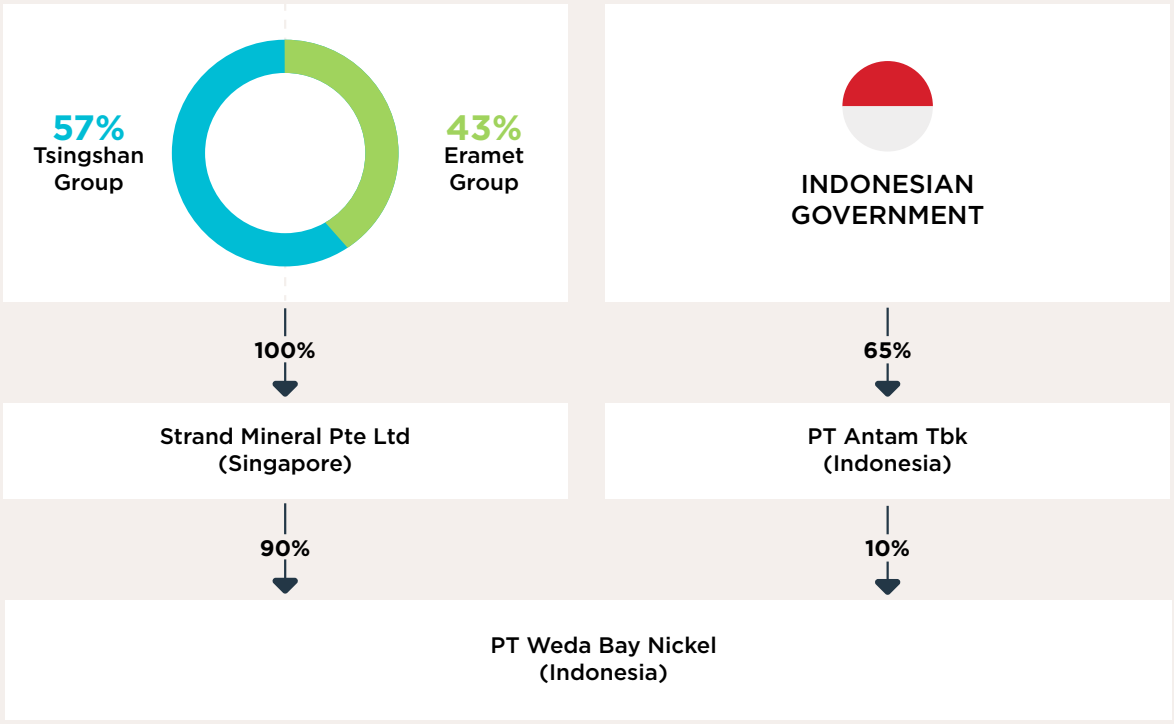


2.2. PT Weda Bay Nickel mine (Indonesia)

2.2.1. About the mine

The open pit PT Weda Bay Nickel (WBN) mine, located on the island of Halmahera, the largest island in the North Maluku province, began operations at the end of 2019. The WBN deposit is one of the largest in the world. Its production reached 36.3 mt of nickel ore in 2023, representing 17% of world production.[84] WBN, created to develop the Weda Bay nickel deposit, is 90% owned by **Strand Minerals** (Singapore) and 10% by the Indonesian state-owned company, PT Antam (Figure 3).[85] Strand Minerals, in turn, is 43% owned by **Eramet Group** (France) and 57% owned by **Tsingshan Group** (China).[86]

Figure 3 Ownership structure of PT Weda Bay Nickel



Source: Eramet (n.d.), "*Eramet in Indonesia. Facts and figures*".

The WBN plant is located in the IWIP. The IWIP is part of the Tsingshan Group, which operates the entire industrial park. The plant produces a low-grade nickel ferroalloy (between 12% and 15% nickel content).[87] WBN is one of three tenants of the park.[88]

Residential and employee housing near IWIP 01, an active nickel mining operation, submerged in flood.
Photo: ResponsiBank Indonesia

Box 2: About the communities near the WBN mine

In the Central Halmahera region of Indonesia, the IWIP towers over Gemaf, a small fishing village in North Malaku. IWIP covers one the world's largest nickel deposits, with high average nickel content in its ore.[89] The old fishing village of Gemaf is the closest populated village to the east of the Weda Bay area, less than 3 kilometers (km) from the smelter.

During field research,[90] Max Sigoro, a resident of Gemaf, expressed concerns about the impacts of river and sea pollution on the livelihoods and health of community members. Max's story was also part of a report and documentary published by Climate Rights International in January 2024, *"Nickel Unearthed: The Human and Climate Costs of Indonesia's Nickel Industry."*

Coming from a long line of farmers and fisherfolk, he shared that, increasingly, residents are having to sail farther out to sea (8 to 10 km) to catch around 10 kilograms (kg) of fish. Max recalled that fisherfolk used to be able to catch 50 kg of fish among the mangroves.

Other residents of Gemaf interviewed for the field research described the water near IWIP as "*reddish*", which they claim is due to oil from machinery and hot water discharge from IWIP. They avoid fishing near the IWIP, fearing the potential health and safety risks of consuming fish from polluted waters.

BHRRC attributed other negative impacts to IWIP, such as air pollution and respiratory diseases, soil contamination, deforestation, groundwater pollution, potential biodiversity loss, displacement, loss of livelihood, and loss of traditional culture and knowledge.[91]

In May 2024, Mighty Earth also published a report linking IWIP to deforestation and human rights violations.[92] By July 2024, as a result of the reports linking IWIP to negative impacts, Eramet and BASF withdrew their pledged $2.6 billion investment in the expansion of IWIP. However, as will be discussed later, Eramet is still a significant shareholder in WBN.

Photo of the IWIP development area. Photo: ResponsiBank Indonesia.

2.2.2. Midstream and downstream supply chain links

Eramet

Eramet is a French mining and metallurgical company that operates mining and industrial sites in 16 countries, with an annual turnover of EUR 3.8 billion (2023).[93] Eramet generates 41% of its turnover from nickel, 85% of which is produced in Indonesia.[94] Manganese, mineral sands, and, in the future, lithium, are Eramet's other segments.[95]

Eramet has customers and markets in China, India, Taiwan, Japan, South Korea, and Brazil.[96] In the nickel sector, its customers are base metal refineries that supply precursor manufacturers.[97]

After a deal between Eramet and German company BASF to establish a nickel processing plant in Indonesia was cancelled in June 2024, in July 2024, Eramet and Zhejiang Huayou Cobalt announced they would be exploring a potential partnership to produce nickel for use in batteries. According to media, this could involve Eramet supplying ore to Huayou's HPAL plant in IWIP and interest from Eramet to acquire a stake in the plant.[98]

Zhejiang Huayou Cobalt

Huayou aims to realize *"the idea of controlling the resources upstream, developing the markets downstream"* and features two nickel development projects in Indonesia on its website: the Huayou HPAL Hydrometallurgical project in Sorowako (Sulawesi) and **IWIP** in Halmahera.

Huayou has two nickel projects under construction in IWIP:

- the Huafei HPAL Project, a laterite nickel ore hydrometallurgy project; and
- the Huake Rotary Kiln Electric Furnace (RKEF) project. *"Huake project adopts mature RKEF + ferronickel sulfidation and blowing process technology, and uses laterite nickel ore to produce ternary precursor intermediates of new energy materials."*

Huayou mentions in its 2023 annual report that it entered the supply chain of Japanese carmakers and expanded its activities related to EV supply chains in the European and US markets. The company states that its "*main products have covered the global power battery brand enterprises such as LGES, CATL, Volkswagen Gotion, EVE Energy, AESC and WELION New Energy"* and are "*widely used*" in EVs by **Tesla**, **BMW**, **Stellantis**, **NIO**, **VW**, **Hyundai Kia**, and **Ford**. Huayou's activities in IWIP may expose its clients to WBN in the future.

Tesla

Several sources indicate that there may be links that expose Tesla to WBN, both now and in the future. According to a recent Reuters article (October 2024), Indonesia's energy minister, Bahlil Lahadalia, stated that Indonesia *"[...] plans to export nickel-based material used to make electric vehicle batteries to the United States"* from November 2024. *"Indonesia would provide the material, known as EV battery precursor, to U.S. electric carmaker Tesla. We will export precursor to the U.S. by next month to Tesla, from **Weda Bay**."*[99]

Tesla disclosed the names of six nickel suppliers (mines and refiners) in its 2023 impact report. Both **Huayou Indonesia** and **Huayou China** are mentioned as direct suppliers (refiners).[100]

Chinese company **CNGR China** and its sister company **CNGR Indonesia** are also mentioned by Tesla as direct nickel suppliers (refiners).[101] CNGR produces battery precursors. Its 2022 audit report mentions a complex ownership structure linked to IWIP. In 2022, CNGR, through its wholly-owned subsidiary Hong Kong CNGR Zhongtuo New Energy, acquired 100% equity of Debonair Holdings Private Limited (DHPL). DHPL owns 50.1% equity of PT Debonair Nickel Indonesia (DNI), which is the project company for the construction of two RKEF ferronickel iron production lines and one 380 megawatt (MW) supporting power plant project in IWIP. In addition, CNGR holds 50.10% equity of PT Jade Bay Metal Industry, the project company for the construction of two RKEF ferronickel production lines in IWIP.[102] **CNGR** has three operating industrial production bases for nickel processing in Indonesia, including in Weda Bay.[103] Furthermore, in 2022, *Mining.com* suggested a link between **CNGR** Advanced Materials and **Tsingshan**, stating that the two companies agreed the latter would supply CNGR with nickel.[104] Considering Tsingshan's stake in Strand Minerals, this may also expose Tesla to WBN.

Volkswagen (VW)

VW Group includes 10 car brands: Volkswagen (VW), VW Commercial Vehicles, Škoda, Seat, Cupra, Audi, Lamborghini, Bentley, Porsche, and Ducati.[105] The carmaker does not disclose its suppliers, but states that *"[f]or the VW Group, EV batteries are by far the largest field where nickel is required, and we did not directly source any nickel for this use in 2023. Our main sourcing*

countries for nickel are Australia, China, Papua New Guinea, ***Indonesia*** *and New Caledonia (France)."*[106] According to S&P, VW today sources about 95% of its nickel from Indonesia.[107] Considering the role of the WBN mine in the Indonesian sector, this may expose VW to the mine. VW did not provide details on its nickel suppliers when asked for a statement in response to Mighty Earth's 2024 report on nickel mining in Indonesia, citing business confidentiality.[108]

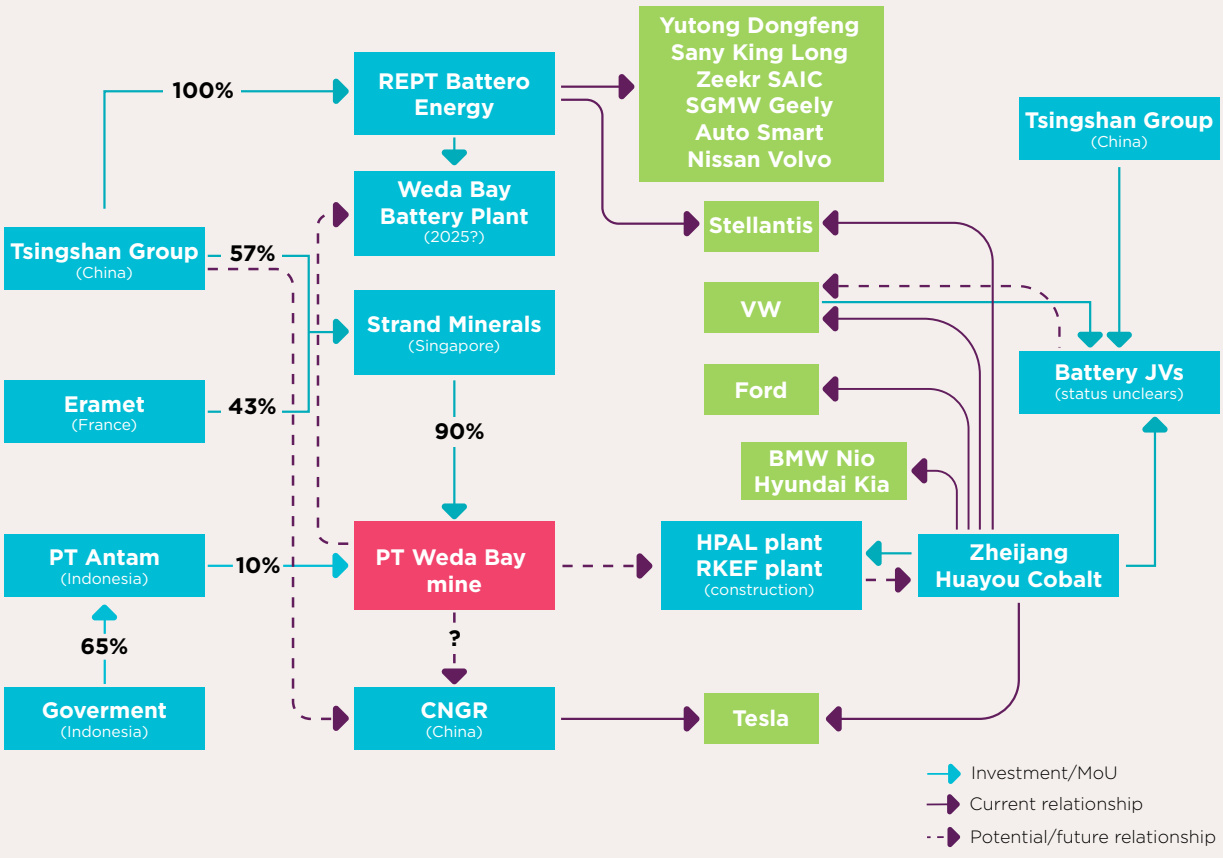
In March 2022, VW China signed two MoUs with **Huayou Cobalt** and **Tsingshan Group** for the creation of two JVs that will aim to strengthen Chinese battery value chains and secure raw materials. In addition to an Indonesian upstream JV for nickel and cobalt battery raw materials, the agreement also includes a downstream JV with Huayou in Guangxi (China) for the refining of nickel and cobalt sulfates, precursor, and cathode material production.[109] Considering Huayou's projects in Weda Bay and Tsingshan's stake in Strand Minerals, these business relationships may expose VW to nickel from the Weda Bay mine in the future.

REPT BATTERO Energy

REPT BATTERO Energy (REPT) is an EV battery company part of the Chinese **Tsingshan Group.** Tsingshan has a stake in PT Weda Bay Nickel via its role in Strand Minerals. According to REPT, they "*cooperate*" with carmakers **Yutong**, **Dongfeng Trucks**, **Sany**, **King Long**, **Zeekr**, **SAIC**, **Stellantis**, **SGMW**, **Geely Auto**, **Smart**, **Nissan**, and **Volvo**, among others.[110] As a Tsingshan Group company involved in battery production, it may be linked to the supply of nickel from the WBN mine.

According to media reports, in 2024 REPT is planning to build its first overseas battery plant adjacent to Tsingshan's existing operation in **Weda Bay**, Indonesia.[111] According to Bloomberg, operations may begin as early as 2025.[112] Considering Tsingshan's role in Weda Bay, this may expose their clients (listed earlier) to nickel flows from the WBN mine once it begins operating.

Figure 4 Potential current and future supply chain exposure to Weda Bay Nickel mine



2.3. Rio Tuba mine (Philippines)

2.3.1. About the mine

The Rio Tuba mine is operated by Rio Tuba Nickel Mining Corporation (RTNMC), a 60%-owned subsidiary of **Nickel Asia Corporation** (NAC, Philippines). Headquartered in Taguig City, NAC operates, through its subsidiaries, five nickel mines in the Philippines and has minority stakes in downstream nickel processing facilities.[113] PAMCO (Japan) owns 36% and Sojitz Corp (Japan) 4%. Located in Barangay Rio Tuba at the southern tip of Palawan province, the Rio Tuba mine supplies saprolite and limonite ore for export and limonite to the adjacent Coral Bay HPAL plant. This plant is operated by **Coral Bay Nickel Corporation** (CBNC), in which NAC has a 15.625% stake and is the beneficial owner.[114] The remaining 84.375% is held by **Sumitomo Metal Mining** (SMM).[115]

NAC reposted a 2023 article on its website that describes its partnership with SMM in the operation of two HPAL plants in the Philippines, including Rio Tuba, and the export of mixed sulfide to SMM in Japan for further processing into nickel used in the production of EV batteries.[116]

According to NAC, the company's combined operations of the five mines (including Rio Tuba) in the Philippines produce the largest volume of lateritic nickel ore in the country. The mines supply saprolite and limonite ore for export to China and Japan, where it is further processed into ferronickel and nickel pig iron for the manufacturing of stainless steel.[117]

The Rio Tuba Mine has reported contained nickel reserves (measures and indicated) of 680,000 mt as of December 31, 2023.[118] The mine holds a mineral production sharing agreement (MPSA) covering 4,538.4 ha. During 2023, 4.16 million wet metric tons (WMT) of ore were mined, including 1.54 million WMT saprolite and 2.53 million WMT limonite. Sales in 2023 amounted to a total volume of 4.16 million WMT of ore. These shipments consisted of 1.64 million WMT saprolite that was sent to China, while 2.53 million WMT of limonite was transported to the HPAL plant.[119]

NAC reports that its two largest mines, Rio Tuba and Taganito, "*are part of the global supply chain for electric vehicle battery components. These mines supply low-grade ore to Coral Bay Nickel Corporation (CBNC) and Taganito HPAL Nickel Corporation (THPAL), the Philippines' only two nickel processing plants – whose customers process nickel into battery materials that are linked to world-leading electric vehicle manufacturers in the downstream market.*"[120]

Box 3: About the communities near the Rio Tuba mine

In 2021, Palawan authorities rezoned designated forest areas to allow for more mining.[121] The government's 1992 Strategic Environmental Plan for Palawan (SEP) Act[122] prevented mining in national forests in areas above 1,000 meters and on mountain peaks, which were designated as environmentally critical areas or "*core zones*".[123] However, in October 2019, the Mines and Geosciences Bureau (MGB) gave conditional approval to Rio Tuba's application to expand mining operations into the forested Mount Bulanjao area,[124] an area covering 2,500 ha or roughly the size of 57,524 basketball courts.[125]Indigenous communities at the foot of these mountains worry that rice production will no longer be possible once the mining operation expands. Palawan is among the provinces that have lost a lot of forest cover – nearly 30,000 ha between 2003 and 2015.[126]

Nickel Asia's human rights policy states that it is committed to upholding and promoting human rights in all aspects of its business and operations in alignment with Philippine laws and international norms and standards on human rights and labor rights. The policy applies to its own operations and is part of all contracts with "*non-employees*". Nickel Asia's policy also states that it will make "*good faith efforts*" to have other companies and partners adopt the same or similar human rights policy.[127]

Gaps between policy and practice in the Rio Tuba mines have been observed. In 2021, the Pulitzer Center[128] featured a story by the Philippine Center for Investigative Journalism[129] that reported unsafe levels of hexavalent chromium, a known cancer-causing metal, in waterways around the mining site. The article also cited tests by FoE Japan, which has been monitoring water pollution in Rio Tuba since 2009. In 2022, Eco-Business wrote about *"the persisting lack of accountability and transparency, along with corruption and neglect of environmental protection…casting a shadow"* on the Philippine nickel industry. The article featured several nickel mines, including Rio Tuba, and highlighted their environmental and social impacts. According to the Eco-Business article, RTNMC owes the Bataraza community up to $4 million in royalties in exchange for the exclusive right to operate the mine on their land. That same year (2022), Electronics Watch also published a report, "*Human Rights and Environmental Impact of Nickel Mining at Rio Tuba*", which similarly traced supply chain links to EV batteries and highlighted negative impacts on human health and the environment.[130]

According to Belle Reyes, a local human rights defender working at the Environmental Legal Assistance Centre in Palawan, the mining site is less than 5 km from the nearest village. This means that residents live with constant noise from mining operations. She also echoed concerns about the contamination of waterways and rice paddies, and the impacts on the health of the community, which have included itchy skin lesions and open wounds.

2.3.2. Midstream and downstream supply chain links

Sumitomo Metal Mining

Japan's SMM has a 25.9% stake in NAC, 84.4% ownership of CBNC, and 75% ownership of THPAL.[131] CBNC is supplied by the Rio Tuba mine and produces mixed sulfides (MS), a mixture of nickel and cobalt sulfide, which is further refined at SMM's Harima Refinery and Niihama Nickel Refinery, both located in Japan. The Harima Refinery produces precursors, while Niihama Nickel Refinery produces nickel sulfate and chloride. Both refineries supply SMM's Isoura Plant, which, in turn, supplies precursors to Sumiko Energy Materials (which sells battery materials to customers), while other battery materials and nickel powder are sold directly to customers by the Isoura Plant.[132]

SMM plans to expand the production capacity of cathode materials for secondary batteries for EVs in the Besshi District (where the Niihama Nickel Refinery and Isoura Plant are located, among other operations) and the Harima Refinery, valued at JPY 35.5 billion.[133]

Older SMM statements and more recent media articles point to **Panasonic** and **Toyota** as customers. Panasonic, in turn, supplies nickel cobalt aluminum (NCA) cathode materials for lithium-ion batteries used in **Tesla** EVs.[134]

Philippines export data includes shipments from CBNC to Japan. The shipment records indicate that at least 16,540 mt of nickel/cobalt MS was shipped from CBNC in the Philippines to Japan between January 2022 and August 2024.[135] Although the shipments from CBNC to Japan do not have a consignee name, given SMM's ownership stake and reported sourcing, it is likely SMM.[136]

Tesla

In its 2023 annual report, NAC reports that the Rio Tuba and Taganito mines supply limonite ore to the adjacent nickel processing facilities Coral Bay HPAL and Taganito HPAL, "*which are owned by CBNC and THNC, respectively, and whose customers include electronics conglomerate Panasonic, a main supplier of EV batteries to* ***Tesla***."[137]

Shipment data suggests that **Panasonic** shipped around 53,000 mt of lithium-ion batteries from Japan to **Tesla** in the US between January 2022 and August 2024.[138] Despite Tesla's switch from nickel-based batteries to LFP batteries for its standard-range EVs,[139] its Master Plan foresees that nickel-based batteries will be included in Model S/X, Cybertruck, and Semi Heavy, while LFP batteries will be used in Model 3/Y and Semi Light.[140] Therefore, a considerable part of Tesla vehicles will still contain nickel-based batteries, although less than before.

These links may expose Tesla to nickel from the Rio Tuba mine.

Toyota

The supply chain from SMM to Panasonic also connects to automaker **Toyota**. Until March 2024, Panasonic was in a battery JV with Toyota called Primearth EV Energy. As of October 1, 2024, Primearth is a wholly-owned Toyota subsidiary renamed Toyota Battery.[141]

An SMM press release from March 2020 confirmed a relationship with **Toyota**, to which SMM supplied NMC oxide as cathode material for lithium-ion batteries used in the **Toyota** Yaris model.[142] Another indication is SMM's announcement of the construction of recycling plants for lithium-ion batteries in March 2024, for which it, among others, concluded a partnership agreement with Toyota, suggesting an ongoing supplier relationship.[143] Moreover, SMM and Toyota received a patent on secondary battery and lithium-ion secondary battery development in June 2024.[144]

The links with SMM and Panasonic may expose Toyota to nickel supplies from the Rio Tuba mine.

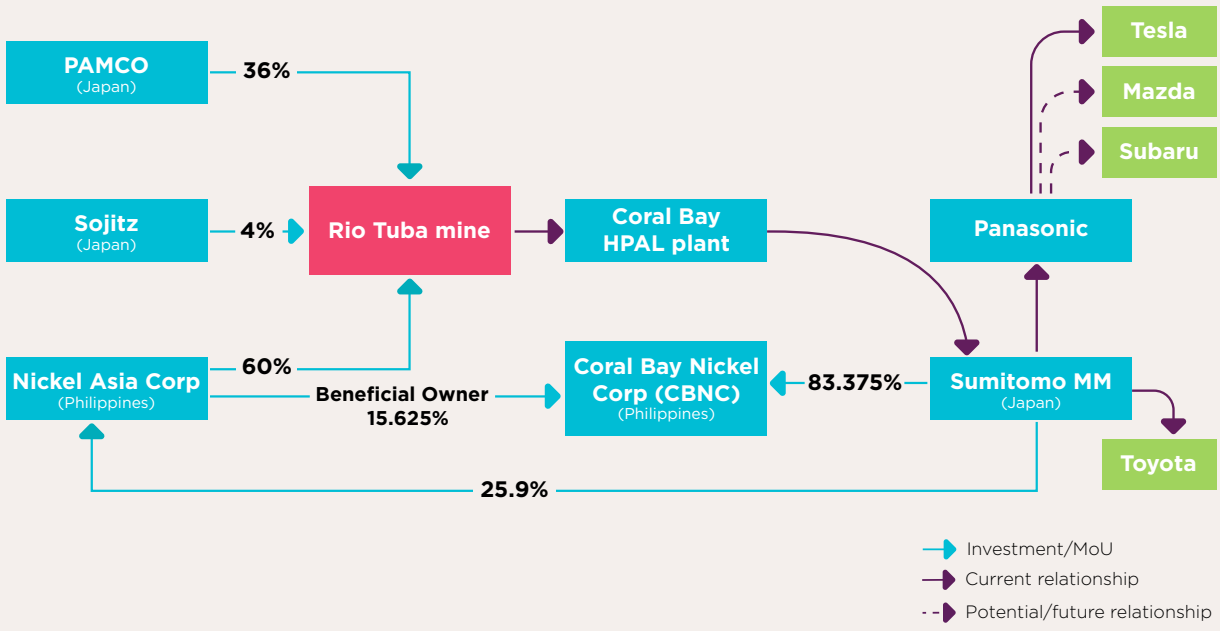
Mazda

On September 6, 2024, Panasonic Energy and **Mazda** announced a collaboration to supply lithium-ion batteries for Mazda's EVs, to be introduced in 2027. Their joint plan is to expand battery production to establish a stable supply of batteries.[145] The link with Panasonic may expose Mazda to nickel supplies from the Rio Tuba mine in the future.

Subaru

On September 6, 2024, Panasonic Energy and **Subaru** announced a partnership to supply lithium-ion batteries for Subaru's EVs, which will be introduced in the latter half of the 2020s. For this purpose, the companies will jointly establish a new battery factory in Oizumi, Gunma Prefecture, Japan. Panasonic will supply the batteries as of 2027.[146] The link with Panasonic may expose Subaru to nickel supplies from the Rio Tuba mine in the future.

Figure 5 Potential current and future supply chain exposure to Rio Tuba mine



2.4. Company selection

Based on the findings of the supply chain research, seven companies with the most and strongest indications of current and future supply chain links with the three mines were selected for financial analysis (Table 1).

Table 1 Selected companies for financial analysis

EV Producer	Country
Ford	United States
Mazda	Japan
Stellantis	Netherlands
Subaru	Japan
Tesla	United States
Toyota	Japan
Volkswagen	Germany

3 FINANCIAL RESEARCH FINDINGS

This section presents the main findings of the analysis of financing relationships between selected EV manufacturers and financial institutions located in Japan and ASEAN countries. Sections 3.1 and 3.2 focus on credit financing and investments, respectively.

3.1. Creditor analysis

Between January 2022 and November 2024, this research identified a total of USD 16,823 million in financing to the seven selected companies listed in Table 1. Of this total, 16% ($2,763 million), was provided through the underwriting of bonds and shares, while the remaining 84% ($14,060 million) was provided through loans (see Table 2).

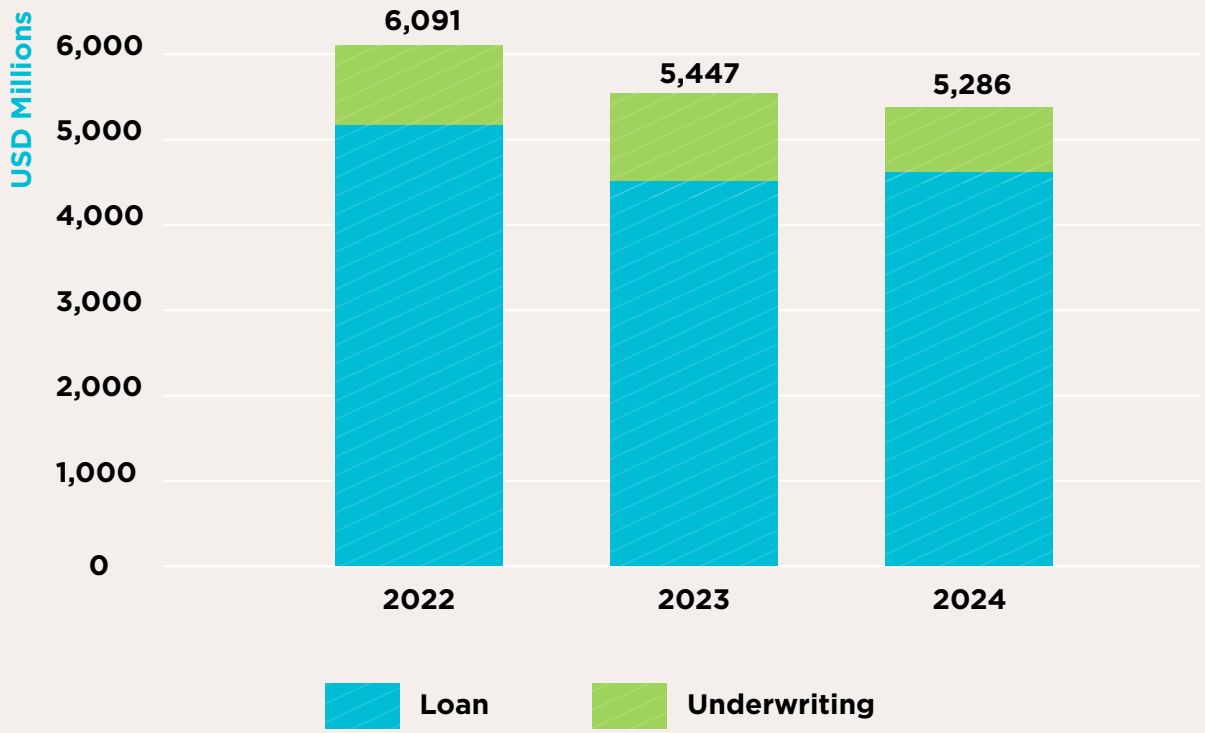
Table 2 Loans and underwriting services per year (USD million, 2022–2024)

Year	Loan	Underwriting	Total
2022	5,136	954	6,091
2023	4,414	1,033	5,447
2024	4,510	776	5,286
Total	14,060	2,763	16,823

Source: Calculations based on the information retrieved and described in Section 1.3

The amount provided in financing fell slightly during the period under analysis (Figure 6). While in 2022, Japan and ASEAN financial institutions provided loans and underwriting services of $6,091 million, by November 2024 the total financing was $5,286 million.

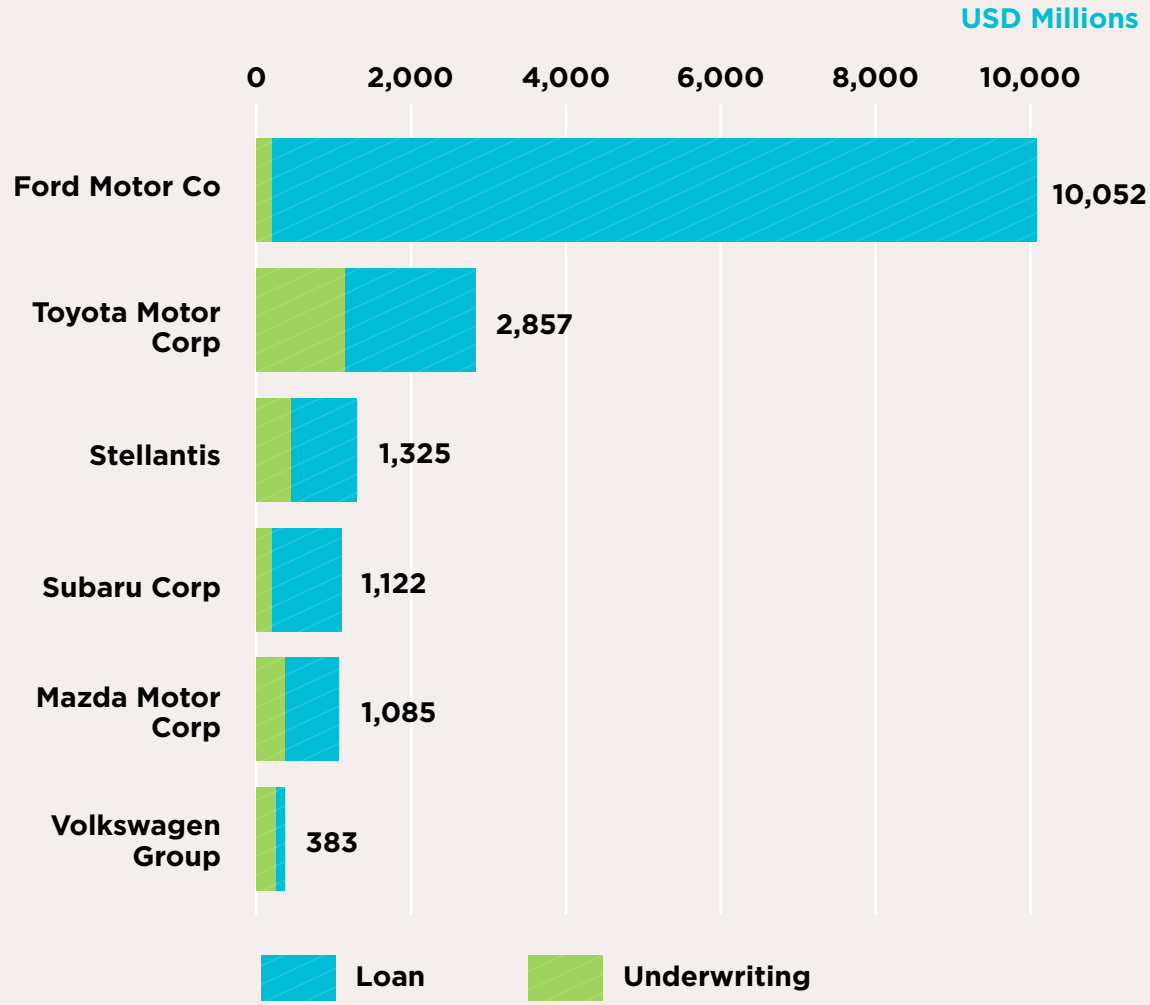
Figure 6 Loans and underwriting services per year (USD million, 2022–2024)



Source: Calculations based on the information retrieved and described in Section 1.3.

Furthermore, Figure 7 shows that the large concentration of financing through loans is directed mainly to one company: Ford Motor Company. Ford accounted for 60% ($10,052 million) of the total financing identified (Figure 7). Of this total, 98% was provided through loans. On the contrary, the other companies financed their operations more proportionately. Subaru received about 80% of the financing through loans; Toyota, Stellantis, and Mazda received around 60%; and VW, with only 30% of loan financing, was the only company to finance its operations primarily through underwriting.

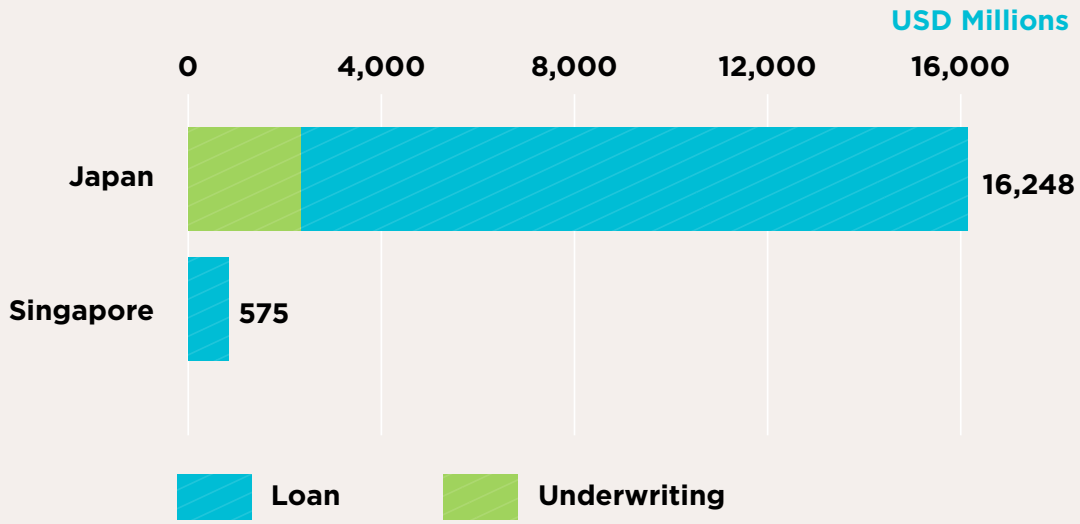
Figure 7 Loans and underwriting services per company (USD million, 2022–2024)



Source: Calculations based on the information retrieved and described in Section 1.3.

In terms of the distribution of financing between Japan and other ASEAN countries, this research finds that most financing comes from Japan. Japanese financial institutions provided 97% of all identified financing (Figure 8). Of the $16,248 million in total financing, 83% was through loans ($13,485 million) and the remaining 17% through underwriting services ($2,763 million). Other than Japan, this research only identified financing from one ASEAN country – Singapore – where financial institutions provided $575 million to the selected companies.

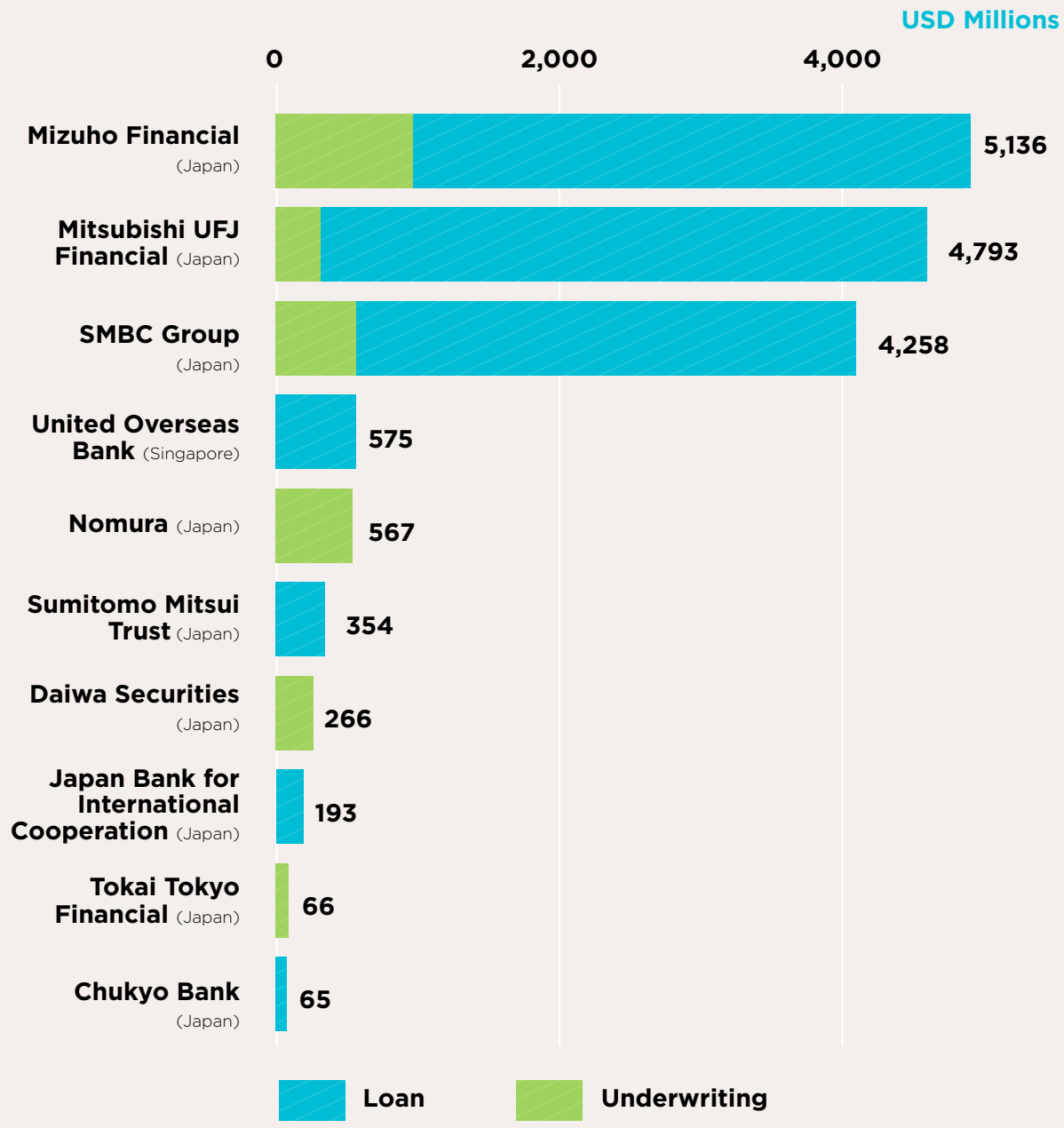
Figure 8 Loans and underwriting services per country (USD million, 2022–2024)



Source: Calculations based on the information retrieved and described in Section 1.3.

To understand which financial institutions provided loans and underwriting services to the selected companies, Figure 9 presents the top 10 identified financial institutions. The largest share of the financing is provided by only three Japanese financial institutions. Mizuho Financial, Mitsubishi UFJ Financial, and SMBC Group provided 84% ($14,188 million) of the total financing identified. The others in the top five included United Overseas Bank, the only financial institution located in an ASEAN country, with financing of $575 million and Nomura, from Japan, which provided $567 million in financing.

Figure 9 Loans and underwriting services per financial institution (USD million, 2022–2024)

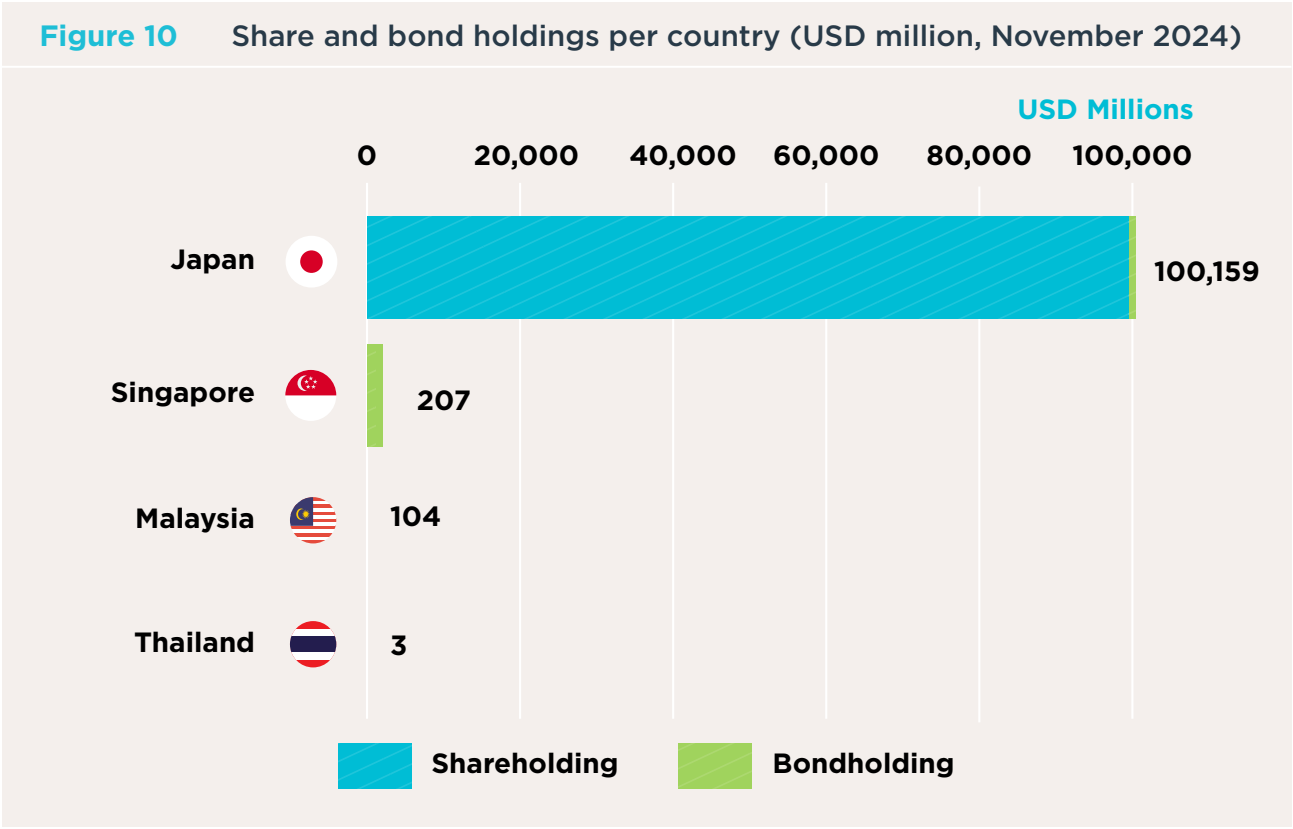


Source: Own calculations based on the information retrieved and described in Section 1.3.

3.2. Investment analysis

In November 2024, or at the latest filing date available, Japan and ASEAN financial institutions had invested a total of $100,474 million in shares and bonds issued by the selected companies. Most of these investments were via shareholdings (Figure 10). Of the total amount, 99% ($99,785 million) were investments in shares of the selected companies. The remaining 1% ($689 million) were investments in bonds issued by the companies. Figure 10 also shows that most of the investment financing is provided by Japanese financial institutions. In contrast, financial institutions located in ASEAN countries provided only 1% or $315 million.

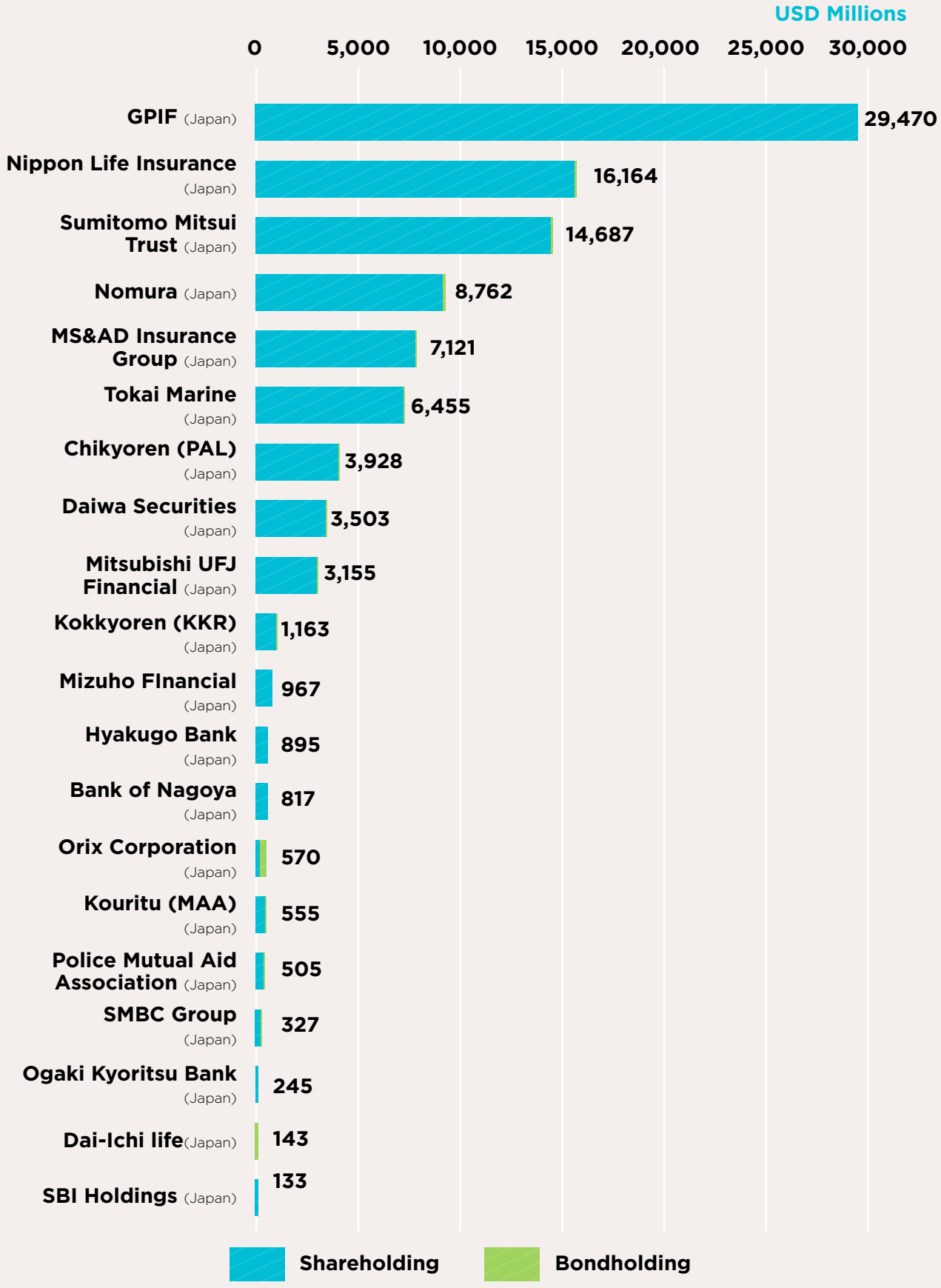
Figure 10 Share and bond holdings per country (USD million, November 2024)



Source: Calculations based on the information retrieved and described in Section 1.3.

Figure 11 shows the top 20 investors in shares and bonds of the selected companies. The main investors are the Government Pension Investment Fund (GPIF) with $29 billion in shares, followed by Nippon Life Insurance with $16 billion, and Sumitomo Mitsui Trust with $15 billion. The other financial institutions in the top five are Nomura and MS&AD Insurance Group with investments of $8.7 billion and $7.1 billion, respectively.

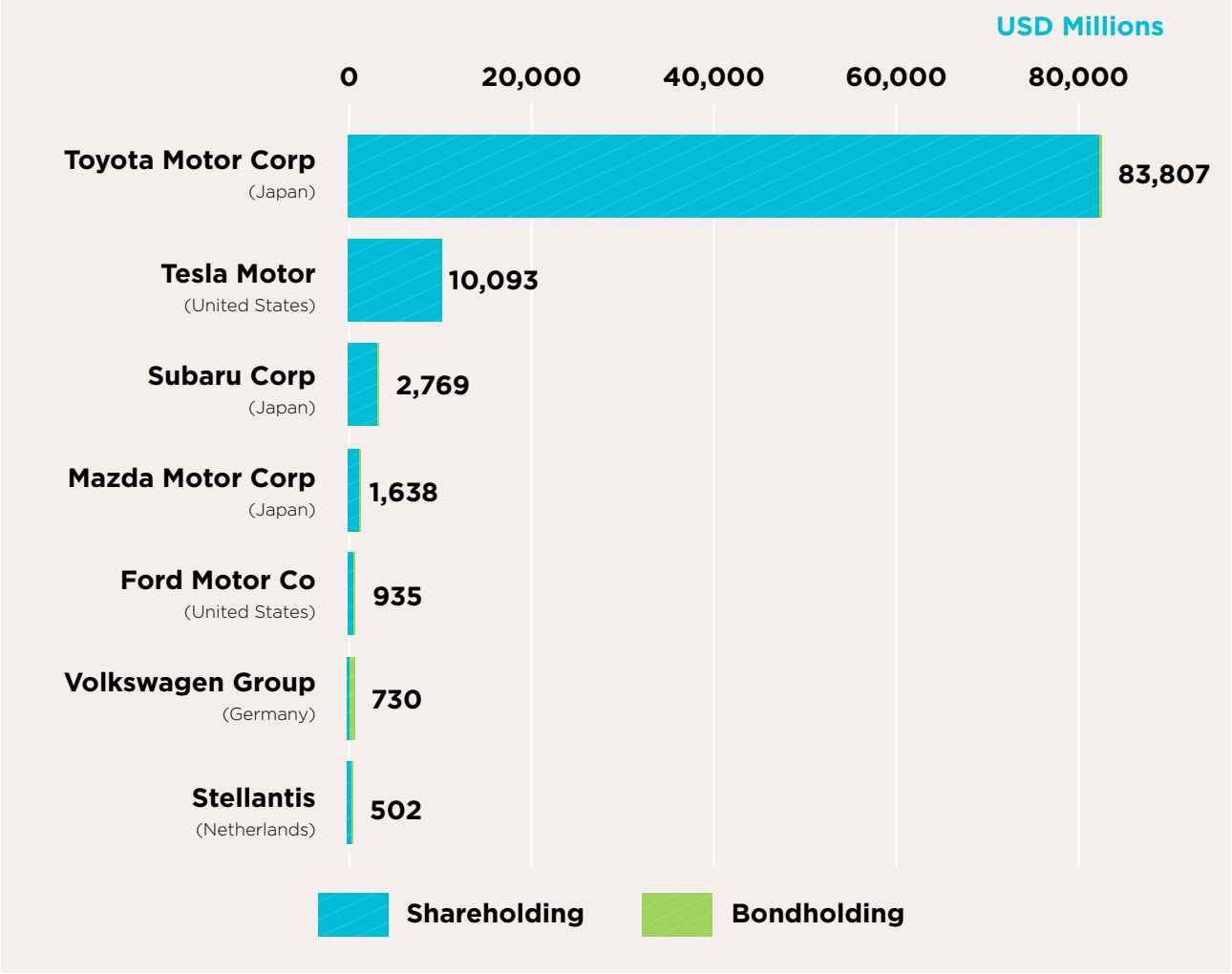
Figure 11 Share and bond holdings per financial institution (USD million, November 2024)



Source: Calculations based on the information retrieved as described in Section 1.3.

Figure 12 shows the companies to which most of the investment financing was directed. Toyota received the most financing with a total of $83,807 million in shareholdings (83% of the total). The other top-five companies in terms of investment received are Tesla Motors with $10,093 million, Subaru with $2,769 million, Mazda with $1,638 million, and Ford with $935 million.

Figure 12 Share and bond holdings per company (USD million, November 2024)



Source: Calculations based on the information retrieved and described in Section 1.3.

ANNEX 1. Types of financing

Credit financing

- **Corporate loans**

  The easiest way for a company to finance is to borrow money. In most cases, money is borrowed from commercial banks. Loans can be either short term or long term. According to accounting principles, short-term loans (including trade credits, current accounts, and leasing agreements, among others) have a maturity of less than a year and are categorized as current liabilities. Short-term loans are mostly used for day-to-day operations and are usually referred to as working capital. Since short-term loans usually do not involve considerable amounts of money (as a proportion of total assets), they are often provided by a single bank via bilateral transactions, which do not require substantial guarantees by the company.

  On the other hand, long-term loans have a maturity of more than a year, usually 3–10, and are categorized as non-current liabilities. Long-term corporate loans are often used to finance expansion plans, which are expected to generate revenues over time. However, the proceeds of long-term loans can be used for other types of company operations. Since long-term loans usually involve considerable amounts of money (as a proportion of total assets), they are often provided by a syndicate of banks – a group of banks brought together to finance a specific project. The bank syndicate will only undersign the loan agreement if the company can provide enough guarantees that interest and principal repayments will be fulfilled.

  As there are different categories of loans based on their maturity, loans can also be categorized according to their purpose. As mentioned, one type of corporate loan is **project finance**, which is an earmarked loan for a specific project. Another common loan category is **general corporate purposes, or working capital**. This type of loan is used when the company does not have a specific purpose for the loan or would rather not disclose it. The final use of the proceeds of specific loans is generally difficult to ascertain.

- **Share issuances**

  Issuing shares on the stock exchange allows a company to increase its equity by attracting a large number of new shareholders or increasing the equity of its existing shareholders. When a company offers its shares on the stock exchange for the first time, it is called an initial public offering (IPO). When a company's shares are already traded on the stock exchange, a new share issuance is called a secondary offering. To arrange an IPO or secondary offering, a company needs the assistance of one or more banks, which will promote the shares and find buyers who will become shareholders. Therefore, the role of an investment bank in this process is very important, although temporary. The investment bank initially purchases the shares and then promotes the shares and finds shareholders. When all the issued shares that the financial institution has underwritten are sold, they are no longer included in the balance sheet or the financial institution's portfolio. However, the assistance provided by financial institutions to companies in their share issuances is crucial. They provide the company with access to capital markets and guarantee that the shares will be bought at a predetermined minimum price.

- **Bond issuances**

  Bonds can be understood as a mix between loans and share issuances. On the one hand, bonds can split a large loan into small pieces with each piece sold separately to a lender. The different pieces of the bond are sold using underwriting services, as with share issuances. Bonds are issued on a large scale by governments and, to a lesser extent, by corporations. Also, like shares, bonds are traded on the stock exchange. To issue bonds, a company needs the assistance of one or more banks, which act as underwriters of a certain amount of the bond. Underwriting is, in effect, buying a piece of the bond with the intention of selling it to investors. The role of the underwriters is very important because if they fail to sell the bonds they have underwritten, the underwriters will end up owning the bonds.

Investment financing

- **Holding and managing shares**

  Financial institutions can acquire shares of a company through the funds they manage or through their own funds, making them part-owners of the company that issued the shares. Share ownership, especially if it is a considerable percentage, gives the financial institution direct influence over the company's strategy and operations. The magnitude of the influence depends on the amount of shares the bank holds.

  As financial institutions actively decide which sectors and companies to invest in, and, as just described, can influence the company's business strategy, this research investigated the shareholdings of the financial institutions that invested in the selected companies. Shareholdings are only relevant for stock-listed companies. All companies in this study are listed on a stock exchange.

  Researching a company's shareholdings is complex, and poses challenges that have implications for the research strategy. First, shares can be bought and sold on the stock exchange from one moment to the next. Financial databases keep track of shareholdings through snapshots or filings. This means that when a shareholding is recorded in a financial database, the actual holding, or a portion of it, may have already been sold or more shares may have been purchased. The other main implication for the research is that share prices are constantly fluctuating. Consequently, the shareholding amounts identified in the research probably do not reflect the actual shareholdings of a given financial institution; rather, it will reflect the level of shareholdings of the financial institution at the time of the research.

- **Holding and managing bonds**

  Similarly to shareholdings, financial institutions can acquire bonds issued by a company. The main difference between owning shares and owning bonds is that bonds do not give the holder influence over the company's strategy and operations (i.e., holding bonds does not make the bondholder a co-owner of the company issuing the bonds, but rather a creditor). The bondholder is entitled to repayment when the bond matures after a certain number of years, and to a predetermined interest rate over this period.

ANNEX 2. Financial contributions methodology

Profundo developed a methodology to estimate a financial institution's contribution based on available information. When the fees charged by each financial institution are available, this research estimates each financial institution's contribution as a proportion of the total fees received by all financial institutions. Then, the estimated proportion (for instance, if Bank A received 10% of all fees) is applied to the total value of the deal (assuming a deal of $10 million, Bank A would be assigned a contribution of $1 million or 10%).

When data on the deal's fees is missing or incomplete, this research uses a book ratio approach. The book ratio determines the distribution of the deal between bookrunners, managers, and other participants. The formula is as follows:

$$\text{Book ratio} = \frac{\textit{number of participants - number of bookrunners}}{\textit{number of bookrunners}}$$

Table 3 shows the commitments assigned to bookrunner groups based on the proposed estimation method. When the number of total participants increases with respect to the number of bookrunners, the share attributed to each bookrunner decreases. This prevents substantial differences in the amounts attributed to different bookrunners and other participants.

Table 3 Commitment to assigned bookrunner groups

Book Ratio	Commitment	
	Loans	Issuances
> 1/3	75%	75%
> 2/3	60%	75%
> 1.5	40%	75%
> 3.0	<40%*	<75%*

* For deals with a book ratio of more than 3.0, an additional formula is used that gradually lowers the commitments assigned to bookrunners as the book ratio increases. The formula is as follows:

$$\text{Commitment} := \frac{1/\sqrt{\textit{book ratio}}}{1.443375673}$$

The number in the denominator is used to make the formula start at 40% in case of a book ratio of 3.0. As the book ratio increases, the commitment will decrease from 40%. For share and bond issuances, the commitment's denominator is 0.769800358.

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