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Master in Global Energy Transition and Governance

CHILE; ENERGY TRANSITION AND GEOPOLITICAL DEPENDENCE
Is the Chilean mining sector under international dependency?

Supervised by François Bafoil

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2024

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ABSTRACT

Chile, a country rich in copper and lithium, stands at a crossroads in its energy transition. This thesis explores the complex interplay between its mining industry, geopolitical dependence on key partners, and the potential risk of "green-extractivism".

Drawing on dependency theory and concepts like extractivism and sustainable development, the thesis analyzes Chile's relationships with the European Union, the United States and China. Each partnership reflects distinct economic strategies and geopolitical interests. While the US represents a traditional investment model, the EU emphasizes sustainability, and China embodies a resource-driven approach.

The analysis reveals that, on paper at least, Chile avoids the risks of green extractivism thanks to international agreements and national regulations. However, the effectiveness hinges on proper implementation and auditing. From the other hand, dependence on China, evident in export patterns, necessitates diversification to avoid economic vulnerability.

A key recommendation is the establishment of a robust and independent auditing mechanism to ensure adherence to agreements, policies and laws, and responsible resource management. This, alongside joining initiatives like the Extractive Industries Transparency Initiative (EITI), can foster transparency and accountability.

This thesis recognizes the challenges of balancing profit, environmental protection, community well-being and the need of Chile to be an important part of the value chain. It underscores the importance of dependency theory, suggesting that core countries could impede transitions away from extractivism.

Despite complexities, Chile, with its abundant copper and lithium reserves, is uniquely positioned in the global energy transition. To leverage this, the country must redefine its global partnerships, transform its mining sector, and strive for sustainable development, needing collaboration among all stakeholders, a shift towards sustainable practices, and a move away from extractivist models.

This thesis sheds light on these dynamics, providing valuable insights for policymakers, industry leaders, and researchers to navigate a successful and equitable energy transition for Chile.

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Thank you.

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INTRODUCTION

The world is in the midst of a significant transition, moving away from fossil fuels towards renewable energy sources. This shift, while necessary for environmental sustainability, has brought to light new forms of dependence and has reshaped the dynamics of global power. This thesis aims to explore how these dynamics affect the mining sector in Chile, focusing on the paradoxical development of dependence within the context of the renewable energy transition.

Historically, Chile's economy has been heavily reliant on the large-scale extraction of natural resources. From the nitrate boom of the 19th century to the current dominance of copper mining, Chile's prosperity has been tied to its ability to exploit its mineral wealth (Ebert and La Menza, 2015). This dependence has had both positive and negative consequences. While it has generated significant revenue and fueled economic growth, it has also led to environmental degradation, social inequalities, and a vulnerability to fluctuations in global commodity prices (Bath and James, 1976).

The extractive industry has long been a cornerstone of economic development. However, the advent of the energy transition has given rise to a new form of extractivism, known as ‘green extractivism’. These concepts extend the traditional notion of developmentalism, highlighting the environmental implications of resource extraction and the power dynamics between developed and developing nations (Andreucci et al., 2023).

Green extractivism refers to the large-scale extraction of natural resources for the production of renewable energy technologies, such as lithium for electric vehicle batteries. While this form of extractivism is often touted as a sustainable solution, it can lead to environmental degradation and social inequality (Andreucci et al., 2023). This is directly linked to the control exerted by developed nations over the natural resources of developing nations in the name of environmental sustainability. This can perpetuate existing power imbalances and contribute to economic dependence.

The Dependency theory provides a useful framework for understanding these dynamics. This theory is the notion that resources flow from an underdeveloped state (“periphery”) to a developed state (“core”), enriching the latter at the expense of the former (Mohinuddin, 2018). Critics of this theory argue that it overlooks the potential for change and innovation, and that

it can lead to deterministic and a simplistic interpretation of complex phenomena (Bath and James, 1976).

In the context of the renewable energy transition, new forms of dependence are emerging. Countries rich in renewable energy resources, such as Chile with its vast copper and lithium reserves, are becoming increasingly dependent on foreign investment and technology. At the same time, they are grappling with the environmental and social impacts of resource extraction.

A sustainable and inclusive mining industry, for the purposes of this thesis, will be one that prioritizes environmental regulations to minimize ecological damage caused by extraction activities. This includes responsible waste management, water resource conservation, and land reclamation efforts (Guzmán et al., 2023). Additionally, it will emphasize community participation in decision-making processes related to mining projects. This ensures that local voices are heard and that the benefits of mining are shared with the communities most directly affected. Finally, a sustainable and inclusive mining industry will strive for economic benefits for Chile, not just foreign corporations. This could involve ensuring a fair share of profits remains in the country, fostering the development of domestic expertise and value-added industries related to mining products

In essence, the path out of underdevelopment and dependence may not necessarily lead to development, but rather to a different form of dependence. History does not follow a linear path, but rather a complex and paradoxical one. By exploring these complexities, this thesis aims to shed light on the intricate dynamics of the global energy transition.

One of the greatest difficulties for the development of new projects in Chile is the distrust towards authorities, as communities feel their needs overlooked in favor of private interests. This is even worst in projects related to the mining sector. Communities, and the general public, feel that such projects use the country's resources without giving anything in return, exacerbating the feeling of green extractivism. The feeling of imposition on their communities, arouses strong opposition to the projects that sometimes results in significant delays in the construction or even in the abandonment (Ramons, 2023).

This thesis will try to answer the question if Chile is currently under a dependency relation with an international partner in the mining industry, giving place to green extractivism, to see if this feeling of distrust is well funded. To be able to have an objective answer, it will examine the intricate dynamics of Chile's energy transition and its geopolitical dependence on three key global powers: the United States, the European Union, and China. It will explore how these relationships shape Chile's strategies and policies in the energy sector, and how they contribute to its shift away from extractivism towards a more sustainable and inclusive mining industry.

To do so, in the CHAPTER 1: THEORETICAL FRAMEWORK we will define the main theoretical framework related to the study, to define the foundations need to the analysis. Later in CHAPTER 2: ANALYSIS OF DEPENDENCY DYNAMICS WITH THE US, EU, AND CHINA, we will analyze the different geopolitical dynamics with the 3 key partners of Chile: the US, EU and China, by reviewing and analyzing the main agreements in the mining sector between the parts. Finally, in CHAPTER 3: ANALYSIS OF ENERGY PARTNERSHIPS AND DEPENDENCY DYNAMICS we will analyze how the agreements between the partners, shape and affect the Chilean mining sectors to evaluate if is there any dependency dynamics involved

CHAPTER 1: THEORETICAL FRAMEWORK

In this chapter, we will delve into the theoretical foundations of the study, exploring the Dependency Theory and its implications for underdeveloped countries, with a particular focus on Chile's international relations and investment dependence, as well as the concept of Green extractivism.

1.1 DEPENDENCY THEORY: PERIPHERY VS THE CORE

The dependency theory is the first development theory formulated in undeveloped countries. It came as a form reaction to the modernization theory. It argues that all societies undergo comparable developmental stages, asserting that the sole solution for underdeveloped regions to escape poverty is to expedite their progress along this presumed "common path of development" (Davis and Adam, 2010).

According to the modernization theory, societies can achieve modernization by adopting Western technical capital, organizational methods, and advancements in science and technology from developed nations (Herkenrath and Bornschier, 2003). According to Rostow, the premise is that "development in the U.S. and Europe can be copied elsewhere, being the goal an industrialized, capitalist liberal democracy, being U.S. the model" (Rostow, 2015). Under the modernization theory scope, development is just a matter of transfer of technology and knowledge, in a seamless and direct manner, without taking in consideration the context, and not disturbing the existing social and cultural ways of living in developing countries (Herkenrath and Bornschier, 2003).

Dependency theory reject this perspective. It states that underdeveloped countries are not simply early stage versions of a developed ones, instead, they possess unique structures and features (Davis and Adam, 2010).

The most frequently cited definition is the one provided by Theotonio Dos Santos, one of the leaders of the movement: "By dependence we mean a situation in which the economy of certain countries is conditioned by the development and expansion of another economy (...) The relation of interdependence between two or more economies, assumes the form of dependence when some countries can expand and can be self-starting, while other countries can do this

only as a reflection of that expansion, which can have either a positive or a negative effect on their immediate development" (quoted in Duvall, 1978, p.56).

As mentioned before, Dependency theory states that resources flow from an underdeveloped state ("periphery") to a wealthy state ("core"), making richer the second at the expense of the poorer country. One fundamental tenet of dependency theory is that poorer states remain impoverished while richer ones become wealthier due to the constraints imposed by the "world system" hinder poor states (Davis and Adam, 2010). "The strength of the "core" and the dependent position of the "periphery" is not seen as a temporary, evolutionary stage, but a persistent, natural condition", Davis and Adam claim (Davis and Adam, 2010).

The theory came out the 1950s from the research of Raul Prebisch, author of "The Economic Development of Latin America and Its Principal Problems" and Head of the Economic Commission for Latin America and the Caribbean (ECLAC) between 1950 and 1963 (Davis and Adam, 2010).

The theory became a legitimate way to analyze Latin American history, even when only recently has been tackled and used by researchers in the United States. This theory has made major contributions to understanding the inter-American system by pointing out graphically what should have been obvious to everybody: It is not possible to discuss Latin American countries' internal political and economic systems without considering how they relate to external factors, particularly United States´s role (Bath and James, 1976). This concept also was extended to politics; the former Brazilian President (from 1995 to 2003), Fernando Enrique Cardoso was a worldwide recognized sociologist and he participated in study groups that resulted in the development of Dependency Theory (Pires, 2000). He claimed that this type of State development brought consequences in itself of economic, social and political dependence in Brazil and the only way to develop is to work together with other underdeveloped countries (Pires, 2000).

A group of American "radicals" was the first in adopt the dependency perspective, which may be a main reason for it not to be considered among the scholars, mainly because the research don't usually respect the approach of radicals, neither their channels of publication (Bath and James, 1976).

Chase-Dunn defined the three main topics that the Dependency theory deals with:

- Exploitation of the periphery by the core: Frank (1969) argues that "penetration of the periphery by foreign investment drains surplus from the periphery to the core through the repatriation of profits and interest. This backwash effect accumulates capital in the core and under develops the periphery". Emmanuel (1972) claimed that "exploitation is hidden in the prices at which commodities from the periphery are exchanged for commodities from the core". Therefore, the hypothesis of Chase-Dunn is that "exploitation of the periphery by the core occur by means of decapitalization, unequal exchange, and subordination to external controls in a competitive system. These mechanisms are thought to retard the development of the periphery" (Chase-Dunn, 1975).
- Structural distortion of the peripheral economy: The peripheral areas have been integrated into the "world system" as extractive producers for export to the industrial countries, leading to the peripheral countries to specialize in a single raw material export, either agricultural or mineral. Galtung (1971) argues that "an economy which is specialized in the production of raw materials will grow less than one in which production is more differentiated". In this way, the hypothesis of Chase-Dunn is that "dependence will distort the economic structure of the periphery by the specialization in raw material production (low differentiation), outward-oriented infrastructure (low integration) and the creation of resource use patterns which retard economic development" (Chase-Dunn, 1975).
- Suppression of autonomous policies in the periphery: Baran (1956) states that "dependence distorts the development of a national bourgeoisie. Merchants, with their stake in the export of raw materials and the import of manufactured goods, combine with landed classes (which have similar interests) to prevent the emergence of a domestic manufacturing or industrial bourgeoisie". So, the hypothesis of Chase-Dunn is that "the dependence creates a political situation which retards development by linking elites in the periphery to the interests of the core. This prevents the emergence of autonomous forces seeking to mobilize balanced development and maintains extreme inequalities in the periphery" (Chase-Dunn, 1975).

The *dependentistas* are convinced that Latin America's subordination extends beyond external relations between countries. They argue that dependence spreads to social structures, internal

decision-making processes, cultural elements, and ideological beliefs (Bath and James, 1976). Since Dependence is a structural dimension of society, legitimization is closely tied to the idea of acceptance of authority, this means that the periphery might have to align its policies with the interests of the core, directly impacting its domestic economic strategies, foreign policies, and even its political structure.

In this context, people living in poverty may view their situation as inevitable due to the ideology propagated by those in power. This belief can contribute to the longevity of authoritarian regimes by discouraging dissent and fostering acceptance of the status quo. If the ruling elite can convince the population that poverty is a natural state or a result of individual failings, they can maintain their power unchallenged. This narrative can be particularly potent in societies with high levels of economic dependency. However, the actual impact of dependency theory can vary greatly depending on the specific context of a country (Bath and James, 1976).

Although the definition and the topics addressed in the theory offer sufficient cohesion to justify the term *dependentistas,* there are 3 main currents within the movement: the Conservative, the Moderates, and the Radicals (Bath and James, 1976).

The Conservative Approach, led by Raul Prebish, claims that the instrument for drastically reduce dependence is an economic transformation with heavy reliance on outside resources and international cooperation between Latin American and developed countries, planned to gain a fast economic growth. This approach is defined as a conservative because, unlike most dependentistas, it has no worries about foreign investment or foreign aid and makes no reference to the social aspect (Bath and James, 1976).

The Moderates disagree with Prebish in believing that foreign investment, aid, and trade agreements are consciously used by the core, especially the US, as political weapon. They see the multinational corporations (MNC) as a financial form of domination. Celso Furtado, one of the leaders of this approach, believes that “the common market principle can help Latin America only if policies are built to be able to decrease the advantages of the MNCs” (Furtado, 1965b:64). MNCs are criticized for exacerbating capital accumulation within already privileged segments of society unfairly, generating large social differences, only benefiting those who have power and not helping to decrease poverty. In the case of Chile, Sunkel (1965)

holds that “the fusion of new and traditional groups has not resulted in a middle class that is a driving force for general socioeconomic change. It has resulted in fragmented interest groups attempting to pressure for their own economic benefit” (Bath and James, 1976).

The Radicals claim that the interests of Latin America and the core are opposed, not complementary. Dependent external relations not only determine internal economic and social structure, political decisions, culture, and ideology; these are also dictated by the internal ruling groups that benefit from dependency. Foreign investment and aid are seen as evils and support social revolutions as the way to continue Latin America's dependent status (Bath and James, 1976).

CRITICISM

The principal critics of the dependency theory claim that its doesn’t provide empirical evidence to support itself. Davis and Adam states that “it uses highly abstract levels of analysis. Another point of critique is that the dependency movement considers ties with transnational corporations as only detrimental to countries when these links can be also used to transfer technology” (Davis and Adam, 2010).

Dependency theory assumed that: “the uneven relationship between the “core” and the “periphery” prejudiced poor countries to such a degree that they would remain in a state of dependency after the colonial powers left in the 1950s and 1960s. However, the existing states have lost their power to control poor countries, and there are former colonies that have developed into semi-peripheral or manufacturing countries, India and Mexico being good examples” (AQA, 2018).

Critics of Dependency argue that it fails to address the growth and development periods that sometimes occur in underdeveloped countries (White, 2015). The dependency theorists were too generalistic in their approach, and they did not consider the uncertainty of the world capitalist market, being very pessimistic about the impact of capitalism on the national market of the countries (White, 2015). The best support for this remark is the decreasing trend of poverty which can be observed in LATAM over the years, has shown in the next graph:

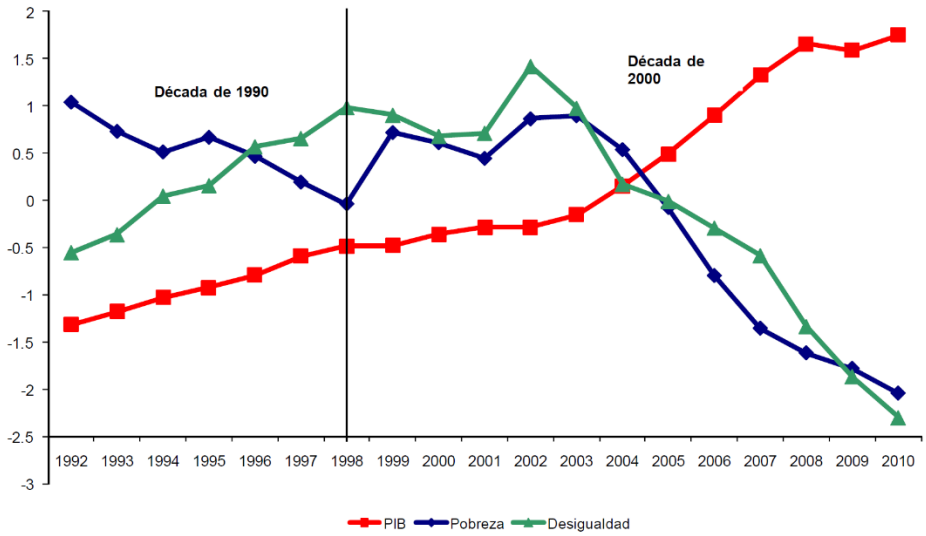

Figure 1. Poverty, inequality, and growth (PIB) in Latin America, years 1992-2010
**Note: The variables are normalized according to the average of the period = 1.*
Source: ("Pobreza y desigualdad en América Latina," 2012)

Critics also claim that it induces emotional responses, either pro or con, not allowing to really appreciate the value of the approach. It seems to provoke fears of Marxism while at the same time, supporters of dependency often label their critics as defenders of the status quo, imperialists, and capitalists (Bath and James, 1976).

DEPENDENCY IN CHILE

Most of the criticism is founded on the lack of empirical data, but there is considerable dependency analysis written about Chile since 1970, due to the analysis of how US policy makers boycotted the Allende presidency (Bath and James, 1976).

Whenever Chile's working-class forces have challenged the capitalist system, policymakers from the US have intervened to bolster the local ruling classes. They provide resources to help these local elites overcome the crisis and suppress the challengers (Bodenheimer, 1971). Through exchange programs and trainings for labor organization, military officers, industrialists, politicians, businessmen and others, these agencies conduct a political socialization process that both indoctrinates participants against "communism" (typically a euphemism for any nationalist or anti-capitalist movement) and predisposes them to favor the "American way of life," particularly in terms of material prosperity. As these programs include political socialization and technical training, they also improve the trainees' chances of rising

through the ranks of their organizations, thus expanding their political influence (Erickson and Peppe, 1976).

For this to work, there must be a clear distinction between the working class and an upper class that acts according to the core needs. In Chile, the Movimiento de Acción Popular Unitaria (MAPU) offers a broad discussion of classes, defining them in the Marxist sense as groups that distinguish themselves by their relations to the means of production. MAPU identifies two major classes in Chile: the proletariat and the bourgeoisie (or capitalist), with various subdivisions within each. However, it points out that certain social sectors, such as students, bureaucrats, the armed forces, etc., cannot be classified as classes. The term "middle class" is considered a "hollow phrase" because it included dispersed classes and strata (Johnson, 1973: 207-38).

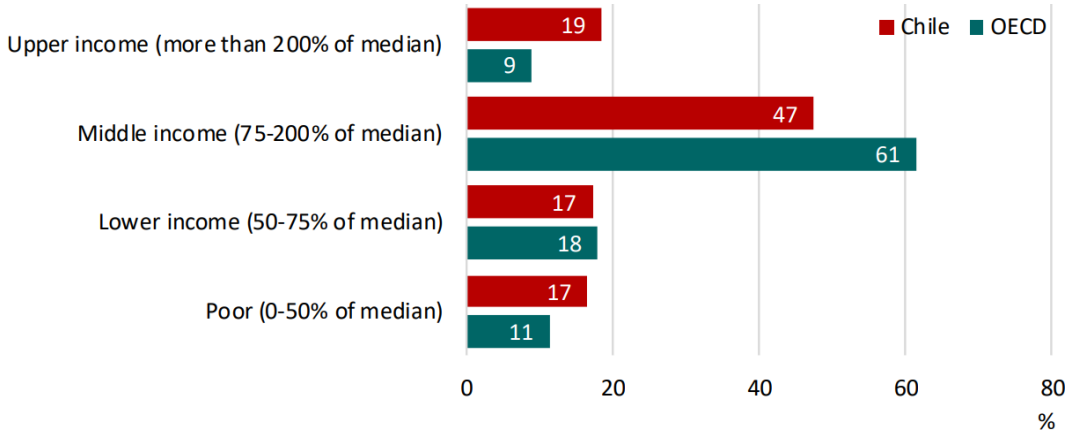

Figure 2. Percentage of the Chilean population in every economic sector, by 2019. Source: (OECD, 2019)

According to Bath and James, dependency analysis requires compelling evidence that the subordinate classes in the "periphery" recognize their superior positions within their own society and unite cohesively to safeguard themselves. However, Chilean industrialists do not appear to utilize the political system in an organized manner to defend their privileged status and position. They seem to lack awareness of the class interests within their own society (Bath and James, 1976).

Perhaps the difficulty to define class is best illustrated by Bodenheimer: “Without getting into an extensive discussion of what is meant by social class, it should nevertheless be understood that the concept of class does not refer simply to one-dimensional income, occupation, "status,"

or "interest" groups. Membership in a particular class implies, in addition to a certain level of income, etc., a "mode of life" and a structural position in relation to other classes in the society, giving rise to a class consciousness, to class interests, and to sharp struggles with other classes (Bath and James, 1976).

In light of this situation, there appears to be a significant gap in dependency analysis, since the dependentistas would need to demonstrate that the upper class actively suppresses other class interests. It seems evident, therefore, that the dependentistas have not thoroughly examined class dynamics and societal structure in Latin America, especially as it relates to Chile. It is not sure what classes do exist and how they relate to each other and to the political system (Erickson and Peppe, 1976).

1.2 CHILE'S INTERNATIONAL RELATIONS: INVESTMENT DEPENDENCE

Power-dependency international relations have different forms. They can vary from straightforward military forces to political subordination (colonialism), to more nuanced forms of economic and power influences, as foreign investment and aid, and trade relations based on vertical form of labor organization (Chase-Dunn, 1975).

According to Chase-Dunn, there are two primary types of international economic dependency: investment dependence, characterized by the infiltration of foreign capital into a country, and debt dependence, where a government relies on foreign credit (Chase-Dunn, 1975).

International economic dependence ranges from direct to indirect dependence due to the position in a larger structure. The transnational corporation's private investment, that directly control and own the production process, facilitates more direct economic penetration of core nations into peripheral areas. Foreign aid programs and lending agencies exert a less direct influence (Chase-Dunn, 1975).

From nitrate industry development finishing the 19th century, Chilean dependence on the world economy has been the most lasting characteristic of the Chilean economy. This reliance on

investment elucidates, more than any other factor, the often rapid fluctuations in the nature, scale and direction of Chile's economic development during the 1970s and 1980s (Allende, 1988).

So, when at the beginning of the 20th century the electrical industry development interested the curiosity of foreign investors to Chile's unexploited deposits of copper, the elites allowed this mineral wealth to fall into the hands of two U.S. transnational corporations (TNCs): Anaconda and Kennecott. As a result of this "denationalization", Chile became deeply integrated into the global economy, with its economy becoming highly export-oriented to critical extents (Allende, 1988).

Currently, private mining companies own the 72% of Chilean copper mines, while the residual 28% are state-owned and managed by the Chilean state-owned copper mining company Corporación Nacional del Cobre de Chile (Codelco), the largest copper mining company in the world. The "Escondida" mine, located in the Atacama Desert in northern Chile, is the world's largest copper mine in production, accounting for 6% of the world's copper production. This mine is managed by BHP, Australia. US, Asian, and European companies are also present in Chile (“Instituto de Ingenieros de Minas del Perú,” 2023).

For the other hand, all Lithium extraction in Chile is carried out by two private companies: Soquimich S.A. (SQM), a Chilean company and Albemarle Ltd., an American company. The Government of Chile has announced national plans for the lithium industry but the normative and policies regarding this, are still in work (AP News, 2023).

Chase-Dunn claims that several studies has shown that investment dependence retards economic growth. A more detailed investigation of the effects of dependence on development across various economic sectors reveals that there are negative effects on output in industry and agriculture, while investment dependence shows a positive effect on mining production (Chase-Dunn, 1975).

The dependence theory suggests that external controls hinder development in a competitive global economy. Foreign capital, viewed as control and resource flow, negatively impacts economic development due to the structural and institutional contexts it operates within. This

contrasts with the effects of domestic capital investment. Nations under external control can't use their surplus capital for balanced development. Transnational corporations prioritize their growth over the development of host countries, using their influence to maintain low labor costs, taxes, and conditions for continued profitability (Chase-Dunn, 1975).

Samuelson claims that "the theory of comparative advantage holds that specialization in the production of raw materials (one of the correlates of dependence) will not have negative effects on growth if it is more economical to exchange raw materials for manufactured goods than to produce the imported goods domestically" (Samuelson, 1964). The theory holds that "whether or not one of two regions is absolutely more efficient in the production of every good than is the other, if each specializes in the products in which it has a comparative advantage (greatest relative efficiency), trade will be mutually profitable to both regions" (Samuelson, 1964). This is in direct contradiction to the ideas of dependentistas discussed above.

Some studies have found that dependence on investment boosts mining production, which may suggest that foreign investment has positive effects on the recipient firm. Combined with the finding of negative effects on overall economic development, this suggests that foreign investment combines positive direct effects on the receiving firm but negative effects on the broader national economy, leading to overall negative consequences (Chase-Dunn, 1975).

The Chilean economy made considerable progress in addressing the macroeconomic imbalances built up over the last few years. Domestic demand continued to adapt, with inflation showing a decline, though it remains above the target level. Economic growth, averaging just 2% in the six years preceding the pandemic, would need to accelerate for significant progress to be achieved (Luco Repossi, 2024). In the next graphs is shown how some key elements related to development, as education spending, unemployment, life expectancy, and poverty have improved considerable over the years.

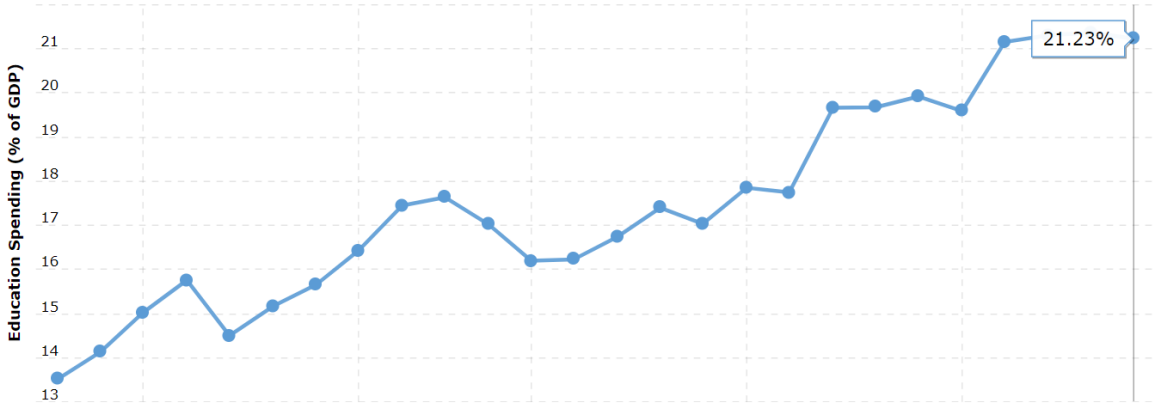

Figure 3. Education Spending from 1993 to 2022.
Source: (Macrotrends, 2024a)

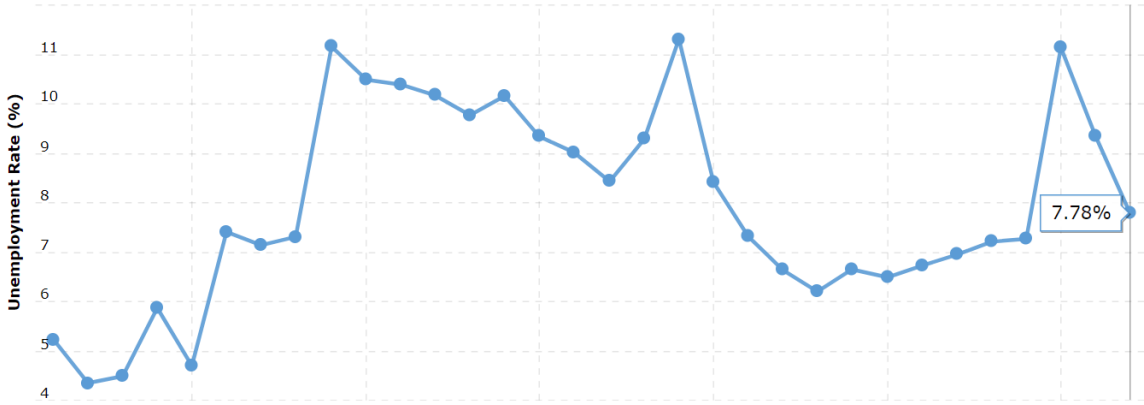

Figure 4. Chilean Unemployment rate from 1991 to 2024.
Source: (Macrotrends, 2024b)

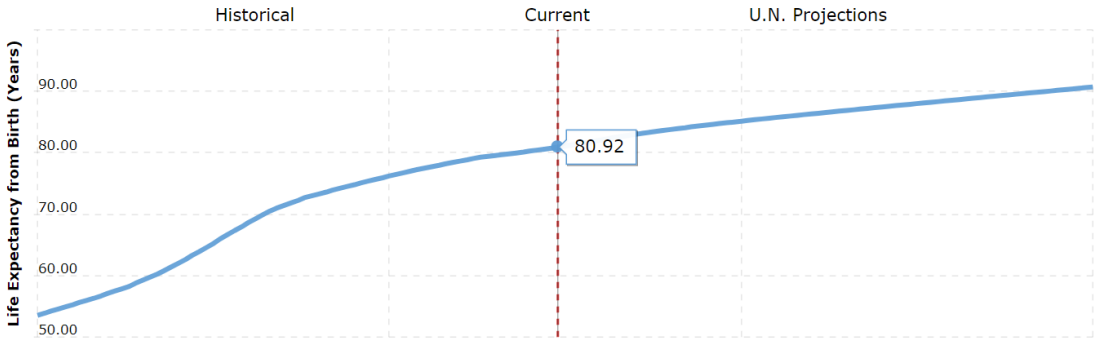

Figure 5. Life Expectancy from Birth since 1950 to 2023 (UN projection until 2100).
Source: (Macrotrends, 2024c)

Real GDP shrank 1% y-o-y over the first half of 2023 driven mainly by the delayed effects of the 2022 fiscal and monetary contraction after the special expenditure in 2021. The unemployment rate rose 0,7% y-o-y in June 2023. The female labor force participation rate rose 2% y-o-y, but remains below pre-pandemic levels (Luco Repossi, 2024).

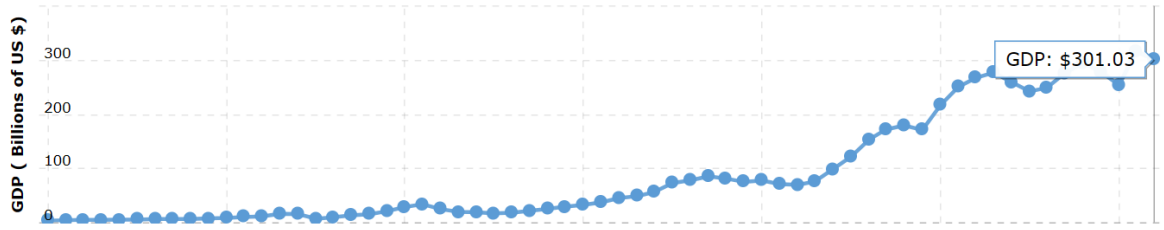

Figure 6. Chilean GDP from 1960 to 2024.
Source: (Macrotrends, 2024d)

The poverty rate (income less than 6,85 dollars per day) fell from 8% in 2020 to 4,8% in 2022. Gini coefficient measurement of Income inequality amounted to 0,43 in 2022. However, privations in non-monetary domains, such as social security and health care, increased compared to 2020 (Luco Repossi, 2024).

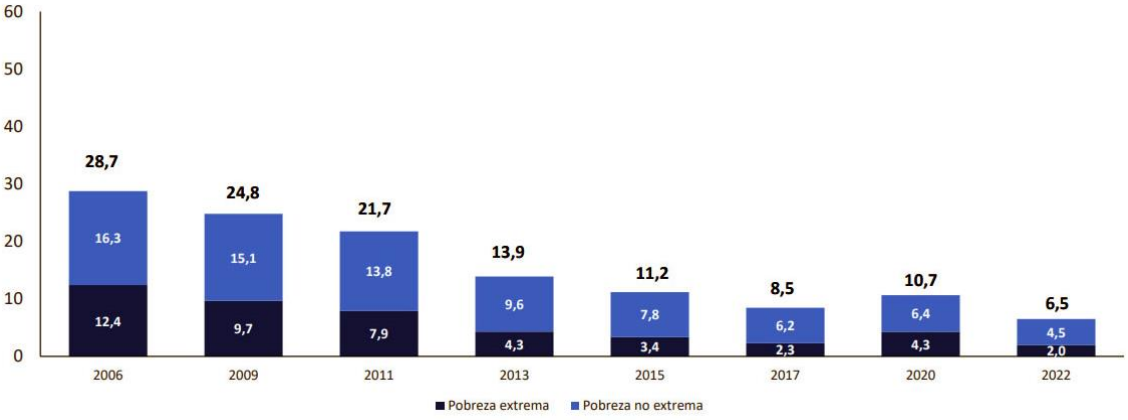

Figure 7. Extreme Poverty (dark blue) and not extreme (light blue) in Chile in %.
Source: (Acuña, 2022)

In conclusion, while Chile's economic development has been influenced by its international relations and investment dependence, the country has made significant strides in mitigating these effects. The next section, will delve into the factors driving Chile's energy transition, further illustrating the country's journey towards sustainable development.

1.3 CHILE'S ENERGY TRANSITION: THE DRIVERS

The Paris Agreement, adopted by 196 countries, aims to limit global warming to no more than 1.5 °C. To do that, emissions must be reduced by 45% by 2030 and achieve net zero by 2050 (UNFCCC, 2015). Given that climate neutrality is mainly achieved through the electrification of the economy and mobility, access to metals such as copper; necessary to conduct electricity,

or lithium; necessary for batteries, is essential. The International Energy Agency (IEA) predicts that, by 2040, the lithium demand will increase 43-fold compared to 2020, and copper demand will increase 28-fold (Dietz, 2023).

Lithium and Copper fall under the definition of Critical metals, a term for metals that are economically important but have a high potential for supply disruption, often because 1 or 2 countries dominates the supply (IEA, 2021).

So-called green technologies are significantly more mineral-intensive than their fossil fuel homologous. A standard electric car necessitates 6x times the mineral input of a conventional car, and an onshore wind power plant requires 9x times the mineral resources compared to a gas-fired power plant of equivalent capacity (IEA, 2021). Studies show that to meet the global demand for clean energy technologies, the next 25 years will require the production of the same amount of copper as in the last 5.000 years (Consejo minero, 2024).

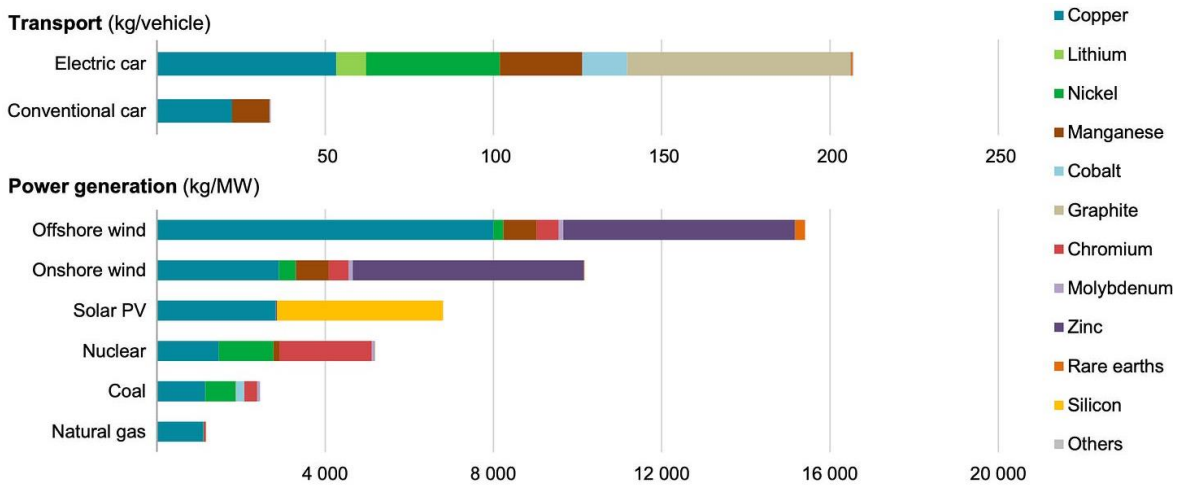

Figure 8. Minerals used in selected clean energy technologies.
Source: (IEA, 2021)

The main powers, such as the European Union, focus the energy transition on the ecological modernization of the capitalist system based on technological solutions, and on scientific innovation to tackle the energy and climate crisis. Most part of it will be imported from countries that have large deposits and have historically played the role of suppliers of raw materials (Dietz, 2023), for example Chile.

A crucial and understated aspect of the current low-carbon economy transition is the associated growth of transitional minerals and its linkage to the old colonial-extractive dynamics of capitalism (Mastini et al., 2021).

In this way, the relations of global inequality are maintained. Transnational corporations play an important role in this, as they are the ones who invest in and control new infrastructure, production plants, mines, research, and transport. Therefore, there are fears that green modernization aimed at decarbonization in the global North could promote a new commodity Supercycle (Dietz, 2023).

Since the copper and lithium mining industry in Chile have an important international influence and investment, there is the worry that due to the need of these metals to achieve the energy transition may lead to a perpetuation of a relationship of dependency with the main powers, as has happened previously.

Chile is included in the so-called South American "Lithium Triangle," an area that is home to lithium salt flats on the borders of Argentina, Bolivia, and Chile. In this territory, Chile has 60% of the world's lithium reserves (Vasters and Sonnenberg, 2011). The most important use of this metal refers to rechargeable batteries (e-mobility and storage for regenerative energies), so its extraction has increased considerably since 2015. Currently, Chile extracts 36% of the world's production, ranking second after Australia (UBIQUE, 2024).

Figure 9. The Lithium Triangle.
Source: (UBIQUE, 2024)

However, copper is the most important mineral for the Chilean economy. With approximately 23% of the world's production, the country leads the world in supply. In 2020, mining exports accounted for 56% of national exports, of which the majority (90%) comes from copper (SERNAGEOMIN, 2021). For this reason, copper has come to be known as "Chile's salary", given to its importance in the national economy (Metzger and Lara, 2022). This is also translated on the GDP of the mining regions. The three mining regions of the country are Tarapacá, Antofagasta, Atacama and, as shown in Figure 11, these regions have the highest income levels in the country (Arvelo, 2023).

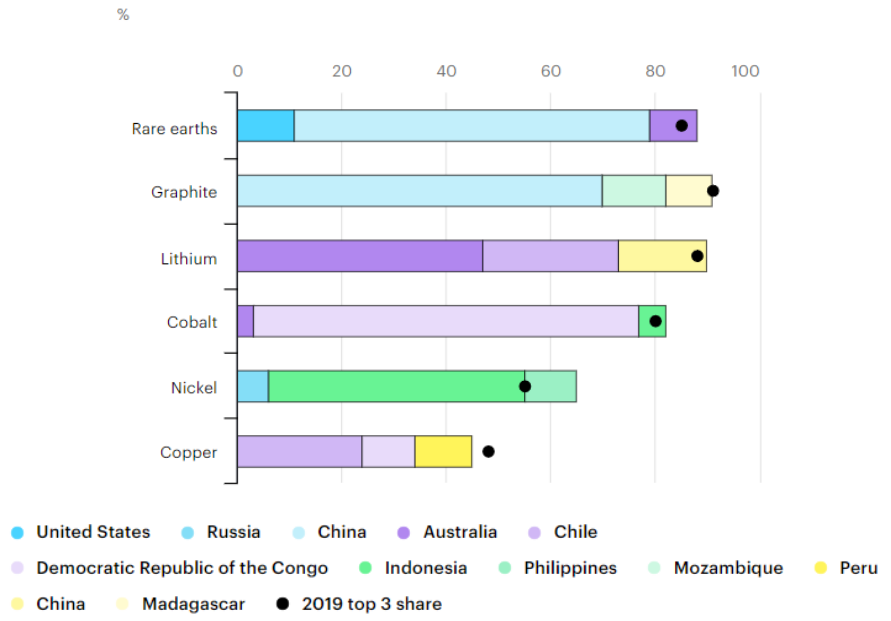

Figure 10. Share top producing countries in mining of selected minerals by 2022. Source: (IEA, 2021)

Figure 11. GDP per capita, of Chile by region (US$), 2022. Source: (Arvelo, 2023)

Western Europe and China depend on the constant supply of these resources. For example, in 2019 Germany had a demand of 1,101,000 tonnes of copper in total and covered 1,020,157 tonnes through imports, 17.4% has been imported from Chile (BGR, 2020). Regarding lithium, Chile has become an important supplier of this raw material to the EU, thus covering 78% of its imports (European Commission, 2020). This shows that Chile represents one of the most important suppliers of raw materials for the energy transition (Metzger and Lara, 2022).

The world needs for these metals also affect the aspiration to the development of an alternative industry to the extractive model since it is an economic sector prone to crises. In the face of strong demand for new resources, it seems difficult to imagine and create another economic model. In addition, the diversification of materials and their exploration lead to heavy burdens on the environment and can generate resistance and social conflicts (Warnecke-Berger et al., 2022).

The Chile's extractive model is a key economic pillar. It accounted for 45,9% of total invoiced products and services in 2019. This model has impacted the economy, resource extraction areas, inhabitants' practices, and politics in the continent. Latin American governments have long followed this model, extracting and exporting raw materials to invest in population welfare, infrastructure, and economic diversification. Despite significant poverty reduction, the region's societal inequalities persist (Burchardt et al., 2021).

The effects of the energy transition to national policies can be clearly analyzed in the Chilean case. Gabriel Boric won the runoff of Chile's presidential election on December 19, 2021. One of its main proposals refers to the transformation of the extractive industry into a key country for exporting raw materials (Ponce, 2019). However, his political plans challenge this economic sector that is so important to the country's economy. This dilemma demonstrates the complexity of a possible transformation of the extractive model.

Currently, the government of Boric is preparing an energy transition law. The first debates on a bill took place in April 2023. The common goal of these initiatives is the phasing out of fossil fuels and the shift to renewable. In addition to this, the programs and laws also aim to win the race for global market leadership in the export of renewable energy, especially green hydrogen and from 2030, become the world's largest exporter of Lithium (Dietz, 2023).

It seems that the goals to change the Chilean extractivist model and become the largest exporter of lithium, while achieving a just and green energy transition, seems to be opposites. It remains to be seen to what extent the government of Chile will succeed in putting environmental protection, as well as national interests, before commodity exports, against the backdrop of the global energy crisis and rising prices and global demand.

1.4 GREEN EXTRACTIVISM

Extractivism as a term has been utilized to describe a stage of capitalism, a new phase of imperialism, and as a form of accumulation. Chagnon argue that "extractivism is based on socio-ecologically destructive processes of subjugation, depletion, and non-reciprocal relations, occurring at all levels of practices (Chagnon et al, 2022). It follows that extractivism is diametrically opposed to the concept and practices of sustainability (including ecological, social, and economic)" (Bowles and Andrews, 2023).

Natural resource extraction, or extractivism, has long been central to the economic development strategies employed by governments, both to expand productive forces and as a mode of capital accumulation. However, in recent years, during a significant commodity boom, the reliance on resource-based development has sparked ongoing debate (Bowles and Andrews, 2023).

According to Bowles and Andrews, the conventional argument for extractive activities emphasizes their capacity to create jobs and generate income (tax and royalty payments) (Bowles and Andrews, 2023). The discovery that economic benefits from extractive activities have often been overstated has coincided with increasing awareness of the environmental and social costs of extraction, leading to growing resistance to such activities in many parts of the world (Bowles and Andrews, 2023).

The main resistance come from the environmental and social sector, especially in South America, mobilized by the detrimental impacts of extractive practices on local livelihoods, by the destruction of their human and land rights, and the ecosystem (Bowles and Andrews, 2023).

With the global energy transition comes the expression "green extractivism" as a way for activists and scientists to criticize the capitalist exploitation and appropriation of raw materials, natural properties (such as solar radiation or wind) and labor, especially in the global South, in order to carry out a green energy transition based mainly on technological innovations (Dietz, 2023). Green is therefore not synonymous of environmentally friendly, but it is with the restructuring of the economy, energy and transport. The exploitation of resources becomes a means for green extractivism, compatible with the Sustainable Development Goals (SDGs) and inevitable for the path to a low-carbon future (Dietz, 2023).

The critique associated with the concept points to the structural conditions and consequences of the green-technological energy transition, which entrenches global relations of inequality and exploitation. The green extractivism highlights that the exploitation and appropriation of raw materials for ecological modernization go hand in hand with the growing control and influence of transnational corporations, international organizations, and western governments, over politics, territories and labor in those regions that are "sacrificed" to meet the goals for the energy transition (Dietz, 2023).

On the other hand, the governments of extractive countries play a much more active role in green extractivism than before, as they also encourage critical resources exploitation and the development of renewable energies to achieve their own country's energy transition (Dietz, 2023). More particularly, the progress of green extractivism in the developing model requires the involvement of the State with both local communities and companies. This involves negotiating an extractive agreement that balances the interests of capitalist development and resistance (Bowles and Andrews, 2023).

In conclusion, this chapter has provided a comprehensive overview of the Dependency Theory, its critique, and its application to Chile's international relations and investment dependence. We've examined the concept of extractivism and its implications for Chile's mining industry. The insights gained from this analysis will serve as a foundation for the subsequent chapters, where we will further explore the dynamics of Chile's dependency on the USA, EU, and China (CHAPTER 2) and analyze the energy partnerships and dependency dynamics that shape Chile's energy transition (CHAPTER 3: ANALYSIS OF ENERGY PARTNERSHIPS AND DEPENDENCY DYNAMICS). This exploration will provide a deeper understanding of Chile's

position in the global economy and its path towards sustainable development, with the final goal of answering the question if Chile is currently under dependency towards international economies in the mining sector.

CHAPTER 2: ANALYSIS OF DEPENDENCY DYNAMICS WITH THE US, EU, AND CHINA

In this chapter, we delve into the intricate dynamics of Chile's geopolitical dependence on three key global powers: the United States, the European Union, and China. We explore how the distinct nature of Chile's relationships with these entities shapes its mining sector and broader economic development. From the United States direct investments in Chile's mining sector to the European Union's emphasis on sustainable trade and China's focus on securing mineral deals, we examine the diverse strategies these powers employ in their interactions with Chile. As we navigate through these complex geopolitical and economic ties, we aim to shed light on whether Chile is under green-extractivism practices, providing a nuanced understanding of the country's position in the global energy landscape.

Latin American countries are involved in a series of experiment related to economic policy, to ensure their development, defined by higher levels of income per capita (Kiddle, 2021). From the initial 19th and early 20th century postcolonial consensus, the mid-20th century witnessed a succession of experiments in import-substitution industrialization. This was implemented in the industry through neo-liberal liberalization of policies and trade and currency re-valuation to lure foreign direct investment and flow of capital in the short-term in order to restart economic development. The hope was that foreign private capital would rescue the region's economies from the depressions and economic recessions of the 1980s (Kiddle, 2021).

This was also applied in the energy sector. The pro-market reforms in this sector during the 80s in Latin America were expected to increase production, and economic development, bringing with them support for marker rules from part of local populations. In this case, some states tried to win public support to expand resource extraction in exchange for income that, it was hoped, would be used to improve the population's quality of life (Perreault, 2022). The deal offered is to bear the dependence on external capital entries and the social and environmental costs of extractivism in exchange for reduction of poverty (Bowles and Andrews, 2023).

Energy policy in resource-rich nations can be viewed through two contrasting lenses: resource nationalism (RN) and energy as a market good (EMG) (Kiddle, 2021). RN prioritizes state control over energy and mineral resources, aiming to leverage them for national development,

though the definition of "development" often remains unclear. This perspective considers natural resources, such as energy or minerals, as part of a country's "national patrimony" (Kiddle, 2021). When a government consider EMG, the State regulate its production and marketing as they would regulate any other good in its economy. This indicates a market-supportive approach, through the imposition of specific taxes or royalties on extractive companies. It encourages foreign direct investment as well as local investors in all aspects of the energy business, from exploration, production, refining and distribution to marketing (Kiddle, 2021). According to the policies applied in Chile during the period between 1990–2015, the country considers EMG (Kiddle, 2021).

States have the authority to regulate extractive activities, setting the conditions for their approval or rejection and establishing who has the right or opportunity to participate in review processes and decision-making bodies. States also decide to whom they grant exploration and exploitation rights (Bowles and Andrews, 2023). Every state works in a global system of capitalism that molds and restricts their policy choices; the extractive industries are dominated by global capitalist corporations. At the very least, governments have a key role in determining the scope and forms of extractive activities that take place within their boundaries (Bowles and Andrews, 2023).

Chile has been successfully attracting Foreign Direct Investment (FDI) in spite of its fairly small domestic market, being the third country in Latin America with most amount of FDI (Figure 12), just after Brazil and Mexico, 2 of the biggest economies of the world (Quevedo, 2023). The pro-market policies of the country have created substantial opportunities for international investors to be a part economic growth of Chile. The country has a solid legal framework and a strong respect for private property rights. Among the sectors attracting significant FDI are mining, and energy in the countries territory is restricted to foreign ownership, but companies can enter into resource extraction contracts with the government (US Trade Administration, 2023).

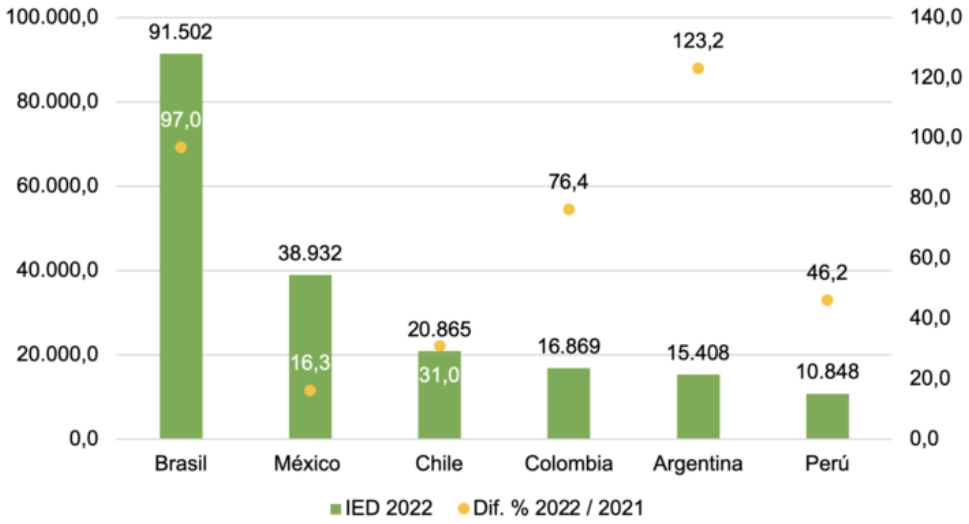

Figure 12. FDI in Latin America 2022
Note: Left axis: US$ Millions, Right axis: %
Source: (Quevedo, 2023)

Also, according to Forbes, Chile has consolidated its position as a leader in the clean energy sector, mainly because of it strong government engagement, big amount of natural resources and several global partnerships, being in the global top 15 best countries to Invest in Renewable Energy in the World (Gobierno de Chile, 2023).

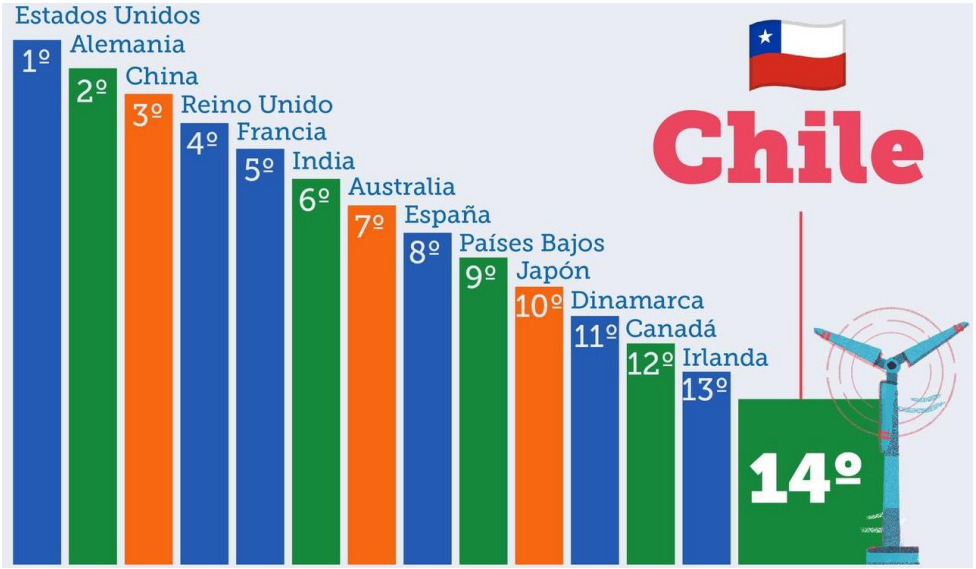

Figure 13. Best Countries in the world to invest in renewable energies.
Source: (Gobierno de Chile, 2023)

In the mining sector, the 72% of Chilean copper mines are owned and operated privately. The remaining 28% is owned by the State and operated by Codelco (US Trade Administration, 2023). Freeport McMoran Copper & Gold Inc. and Albemarle Corporation are two of the main

US investment companies that have shares in the market. Canada, the EU, Australia, and Asia are also present (US Trade Administration, 2023).

Regarding lithium, today, there are only two private companies active in the extraction industry: Soquimich S.A. (SQM), a Chilean company, and Albemarle Chile Ltda. a subsidiary of Albemarle Corp. However, the current administration, after announcing plans to nationalize its lithium industry, is reviewing the current concession regulatory framework thus leaving critical key questions unanswered regarding how the lithium concessions will be managed in the future (US Trade Administration, 2023).

The Chilean government published in July 2022, a new tax reform law that includes new mining royalties. The effective tax burden, defined as income tax and royalty payments divided by pre-tax income stands at 44.7% according to the Mining Council (US Trade Administration, 2023).

The top 5 importers of critical metals from Chile are China, USA, Europe, Japan and South Korea. Japan and South Korea were left out of the analysis because it is a relatively new relationship, i.e. it lacks historical significance.

Table 1. Metal Mining Exports by Product Type and Destination – 2022

	COPPER	% of the Total (Copper)	LITHIUM	% of the Total (Lithium)
USA	3.571	8%	127	2%
EU	2.214	5%	308	4%
CHINA	23.956	55%	5.751	74%
TOTAL EXPORTS	43.830	100%	7.762	100%

(US$ Mn FOB), Source: (Cochilco, 2022)

Unlike the US and the EU, China does not own mines in Chile, but its agreements are focused on deals to obtain the mineral. This has generated a higher level of Chile's dependence on China than with any other country in a very short time. The agreements between China and Chile make no mention of communities, the environment or sustainability. This is the big difference between China and the US and EU, both of which mentioned these issues in the IRA and the Green Deal respectively.

With this information in mind, in this chapter we will analyze specific agreements and arrangements between Chile and its key partners, to assess the extent of Chile's dependence and the potential for extractivist practices within the mining sector. The key partners chosen are USA, EU and China, due to their relevance in the Chilean market. However, only agreements related to the mining industry will be considered, often leaving out industries that have greater relevance between the parties. This is to give coherence to the study.

2.1 UNITED STATES (US)

The association between Chile and the US dates back to the 19th century with the nitrate industry, and has improved significantly since 1988, despite the fact that the US supported the 1973 coup d'état of Chile (State government, 2024). Both countries frequently cooperate on matters of mutual interest, such as multilevel diplomacy, national security, military cooperation, international trade, environmental concerns and energy transition (State government, 2024). In the mining sector, the relationship is centered on the interconnected issues of the extent to which the Americans will have political and economic influence over Chile and the degree to which Chileans will be able to shape their own course (State government, 2024). The US remains a key economic partner for Chile, with trade agreements promoting resource exports. However, concerns exist about fair labor practices and environmental impacts of mining.

Both the US and Chile share a solid commitment to job creation and economic growth by being part of the global markets. The bilateral Free Trade Agreement (FTA) and working together to form the Trans-Pacific Partnership (before Trump formally withdrew from it in 2017) are examples of recent efforts to further enhance investment and trade in a bilateral way and to broaden economic connections between the Americas and the Pacific Rim's growing markets. Additionally, Chile is a member of the Asia-Pacific Economic Cooperation (APEC), the Organization for Economic Cooperation and Development (OECD), and the Pathways to Prosperity in the Americas initiative (American Presidency Project, 2024).

Since 2004, when the US-Chile FTA became effective, bilateral trade in goods has grown more than 340%. US imports from Chile increased from $3.7 billion in 2003 to $9.4 billion in 2012, a total increase of 153% (American Presidency Project, 2024).

Both countries are working together to advance in the development of low-carbon economy, improved clean energy cooperation, and foster an electrical interconnection across the Andean region through two Summit of the Americas initiatives: the Energy and Climate Partnership of the Americas and Connecting the Americas 2022 (American Presidency Project, 2024).

Being the world's top copper producer and a rapidly growing economy, Chile faces the challenge of meeting an estimated annual growth in energy demand of 6-7%. The National Energy Strategy for 2012-2030 was announced in March 2012. Is a solid plan to satisfy the growing demand for energy and promote the development of sustainable and cost-effective energy technologies (American Presidency Project, 2024). The strategy reasserted the government's target of obtaining 10% of its electricity from renewable energy sources by 2024 and set out six key pillars of energy policy. In April 2013, the US Undersecretary of Commerce led a trade mission to Chile of 16 renewable energy and energy efficiency companies. The mission raised Chilean awareness about opportunities for partnership with the US in the sector, exchanged best practices, and deliberated on strategies to lower barriers for market entry (American Presidency Project, 2024).

Since the demand for minerals is skyrocketing, as seen in the previous chapter, US car manufacturers are looking for reliable and safe supplier of copper, lithium, nickel and many other minerals needed to build electric vehicle to be able to compete with China. In order to do so, the US must increase its own mineral production and work together with partner nations. Chile is one of those allies (Edelman, 2022).

Chile is an important partner for the US in both economic and commercial way. Many American mining companies have set up operations in Chile to produce minerals for electric vehicle batteries and to sell equipment and services to the mining operations. In 2020, this equipment sales accounted for $12,8 billion approx. of US exports (Edelman, 2022). This mutually beneficial partnership is only as solid as the agreements that safeguard it.

As an strategy from the US Congress and government to face the energy transition and climate change, the Inflation Reduction Act (IRA) was signed in August 2022 (Blair, 2022). The IRA provides billions in tax benefits for renewables and is committed to increasing the domestic mineral supply to support the transition to electric vehicles, batteries and renewables (Blair,

2022). The IRA has a direct impact on the mining industry since it requires new and reinforced supply chains for metals utilized in renewable technology and electric vehicles (Blair, 2022). In the context of Chile, the IRA could potentially increase the demand for Chilean minerals, leading to an increase in mining activities and investments in the country. However, it also presents challenges, as the deep-rooted Asian supply chain and notably long development timelines for US mines could pose barriers (Blair, 2022).

It's important to note that while the IRA could stimulate the mining industry in Chile, it also underscores the need for sustainable mining practices and responsible resource management. The environmental and social impacts of increased mining activities must be carefully managed to ensure the long-term sustainability of the industry (Blair, 2022).

Waiting for ratification in the US Senate is pending the US-Chile tax treaty, that guarantees that investment from American companies and doing business in Chile will not be subject to higher local taxes than competitors, such as China. Signed in February 2010 for the first time, it has been awaiting ratification since then. If the treaty remains unratified, corporate tax rates will rise from 35% to more than 44,5%, for US businesses. While Chilean based operations in countries with treaties in force (China, Japan, Canada, Australia, UK) will continue to be taxed at the current rate of 35% (Edelman, 2022).

From the US perspective, non-ratification of the treaty will weaken the US-Chile relationship and also the investments. To strengthen the US competitive advantage in mineral supply chains and promise benefits for U.S. companies, the treaty needs to be ratified. This does not consider the impacts this would have on the Chilean side. In South America, this treaty would be the second tax treaty of the US and could pave the way for additional agreements in the region, necessitating thorough consideration of all aspects to establish a foundation for future accords (Edelman, 2022).

The treaties between the parties only mention economic aspects, as is the case with any other contract related to a good. Even though the IRA underscore the environment and communities, the treaties itself leave out any mention that refers to them or the benefit that the extractivist country (Chile) will have due to the agreements.

The 7th biggest copper mining company in Chile, ranked by annual tonnage, is Freeport – McMoran, American copper mining company that its operations include an ownership stake in the El Abra mine, which produces around 180,000 tonnes of copper cathodes annually (Ashcroft, 2024). Is located at an altitude of about 4,100 m.a.s.l., approximately 90 km northeast of Calama, Antofagasta Region of Chile (El Abra Site Conditions, 2024).

Figure 14. Location of El Abra
Source: (El Abra Site Conditions, 2024)

Although the treaties leave out the social and environmental aspect, it is the company and its workers who have acted on these issues. The mine is currently located in what was once Inca territory, where the first glimpses of indigenous mining were developed, therefore, a rich archaeological heritage is treasured there. To reinforce environmental policies and procedures that ensure efficient management in the protection of these places, El Abra carries out activities to raise awareness among workers of the importance of safeguarding this archaeological legacy (Reporte minero, 2024). Also, a daycare center for working mothers, a soup kitchen to address food insecurity, and new bathrooms for low-income nursing homes are some of the projects being initiated by employees at the El Abra mine, through "El Abra en Acción" program, employees are working to improve their local communities with funding and volunteer efforts for projects that address critical community needs (Chacon, 2021).

Regarding the Lithium sector, Chile is hoping that lithium components made from its reserves will be eligible for IRA subsidies, which could attract a wave of new investment from companies seeking to exploit the country's vast reserves (Mining.com, 2024). While raw materials, such as lithium, produced in countries with which the US has trade relations can benefit from subsidies, it is less clear what happens with value-added products, such as the cathodes used in rechargeable batteries (Mining.com, 2024).

Having visited an Albemarle Corp. lithium processing facility during her 2024 trip to Chile, US Treasury Secretary Janet Yellen indicated that the US is likely to increase its lithium imports from Chile. Among the companies engaging with the Chilean government on lithium are Tesla Inc., which commenced local operations this year, and LG Energy Solution Ltd. (Mining.com, 2024).

From the environmental perspective, the lithium industry has a negative perception from the communities. Julietta Zamora, a geologist and professor at Chile's Universidad del Desarrollo says that although the companies with presence in the lithium mining, one with US capital, have compensated the native communities, their extraction technique through evaporation pools has had an impact on the environment, on the water, amid a water crisis. "Mining in the Atacama has had disastrous consequences in terms of toxic waste that poisons soils and rivers," she said (DW.com, 2023a).

The presence of US companies in the mining sector is not large. US hegemony has been weakening politically and economically since the 20th century. As emerging societies emerge, the driving forces of the world economy are changing not only geographically, but also structurally; the world economy is once again being driven by industrializing societies, rather than post-industrial consumer societies. These changes imply major ruptures: a multipolar era; the reaffirmation of the plurality of capitalisms; the emergence of new modernities; and new models of East-South and South-South relations, in contrast to North-South relations. These changes are occurring on a global scale and cannot be adequately understood on a national, regional or even international scale (Bowles and Andrews, 2023). Under this context is where the presence of the European Union and China, have become main players in the Chilean mining sector.

2.2 EUROPEAN UNION (EU)

Chile and the EU have a long-standing relationship that is built around pragmatism and economic cooperation. European influence in Chile dates back to colonial times, with various European countries playing a role in the country's early development. Following the end of the dictatorship, Chile sought to diversify its international relationships, looking towards the EU for economic and political partnerships. The EU has historically focused on trade partnerships with Chile, promoting access to raw materials like copper and lithium for its industries (EU Comission, 2024). The EU is more vocal than the US and China about environmental standards in the mining sector, pushing for sustainable practices and social responsibility.

The EU-Chile Association Agreement (AA) was signed in 2022 in acknowledgement of Chile's political and economic strength, identified by the EU as a strong and reliable partner, as well as a model of development and stability. Though trade with Chile represents only 0,4% of the EU's world trade, the importance of this pioneering agreement for South America must be emphasized. It could serve as a model for other countries considering trade agreements in the coming years (EU-LAC Foundation, 2022).

For Chile, as a nation strongly reliant on mining and agriculture, the Association Agreement (AA) signified enhanced access to the European market, primarily through copper and its derivatives as key export commodities. However, due to fluctuating copper prices, the proportion of copper product exports to the EU declined from 54% of Chile's total shipments to 36% by 2020 (EU-LAC Foundation, 2022).

In contrast to other foreign investments, European projects are not centered on the mining sector. In fact, Spanish companies account for 63% of the investments planned in Chile in the energy sector, especially in renewable energies (InvestChile, 2021).

The “Trade for All” strategy of 2015 emphasized the need to add value to trade policy, by promoting sustainable trade, defense of human rights and good governance. Negotiations for the modernization of the AA acknowledge this vision. Also, thanks to the former Chilean president Michelle Bachelet (2014-2018), gender must also be considered since in 2015, she advocated for the creation of a technical group on gender and trade in the Pacific Alliance and

the Asia-Pacific Economic Cooperation (APEC). Based on this initiative, a new Inclusive Trade Division was created in 2020 to address gender and indigenous peoples' issues (EU-LAC Foundation, 2022).

According to the "Trade for All" Strategy, the EU's goal is to encourage trade in key green technologies and contribute to combating climate change and protecting the environment. They see this as the only way to achieve the commitments of the Sustainable Development Goals (SDGs) (EU-LAC Foundation, 2022).

In December 2019, the EU adopted the Green Deal. This pact lays out an ambitious strategy for the EU to become the first climate-neutral continent by 2050. These have direct impact on imports of products from Latin America, since contribution of greenhouse gas (GHG) emitted from the agri-food and mineral production, will be consider by the EU. The mechanism to be implemented by the EU will consist preferably of a border taxes, the so-called Carbon Adjustment Mechanism (CBAM), making it more expensive for Latin American products to enter the EU. In Chile's case, the mining sector will be impacted, so it will have to prepare to improve its environmental footprint. Although Chile is only responsible for 0,25% of global GHG emissions, its copper industry accounts for 30% of the world's copper emissions and its mining is responsible, directly or indirectly, for about 21% of its emissions (Mining Chile, 2021). According to the Mining Council, all major mining companies have committed to reduce their emissions in accordance with the Climate Change Law regulations aiming to achieve carbon neutrality by 2050 (Mining Council, 2020).

Due to the EU consideration of the negative aspects of AA modernization, such as the impact on the environment and an increased export productivity, a new chapter on sustainable development and trade has been included, thar includes labor standards, social responsibility and the environmental dimension. Business is intended to contribute to improve environmental and labor practices by effectively implementing international commitments (Paris Agreement, multilateral environmental agreements, ILO core conventions, among others). With the modernization of the AA, it is expected that EU cooperation in Chile in green technologies and in the protection of the environment and biodiversity will increase and it will maintain its role as a key player as an investor in Chile (European Commission, 2017).

The updated agreement was signed in 2023, under the name "Global Gateway Strategy and the Critical Raw Materials Act". The aim of the partnership is to strengthen cooperation in the

sustainable raw material value chains sector, necessary for a clean energy transition. It also aims at the development of a competitive and sustainable raw material processing industry and the development of local added value in the mining sector, through the creation of quality jobs and the generation of sustainable and inclusive economic growth for the benefit of both parties (Global Gateway, 2023).

European Commission President Ursula von der Leyen said: "It is a great pleasure for me to witness the signing of this partnership for the development of sustainable commodity value chains between the EU and Chile. The Global Gateway will be one of the main drivers of our evolving partnership" (Global Gateway, 2023).

The basic pillars of the new agreement are trade liberalization, export promotion and investment attraction. The agreement will promote opportunities in the European market for Chilean companies providing services in mining, research, engineering, construction, and energy. In addition, it will increase the EU's tariff reductions. It will enter into force once the legislative and administrative procedures in the countries of the EU and in the Chilean Congress have been completed (BNAmericas, 2023).

This agreement, especially the Critical Raw Material Act, gives an essential place to lithium, cobalt, nickel, among other critical minerals. The law requires that at least 10% of critical minerals consumed annually in EU countries be mined within the bloc and that at least 40% of domestic consumption be covered by local recycling. It also establishes that no more than 65% of domestic mineral consumption comes from a single country (BNAmericas, 2023). "One of the things we've learned, the hard way, over the years is the risks of total dependencies. We want to change that," Commissioner Vestager told reporters in Chile. Currently, 98% of European lithium imports come from China (DW.com, 2023a).

The new partnership focuses on five areas (Global Gateway, 2023):

- Promoting sustainable raw material value chains through collaborative project development, innovative business models, and facilitating trade and investment connections
- Collaboration in research and innovation across the entire raw material value chain, focusing on understanding minerals and reducing environmental and climate impacts.

- Cooperation to align environmental, social and governance (ESG) criteria with international standards.
- The implementation of infrastructures, both physical and intangible, for the development of projects, while minimizing their environmental and climate impact.
- Enhancing capacity, vocational education, and skills development across sustainable raw material value chains, aligned with international labor standards.

An operational roadmap, which the EU and Chile have agreed upon, will be the next step. It will include cooperation actions to be carried out by relevant stakeholders in the EU Member States and Chile, with the support of the EU Global Gateway investment program for Latin America and the Caribbean (Global Gateway, 2023).

This agreement is Europe's belated reaction to Latin America's growing strategic importance, later than that of China and the United States, which have long intensified their relations with the region. Wealthy states in the Middle East are also becoming important investors and trading partners of Latin America. India and other Asian countries also want to expand their relations (DW.com, 2023b).

However, criticism has arisen, especially on the grounds that the environmental protection measures included are insufficient. "The agreement also contains rules for the protection of investments which, according to a study by the Munich Institute for the Environment, pose a major threat to environmental and climate protection. Foreign investors could take legal action that favors them structurally and remains closed to other social groups. The treaty turns our country into a colony, this is 'energy colonialism'" writes the Chilean alliance of more than 100 organizations (DW.com, 2023b).

The environmental journalist Annette Jensen has expressed strong criticism of the green growth policy promoted by the European Commission and the German government. Jensen argues that this strategy, far from being a sustainable solution, adopts what she describes as a "neocolonial" stance: "The German Raw Materials Agency forecasts that copper demand in Germany will double by 2035. And where does all the copper come from? From Chile (...). To this day, the continent has not been able to free itself from the economic role imposed on it by Europeans

after the conquest 500 years ago. Even now, the lucrative parts of battery production take place in Germany" (DW.com, 2023a).

According to official information, the European Commission is identifying with the Chilean Ministry of Mining concrete actions of mutual interest that will allow Chile to develop its mining sector by adding value to its production through technological development. In any case, pending national plans for lithium extraction, of the nearly 60 prospecting projects that are now in Chile, six are European (DW.com, 2023a).

"Yes, lithium is important for our decarbonization. But it is necessary to delimit areas and exploitation quotas " a geologist from the Universidad del Desarrollo says. She also refers to a technology, which does not exist in Chile, that allows the brine to be extracted from the salt flats, extract the precious material, and then reinsert 80% of the water. The survival of communities and biodiversity – flamingos, parinas, chinchillas – depends on the fact that these lakes and salt flats do not dry up (DW.com, 2023a).

On the other hand, there is also the new battery law that requires anyone who buys Chilean lithium for batteries destined for the European market to prove their sustainability. The bet is that recycling will replace at least part of the extraction (DW.com, 2023a).

The biggest European mining companies with presence in the copper sector in Chile are from the UK and Switzerland. The third biggest company in the Chile is Anglo American; a British multinational mining company, and its interests in Chile include a 44% stake in the Collahuasi copper mine. The sixth is Rio Tinto Group, a British-Australian multinational mining company, and the world's second largest metals and mining organization. Glencore plc, a multinational headquartered in Switzerland considered the world's leading private company engaged in the buying and selling and production of raw materials also has presence in the country (Ashcroft, 2024). Since the UK and Switzerland are not part of the EU the agreements from this companies where not considered in this analysis.

Regarding lithium, in March 2024 Lithium Chile announced the signing of an agreement with Eramet, a French mining company renowned as a metal extraction and processing world leader. This partnership is a critical step for Lithium Chile as it leverages the extensive experience and

capabilities of an industry leader to accelerate exploration efforts at four lithium deposits in Chile: Llamara, Aguilar, Rio Salado and Aguas Calientes, which together cover an area of more than 40.000 hectares. Eramet will carry out an exploration program in three separate phases over the next 3 to 4 years according to the agreement. The total planned exploration program is in the range of US$20 million. At the end of each phase, Eramet will earn up to a 70% interest from the joint venture holding the mining concessions, with the option to reach 100% interest. In this regard, Steve Cochrane, President and CEO of Lithium Chile, said: "this partnership underscores our shared commitment to advance sustainable mining projects in Chile. We look forward to leveraging their capabilities to maximize the potential of our Chilean properties", seeing this agreement an advantage for both sides (Mineria chilena, 2024).

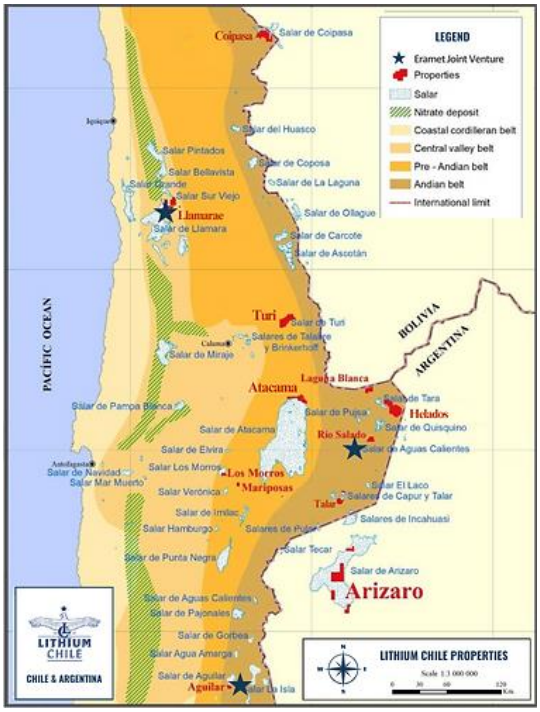

Figure 15. Lithium Chile & Eramet, Joint Venture Properties.
Source: (The Newswire, 2024)

2.3 CHINA

Chile pioneered Latin American relations with China. It has the largest number of partnership and cooperation instruments with China in Latin America and have been building their bilateral relationship around pragmatism and economic cooperation (Aróstica, 2022). It was South America's first country to diplomatically recognize the People's Republic of China (PRC),

when Salvador Allende´s socialist government (1970 – 1973) established contact with the PRC in 1970 (Dialogo Americas, 2023). Chile also became the first country in the region to advocate for the PRC's entry into the World Trade Organization (WTO), as well as the first to recognize the PRC as a market economy in 2004. Through this relationship, the two governments developed permanent coordination mechanisms in economic matters (Dialogo Americas, 2023). In the mining sector, China has further consolidated its position as main trading partner of Chile (Aróstica, 2022).

China has increasingly engaged in trade relations around the world. Its entry into the World Trade Organization (WTO) in 2001 was seen as a game changer for world trade. Likewise, its participation in APEC has been important in building a framework for its rapprochement with region´s economies. These reforms have further enhanced and changed Sino-Latin American economic relations. Previously, trade between the two sides was characterized by Latin American countries supplying low value-added raw materials to China. These trading relations have been developed with preferential deals. China has FTAs with three Latin American countries; Chile 2005, Peru 2009 and Costa Rica 2010, and other partial protocols and agreements with major economies in the region (López et al., 2022).

China's economic influence in the continent has developed in complementary areas such as the opening of financial and logistical platforms and foreign investment. This has forged the image of China as a new and sophisticated partner. China has created centers focus on the extension of Chinese currency and opened headquarters for large Chinese companies in some regions. They have also developed cooperation related to common interests. The most relevant is the China-CELAC (Community of Latin American and Caribbean States) Forum. This mechanism allows China to interact not only with the main partners, but also with the other 33 member of the region (López et al., 2022).

Although Chile is a small economy (0,37% of world exports), is oriented toward free trade, with trade openness as a state policy, i.e., a commitment to openness and integration that goes beyond the government in power. Chile is other country with more FTAs signed in the world, and it was the first one to sign an FTA with China in Latin America (López et al., 2022). In 2017, a modernization agreement on the FTA was signed with China. This is only China's second FTA upgrade agreement after the China-ASEAN FTA. Previously, on May 24, 2015,

Chile and Chine signed a double taxation avoidance agreement (DTA) and consented to establish an RMB clearinghouse in Chile. The DTA was a symbol for China, as it was the tax treaty number 100 that China signed (Saarinen, 2019).

In 2020, having marked 50 years of diplomatic relations, Chile and China were embarking on a new phase in their partnership. The expansion of renewable energy infrastructure, green hydrogen, and lithium mining presents new opportunities for trade, collaboration, and investment (Aróstica, 2022).

In the past 10 years, the US has been surpassed by China and has become Chile's second largest trading partner, and the main foreign investor in Chile. At the end of 2021, China accounted for 38,3% of Chilean exports, with the US following at 16,4%, the European Union received 8,6%, Japan 7.7%, and the Mercosur regional trading bloc 6,2% (Aróstica, 2022). The trade balance between the two countries favors Chile in nominal terms but is heavily reliant on mineral exports. Mining constitutes 84,4% of Chile's exports to China (Aróstica, 2022). In 2022, Chile's exports to China exceeded the combined total of its next five largest trading partner (Colville, 2023).

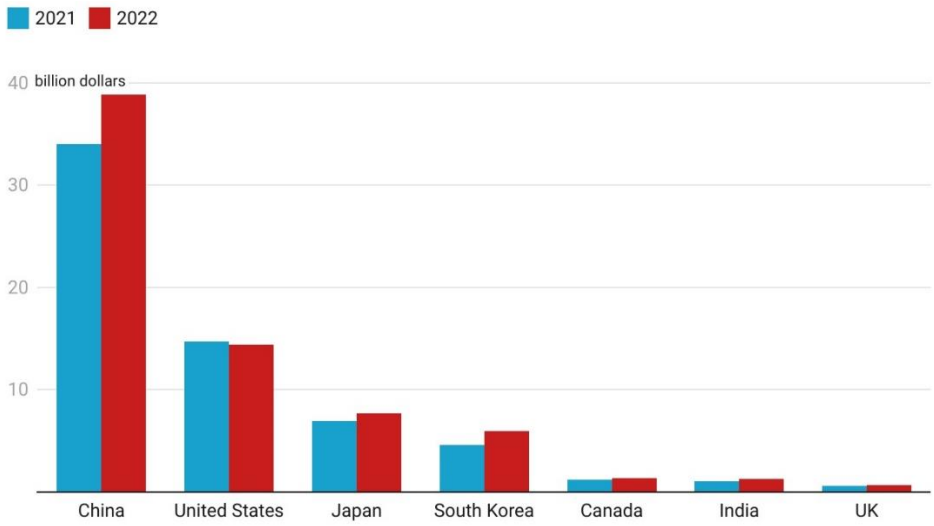

Figure 16. Exports from Chile to its main 5 trade partners in 2022.
Source: (Colville, 2023)

Investments from China rose by 167% in 2019. With the registration of 31 initiatives finishing 2019, the number of projects increased by 55% in comparison to 2018. The main directions of Chinese investments are (Aróstica, 2022):

- Natural resources (focused on materials for non-conventional renewable energy).
- Construction (with a focus on concessions).
- Financial sector.

China's interests in Chile, however, have raised concerns, as they involve strategic sectors, leading parliamentarians on both sectors, the left and the right, to work on strongest regulation of foreign investment. In the past two decades, the foreign trade in Chile was directed primarily to Asia, North America, and Europe, in a balanced way. Over the past decade, a trend of increasing reliance on a single market has become evident. Chile's heightened dependence on China and a single commodity has been termed "copper dependence." As China's demand for raw materials continues to grow, this trend is expected to intensify, exacerbating Chile's vulnerability to economic downturns in China (Aróstica, 2022).

The Chinese have played a strategic long game. Despite the low quality of its ores, China’s mines have positioned the country as the world's third-largest producer, following Chile and Peru. Even more importantly, China has taken a leading position in refining, as evidenced by the Figure 17. This places it at the head of the raw material supply queue (Cytera, 2023).

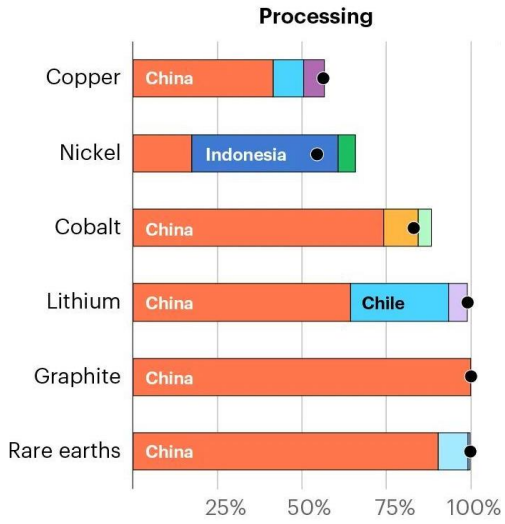

Figure 17. Top Processing countries of critical metals, 2022.
Source:(IEA, 2021)

Efforts to meet China's copper demand are exerting significant pressure on Chile's environment. China stands as Codelco's largest customer. The company holds the world's largest copper reserves, totaling 77 million metric tonnes, which constitutes 20% of the global supply. Additionally, it claims to contribute 10% to the world's copper production, amounting to 797 million tonnes. "But this is not enough for our client – China – who wants higher quality of copper," said a representative from Codelco (Dialogue Earth, 2014). "Clearly with the increasing demand for copper from China, there will be more contamination of the environment," says Yery Luza, an ecologist in the environment department of Calama municipality. He highlights the Gabriela Mistral mine in the Antofagasta Region, which sold its entire output—over 128,000 metric tonnes of fine copper in 2013—to China. He argues that the pollution in this area underscores the local economy's intense focus on metal extraction. "Undoubtedly, there has been in the past 50 to 60 years a strong contamination of the air, the land and the water in Calama. Initially, the city was an important commercial route for Chileans from the interior of the country. Agriculture was also an important industry. This zone has now become exclusively mineral due to foreign pressure," says Luza (Dialogue Earth, 2014).

Figure 18. Location on Gabriela Mistral Mine in Antofagasta Region.
Source: Google maps.

Water is a critical issue in copper extraction, as it necessitates significant quantities, placing a considerable burden on resources in the Atacama Desert, recognized as the driest place on

Earth, that crosses 5 regions of the country, from Arica to Coquimbo (including the mining regions of Tarapacá, Antofagasta and Atacama). Despite Codelco's investment of US$181 million in security and occupational health projects in 2013, Chileans continue to bear the environmental burdens of extensive copper production. Extraction and refining have led to significant health issues among miners, ranging from asthma to compromised immune systems (Dialogue Earth, 2014).

Figure 19. Location of the Atacama Desert, dryest desert of the world.
Source: (Rafferty, 2024)

As demand for copper is expected to rise, potential disruptions could also exert pressure on prices, potentially benefiting Chile. However, China aims to take on a more substantial role in the production and refining of copper, which could potentially alter the economic landscape for Chile. The international geopolitical landscape would have important implications, since this could be detrimental to the American energy transition plans (Scott B. MacDonald, 2024).

China's motivation to expand its market share in copper is driven by a number of factors. The economic development of China, especially with its recent emphasis on green technology, demands much more copper than it can produce domestically. By 2022, China is projected to account for 58% of global copper imports. Considering this, in 2023, China implemented a multi-agency government work plan to promote and steadily expand the non-ferrous metals

industry, including copper. Additionally, China is concerned about the increasing vulnerability of its supply chains, making its production capacity crucial. As a result, China aims to further develop its copper resources to reduce its reliance on expanding supply chains (Scott B. MacDonald, 2024).

This is why, China approved a $2.4 billion plan to enlarge the Julong copper mine on the Qinhai-Tibet plateau, in February 2024. The project, owned by the Zijin mining group, would give the country the world's largest copper mine. Scheduled to start operating by the end of 2025, it will contribute to consolidate China's position as the world's leading copper refiner. China is also expected to increase its copper smelting capacity by 45% by 2027, which will account for 61% of the new plants planned worldwide (Scott B. MacDonald, 2024).

In the lithium sector, in 2022, Chile granted a contract for lithium extraction, for a total value of US$121 million, to the consortium made from China's BYD Chile and Chile's Servicios y Operaciones Mineras del Norte, outbidding two of the world's largest producers. The consortium was awarded the right to extract 80,000 tons of lithium each. BYD bid US$61 million for its lot, while Mineras del Norte offered US$60 million. "The entry of both companies will increase the dynamism of the local lithium industry so that Chile can recover its position on the world stage," said the Chilean Mining Ministry. It noted that the quotas awarded are equivalent to 1.8% of Chile's known lithium reserves (Russell, 2022).

Due to the increase battery demand for electric vehicle, this acquisition has increased the Chinese control over the world’s lithium market. Chinese companies have secured winning bids on five lithium projects worth $1.58 billion (Russell, 2022).

In October 2023, in parallel with the visit of the Chilean President Gabriel Boric to China, the Chinese based company Tsingshan, announced a planned investment of $233 million in Chile’s lithium sector. This investment aims to produce batteries using materials obtained at concessionary prices from the SQM lithium operation, in which China’s Tianqi holds a stake (Russell, 2022).

Unlike the US and the EU, China has not presented its energy transition plan (as the IRA or the Green Deal), so all deals and agreements so far are economic, with the objective of securing

the material at a convenient price, without mentioning the environment, sustainability, communities or value chain, i.e., they do not consider the needs of Chile.

As a summary, all the treaties between Chile and USA, EU and China are presented in the next timeline:

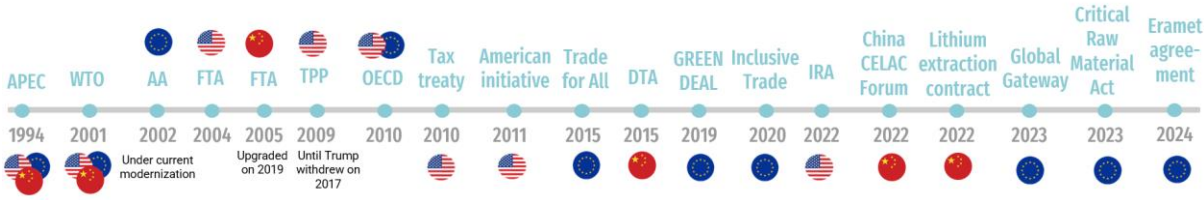

Figure 20. Timeline of the agreements and treaties between Chile and USA, EU and China.

Source: Own making

In conclusion, this chapter has provided a comprehensive analysis of Chile's energy transition and its geopolitical dependence on three key global powers: the United States, the European Union, and China. Each of these entities has a unique relationship with Chile, shaped by distinct economic strategies and geopolitical interests.

The United States, with its direct investments in Chile's mining sector, represents a traditional form of economic engagement. The European Union, on the other hand, emphasizes sustainable trade and environmental standards, reflecting a more modern approach to international economic relations. China represents a new form of economic engagement that is driven by its domestic needs and global ambitions.

However, these relationships also raise important questions about Chile's future. The country's increasing dependence on China, particularly in relation to copper, has led to concerns about its vulnerability to Chinese economic slowdowns. Similarly, the environmental impacts of mining activities pose significant challenge for Chile.

As we move into the next chapter, we will delve deeper into the energy partnerships and dependency dynamics that shape Chile's energy transition. We will examine how these dynamics influence Chile's strategies and policies in the energy sector, and how they impact the country's economic development and environmental sustainability. This will provide a more nuanced understanding of Chile's position in the global energy landscape and its prospects for the future.

CHAPTER 3: ANALYSIS OF ENERGY PARTNERSHIPS AND DEPENDENCY DYNAMICS

In this chapter, we delve deeper into the analysis of the energy partnerships and dependency dynamics that shape Chile's economy in the mining sector and the energy transition. Building on the insights from Chapter 2, we explore how Chile's relationships with the United States, the European Union, and China influence its strategies and policies in the energy sector.

In this chapter we will examine the role of international partners in the implementation and auditing of these policies, and how (and if) they contribute to Chile's shift away from extractivism towards a more sustainable and inclusive mining industry. This chapter provides a nuanced understanding of the complex interplay between domestic policies, international agreements, and industry practices in shaping Chile's energy transition and geopolitical dependence.

3.1 COMPARING PARTNERSHIPS

As studied in the Chapter 2, there are numerous agreements between Chile with the US, EU and China, whose main common point and objective is to obtain critical metals for the energy transition in a more economical and secure way.

In order to evaluate if these treaties can be considered as a way of perpetuating the historical dependency relations between the partners by enhancing the extractivist role of Chile, the following methodology will be utilized; using as a basis the definitions of dependency and green extractivism made in CHAPTER 1: THEORETICAL FRAMEWORK, a matrix was generated where it will be evaluated with a "Yes" or "No", if a specific topic is mentioned in the agreements between the parties.

The issues to be evaluated are:

- Environment: if the care of the environment is mentioned and prioritized in the agreements.
- Sustainability: whether the product transacted must be obtained in a sustainable way or not.

- Communities: whether the involvement with communities is mentioned in the agreements, through the consideration of their needs, training courses, among others.
- Value chain: whether the treaties include support for Chile to be part of the value chain (other than the extractivist role) or not.

It should be noted that this evaluation will be made exclusively by analyzing the agreements and evaluating the main frameworks that the treaties are under, leaving out what is mentioned in the Chilean laws and what private companies does. The IRA and the Green Deal are not direct agreements with Chile, but they are the main framework that will be used for trading, so they are considered in this analysis. It is important to mention that this matrix is a good tool to facilitate the reading of the agreements, but it is not sufficient to determine whether the objective of these countries is to maintain the extractivist model and dependence on Chile since there are other factors involved.

Considering the information mentioned above, the evaluation matrix is as it follows:

Table 2. Dependency Matrix

DEPENDENCY EVALUATION OF THE AGREEMENTS			
	USA	EU	CHINA
Environment	YES	YES	NO
Sustainability	YES	YES	NO
Communities	YES	YES	NO
Value Chain	YES	YES	YES

Through the evaluation of Table 2, the only treaties that can be considered as adding value to the country, moving away from the extractivist dynamic, are the ones with the United States and the European Union. The difference between the two is that the treaties with the US only reference that Chile need to be is part of the value chain, and the other aspects evaluated (Environment, Sustainability and Communities) are part of the IRA, that is, they are part of the framework that is used to evaluate the trades. While the EU mention of all the aspects evaluated in each of its treaties, not only in the Green Deal. The Chinese agreements are primarily concerned with the economic transaction involved.

As was mentioned before, the matrix itself is not sufficient to determine if these agreements maintain the extractivist model and dependence on Chile. That is why it is necessary to analyze each item and the national measures that are being applied.

Chile has implemented several policies and agreements to protect the local industry, environment and economy related to the mining industry. Now the different Chilean policies will be analyzed by each item mentioned in the Table 2, to later, given this information plus the internation agreements, be able to identify if Chile is under the dependence of international economies or not.

ENVIRONMENT

Chile has implemented several policies and agreements to protect the environment in the copper and lithium mining industry:

- **Chilean National Mining Policy 2050** (Policy 2050, 2022): This policy aims to guarantee a sustainable mining industry. It outlines how the country could harmonize the development of the mining industry with the environment, achieve carbon neutrality, and grow the circular economy model. Some of the key environmental aspects of this policy include:
  - Reduce the percentage of continental water used in the mining industry so it doesn't exceed 10% of the total water used by 2025 and 5% by 2040.
  - Forbid any activity that involves the removal, transfer or covering with debris, of glaciers.
  - Eliminate critical tailings facilities by 2030 and ensuring there is no abandonment of tailings by 2050.
  - Achieve international standards in sustainability and environmental responsibility in smelters and refineries in the country by 2030.
  - Generate a positive net impact on biodiversity by 2050 in all large and medium-sized mining projects developed from 2021 onward.
- **National Lithium Policy** (National Lithium Strategy, 2022): The National Lithium Policy (NLP) indicate the future plans for the implementation of lithium exploration and exploitation policies aimed at restoring Chile's position as a leader in global lithium

production. This new policy is the result of a consultation process with several national and international stakeholders. The NLP outlines several measures related to the environment:

  - Protection of Ecosystems: The NLP emphasizes the protection of ecosystems. It includes measures to guarantee the use of technologies with low environmental impact.
  - Public-Private Partnerships: The NLP emphasizes the role of public-private partnerships. The development of the lithium industry will be led by the State and the private sector will contribute with capital, technological innovation, and networks in the market.

- **Environmental Framework Law (Law No. 19,300)** (MMA, 2024)**:** This cornerstone legislation establishes principles like prevention, polluter pays, and public participation. It mandates Environmental Impact Assessments (EIAs) for mining projects, requiring companies to demonstrate minimal environmental impact. Foreign companies operating in Chile must comply with all national environmental regulations and the EIA process. This can raise production costs for companies but incentivizes responsible mining practices.
- **Superintendence of the Environment (SMA)** (SMA, 2024): Created by Law No. 20.417, the SMA enforces environmental regulations, conducting inspections and imposing sanctions for violations. This provides a mechanism to hold mining companies accountable.
- **Environmental Courts (Law No. 20,600)** (MMA, 2024)**:** These specialized courts handle environmental disputes, ensuring legal recourse for environmental damage or violations.
- **Sectoral Regulations** (MMA, 2024)**:** The Mining Safety Regulation (Title XV) outlines specific environmental considerations for mine operations, including waste management, water use, and closure plans. These regulations are crucial for minimizing environmental impact throughout the mining lifecycle.
- **International Agreements** (MMA, 2024): Chile is a signatory to several international environmental agreements, including the Convention on Biological Diversity and the Ramsar Convention on Wetlands, set international standards for environmental protection that Chile is obligated to uphold. This creates an international framework for

environmental responsibility and potentially influences partner countries to adopt similar standards.

While the legal framework is robust, enforcement is crucial. The SMA's capacity and effectiveness in holding companies accountable sends a strong message to potential international partners.

SUSTAINABILITY

Chile has implemented several policies and agreements to ensure that the mining process is sustainable:

- **Chilean National Mining Policy 2050** (Policy 2050, 2022): The policy puts sustainability at the forefront of its goals for the future. It acts as a guide to future governments and industry stakeholders as they develop the local mining industry in a world that is demanding that companies take into consideration the environmental aspects of their businesses.
  - Generate zero-emission fleet plans by 2025 for large-scale mining to be implemented in 2030.
  - The 90% of electricity contracts must come from renewable sources by 2030 and 100% by 2050.
  - Set up goals for GHG emissions to be comply in 2030, including their monitoring and update.
- **National Lithium Policy** (National Lithium Strategy, 2022): The NLP aims to incorporate sustainability in the productive sector. It seeks to develop technologies and research to minimize the impact on ecosystems and create more efficient ways of exploiting the resource.
- **Environmental Impact Assessments (EIAs)** (MMA, 2024): Mandatory for all new mining projects, EIAs require companies to demonstrate minimal environmental impact. This promotes responsible mine design and mitigation strategies for water use, waste management, and air pollution.
- **Closure Plans** (MiMin, 2024)**:** The Mining Safety Regulation requires detailed closure plans outlining post-mining activities like rehabilitation and remediation of the mine site. This ensures responsible land management throughout the mining lifecycle.

- **Water Management** (MMA, 2024): Strict water use regulations exist, including water permits and mandatory water efficiency measures. These regulations aim to minimize water consumption and protect water resources in arid regions like those where much of Chile's mining activity takes place.
- **Waste Management** (MMA, 2024): Regulations require proper handling and disposal of mining waste, including tailings and hazardous materials. This minimizes environmental contamination and promotes responsible waste management practices.
- **Adherence to International Standards** (MMA, 2024): Chile's commitment to international environmental agreements like the Stockholm Convention on Persistent Organic Pollutants sets a precedent for sustainable mining practices. This can encourage partner countries and international companies to follow suit.
- **International Copper Association** (Policy 2050, 2022): The International Copper Association has highlighted the role of copper mining in Chile's sustainable economic development. Copper-mining companies are some of the most cutting-edge in the country, so they have a significant positive indirect impact on supporting other industries.
- **Aurubis and Codelco Partnership** (Policy 2050, 2022): Aurubis (world largest copper recycler) and Codelco have agreed to collaborate on sustainable copper production. The cooperation includes six key working areas, including projects to achieve a more environmentally friendly production in Chile and an employee exchange program to promote awareness of a sustainable supply chain.
- **Responsible Lithium Partnership** (Policy 2050, 2022): Several companies, including BASF, Daimler AG, Fairphone, and Volkswagen Group, have initiated a 'Responsible Lithium Partnership' to work for a more responsible natural resource management, including the Salar de Atacama Lithium.

COMMUNITIES

Chile has implemented several policies and agreements to protect local communities affected by the copper and lithium mining industry:

- **Chilean National Mining Policy 2050** (Policy 2050, 2022): The policy aims to support higher living standards for people in the Antofagasta region. It acknowledges that

mining industry in the region has generated major wealth for the country, but the benefits related to that have not been equally distributed across the region.

  - Participatory Process: The policy was developed through a participatory process between national and local entities. It aims to become the main framework to guide towards a sustainable mining for Chile. The policy emphasizes the importance of collective processes, with different levels of participation and decentralized, from the formulation to the validation of the results.

- **National Lithium Policy** (National Lithium Strategy, 2022): The NLP promotes citizen participation with communities. This is an integral part of its environmental permit.
  - Codelco and SQM Roundtable Discussions: Codelco and SQM will have discussions with representatives of indigenous communities in 2025. The 31 of May 2024 they signed the Association Agreement that establishes the steps, stages, rights, obligations, terms and conditions of the public-private partnership related to the production of lithium in the Salar de Atacama from 2025 to 2060. The partnership will become effective once all legal, technical and environmental requirements are met, and when this mentioned indigenous consultation process finished (CODELCO, 2024).
- **Indigenous Land Rights** (Conadi, 2024): Chile's Indigenous Law (Law No. 19.253) recognizes ancestral land rights for indigenous communities. This protects some traditional habitats from mining concessions, although limitations and ongoing disputes exist.
- **Environmental Impact Assessments (EIAs**) (MMA, 2024): EIAs are required to consider the social impact of mining projects on local communities, including potential impacts on their habitats. This promotes a more holistic approach to project evaluation and identifies potential mitigation measures.
- **Community Consultation and Participation** (MMA, 2024): The Environmental Framework Law (Law No. 19,300) emphasizes public participation in environmental decision-making. This allows communities to express concerns about potential habitat disruption and advocate for their protection.
- **Relocation and Compensation Agreements** (MiMin, 2024)**:** When mining unavoidably impacts traditional habitats, relocation and compensation agreements are

negotiated. These agreements should provide communities with alternative housing and resources to rebuild their lives.

- **International Labor Organization (ILO) Convention 169** (ILO 169, 1989)**:** Chile is a signatory to ILO Convention 169, which guarantees the right of indigenous and tribal peoples to be consulted prior to any measures affecting their lands or territories. This international framework strengthens the rights of communities potentially impacted by mining.

Effective enforcement of indigenous land rights and community consultation mechanisms is crucial. Ensuring transparency and fairness in these processes is critical for securing community well-being, protecting their habitats, and also, a way to be able to reduce the distrust among people towards these projects.

VALUE CHAIN

Chile aims to move beyond simple extraction and participate more actively in the mining value chain. Here's an analysis of Chilean policies and agreements designed to achieve this goal:

- **Chilean National Mining Policy 2050** (Policy 2050, 2022): The policy emphasizes the need to strengthen the development of a technology-based cluster. This is aimed at improving the efficiency of the mining process and reducing its environmental footprint.
  - The policy aims to improve investment in Research and Development to 0,5% of the GDP in 2030, and to reach the levels of investment of the leading mining countries by 2050.
  - The policy sets a goal to have 250 first level suppliers and improve exports of mining goods and services to US$1,.5 billion by 2030 and US$4 billion by 2050.
- **National Lithium Policy** (National Lithium Strategy, 2022)**:** The NLP outlines several measures related to the value chain from the mining sector and moving away from extractivist practices:
  - National Lithium Company: Central to the strategy is the establishment of a National Lithium Company, marking a significant milestone aimed at enhancing

the country's prosperity through collaboration between the public and private sectors.

- Sustainable Development of Exploration, Extraction, and Value-Addition Projects: The National Lithium Company will seek private partners to develop the projects under the state standards and regulations. It will also encourage the development of technologies in all areas of the value chain, from extraction to applications and recycling.
- The Association Agreement signed between SQM and Codelco, aspire to increase the production of Lithium from 300 thousand tons of Lithium during 2025-2030, to 280 to 300 thousand tons per year on the period of 2031 to 2060. This will be achieved through improvements in efficiency, new technologies and optimization. This increase will not imply inland water use. In economic terms, the State through Codelco, Corfo and the Treasury, will receive approximately 70% of revenues gained by the new production between 2025 and 2030. From of January 1st, 2031, the State will receive 85% of the revenues, through payments to CORFO, taxes and the profits received by Codelco as a shareholder (CODELCO, 2024)

- **Chile - EU Strategic Partnership on sustainable raw materials value chains** (Global Gateway, 2023): This partnership wants to integrate sustainable raw materials value chains through projects, trade, research and innovation, following international standards.
- **Innovation and Technological Development** (Corfo, 2024)**:** The government invests in research and development (R&D) initiatives focused on new technologies for extracting, processing, and using copper and lithium. This fosters innovation and promotes the development of domestic expertise within the value chain.
- **Attracting Downstream Industries** (Corfo, 2024)**:** Policies like tax breaks and special economic zones aim to attract companies involved in downstream activities such as refining, battery manufacturing, and recycling. This increases domestic value addition and creates new jobs.
- **Education and Skills Development** (Corfo, 2024)**:** Investments are made in education and training programs to equip the Chilean workforce with the skills needed for higher-value jobs in the mining value chain. This ensures Chile has the human resources required to participate in more complex stages of resource processing.

- **Free Trade Agreements (FTAs):** FTAs with reduced tariffs on processed goods incentivize companies to locate downstream operations in Chile rather than exporting raw materials. This encourages investment and creates a more integrated mining sector.

These policies and partnerships demonstrate Chile's commitment to being part of the value chain from the mining sector and facing away from the extractivist practices in the copper and lithium mining industry. They also highlight the significant role of international partners in achieving these goals.

THE NEW ROYALTY

From a more general perspective since the past January 1, the new royalty system for large-scale mining came into force. The initiative was approved and dispatched by Congress in 2023 after more than four years of processing. This mechanism seeks to collect an estimated 0,45% of GDP and distribute income among the different regions and communes of the country (MINHAC, 2024).

The graph below shows the evolution of the tax burden in Chile in the mining industry from 2005 to 2018, evidencing a sustained upward trend. Until 2005, no type of special tax was imposed on the mining industry in Chile and the Corporate Income Tax rate was 17%, creditable against final taxes, in accordance with the general rules. From 2006 onwards, the Specific Tax on the Mining Industry (IEIM) was incorporated (Law 20,026 of 2005), which taxes the net mining operating income at a rate of 5% in the case of large-scale mining (Consejo minero, 2018).

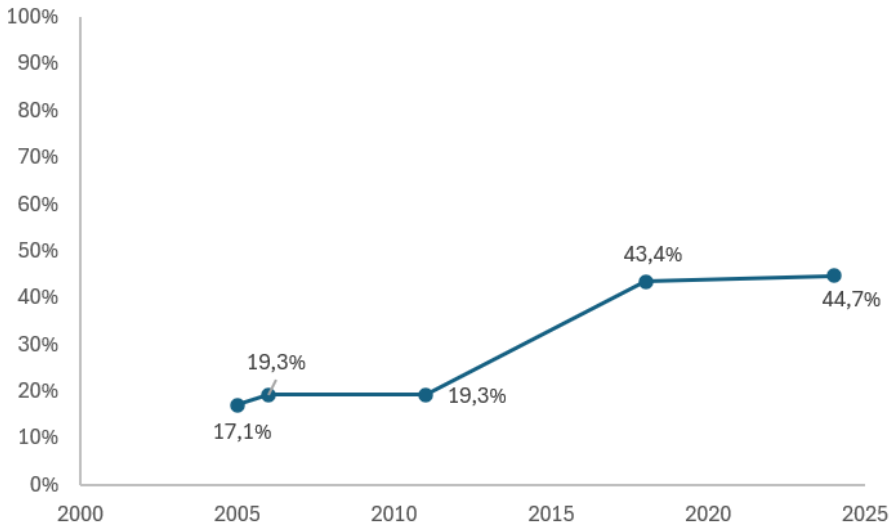

Figure 21. Evolution of the Chilean Royalty rate over the years.

Source: (Consejo minero, 2018)

This new royalty is a significant step towards achieving the countries goals of environmental protection, sustainability, community well-being, and value chain integration. With the new law, the IEIM rate in Chile is 44,7%. Deloitte estimates that Chile has a higher effective tax burden than direct competitors in this industry, such as Peru, Australia and Canada (Ex-Ante, 2023):

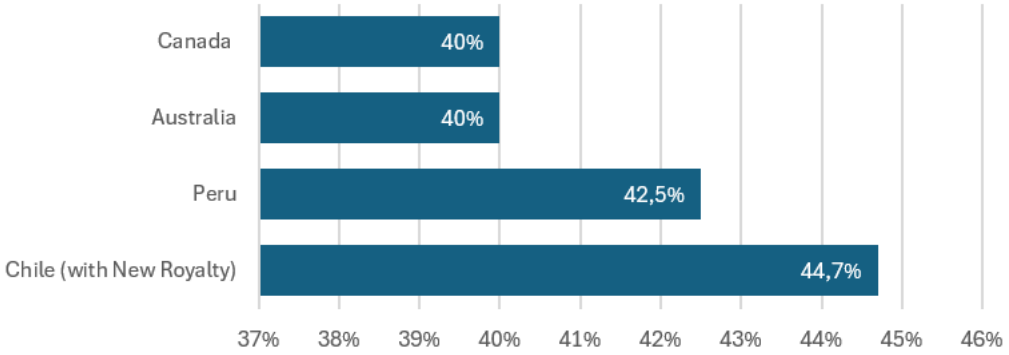

Figure 22. Difference in the tax burden between Chile and its main competitors.

Source: (Ex-Ante, 2023)

The Mining Royalty Law will allow 1.350 million dollars to be collected annually from 2025. Of the total collection in the regime, 450 million dollars of free disposal, will be used to promote the development of the regions. Half of these resources will be delivered to all regional

governments, through the Fund for Productivity and Development, and the other half to 90% of the country's municipalities through two instruments (Gobierno de Chile, 2024):

1. **Territorial Equity Fund,** to be distributed among the communes with the greatest dependence on the Municipal Common Fund.
2. **Mining Communes Fund** to compensate mining communes that directly experience the externalities of mining activity.

Since the Mining Royalty Law is of free disposal, here are a few general recommendations that would allow the New Royalty to contribute to each aspect of the Table 2. To more specifically address recommendations, is needed further study to identify the region's needs.

Environmental Protection and Sustainability

- Potential Leverage in Negotiations: The royalty law might give the Chilean government more leverage in negotiations with mining companies. This could allow stricter environmental conditions to be attached to mining concessions.
- Increased Revenue for Environmental Programs: the new revenues can be allocated towards strengthening environmental enforcement agencies like the Superintendence of the Environment (SMA) and funding initiatives for cleaner mining technologies and mine site rehabilitation. Critics argue that the SMA is under-resourced, hindering its ability to effectively monitor all mining projects and enforce regulations consistently, that the sanctions are not effective, some argue the fines are not high enough to be a significant deterrent for large companies and also concerns exist about potential political influence on the SMA's decisions, particularly regarding projects with significant economic benefits (Mager, 2022).

Community Protection

- Increased Revenue for Social Development: a portion of the revenues can be directed towards regional development projects. These funds can be used to address social concerns in mining communities, improving infrastructure, education, and healthcare services.

Value Chain Integration

- Royalty Incentives for Processing: The royalty law includes a lower tax rate for processed minerals compared to raw materials. This incentivizes companies to invest in downstream activities like refining and battery manufacturing within Chile, capturing more value in-country.

3.2 DEPENDENCY OR PARTNERSHIP?

Chile's shift away from extractivism is evident in its policies and agreements. The emphasis on sustainability, environmental protection, community involvement, and value chain integration in the National Mining Policy 2050, the National Lithium Policy and the Mining Royalty Law signifies a departure from traditional extractivist practices. In addition to this, the international agreements, in exception of China, also mention these aspects, as seen in the previous sections, as well as in Table 2.

However, moving away from extractivism is not just about policy changes. It also involves transforming the mining industry's practices and mindset. This requires the active participation of all stakeholders, including the government, mining companies, local communities, and international partners.

Regarding dependency relations, is a more complex topic to evaluate. In paper, all the agreements are beneficial to both parties. Despite this, it is a fact that the largest importer of Chilean minerals is China. By not having a more diversified market, Chile is highly dependent on China's economic fluctuations, as when China buys less material, or there are fluctuations in the price, Chile will be highly affected. So, from this perspective, Chile could be considered economically dependent on China.

While Chile has made significant strides in policy formulation to move away from dependency and extractivism, the implementation of these policies is equally important. The Chilean government has established various mechanisms to ensure the effective implementation of these policies. For instance, the SMA is tasked with enforcing environmental regulations,

conducting inspections, and imposing sanctions for violations. However, the effectiveness of these mechanisms is contingent on their capacity and resources.

To ensure that the mining industry adheres to the stipulated policies, regular audits are necessary. These audits should assess compliance with environmental regulations, sustainability practices, community involvement, and value chain integration.

3.3 RECOMMENDATION FOR THE FUTURE

After reviewing the agreements between the different partners, it is possible to notice that to a large extent, the agreements consider the reality of the country in general terms and that have the main objective of increasing economic gains. Considering that, it is possible to make recommendations for the future to increase the scope of these laws and agreements, to optimize and improve their final results, and also, to improve the public perception of these agreements.

Firstly, Chile should continue to foster public-private partnerships in its energy sector. These partnerships can drive innovation, facilitate technology transfer, and mobilize the necessary capital for energy projects. They can also ensure that the benefits of energy transition are shared equitably among all stakeholders, including local communities and indigenous populations. To this end, Chile could consider establishing a national framework for public-private partnerships in the energy sector, which sets out clear guidelines for collaboration and ensures transparency and accountability in these partnerships.

Secondly, Chile should strengthen its regulatory framework for the energy sector. This includes enforcing stringent environmental standards, promoting energy efficiency, and ensuring the responsible use of natural resources, prioritizing the needs of the country. This could be achieved through policy measures such as feed-in tariffs, tax incentives, and low-interest loans for renewable energy projects.

Thirdly, Chile should leverage its strategic position in the global energy market to negotiate favorable terms in its energy partnerships. This includes securing long-term supply contracts, obtaining technology transfer agreements, and ensuring access to international markets for its

energy products. In doing so, Chile can reduce its dependency on external energy sources, enhance its energy security, and position itself as a key player in the global energy transition.
Lastly, Chile needs to establish a robust and independent auditing mechanism. This mechanism should be tasked with regularly reviewing the implementation of laws and agreements related to Chile's mining sector. The auditing body should have the authority and resources to conduct comprehensive audits, including on-site inspections, document reviews, and stakeholder interviews. It should assess whether the laws and agreements are being adhered to, whether they are achieving their intended outcomes, and whether any unintended consequences are arising.

The findings of these audits should be made publicly available to ensure transparency and accountability. If non-compliance is detected, the auditing body should have the power to impose sanctions or require remedial actions. Moreover, the auditing mechanism should be complemented by a strong legal framework that clearly defines the obligations of all parties involved. This will provide a clear benchmark against which compliance can be measured.
International partners can contribute to the auditing process by adhering to international standards and best practices. They can also provide technical assistance and share their expertise in sustainable mining practices. This can help enhance the capacity of Chilean institutions to conduct effective audits.
In essence, while laws and agreements are crucial, they are not enough by themselves. They need to be backed up by strong enforcement and auditing mechanisms to ensure that they are effectively implemented and that they deliver the desired results. This will be key to managing Chile's energy partnerships and dependency dynamics effectively.

An example of a successful mining audit mechanism is the Extractive Industries Transparency Initiative (EITI), a global standard that promotes the open and accountable management of oil, gas, and mineral resources, founded in 2003 in Norway. It's a multi-stakeholder initiative involving governments, companies, and civil society organizations (EITI, 2024).

Chile is not currently an EITI member country. However, adopting its framework could significantly strengthen the auditing of its mining sector. The implementation would improve:

- Stakeholder Engagement: The Chilean government would need to engage with mining companies, civil society organizations, and international partners to establish an EITI implementation process.
- Data Collection and Reporting: Mechanisms would be established for collecting data on mining revenues, production volumes, and social spending. This data would then be compiled into EITI reports.
- Independent Validation: An independent administrator would be appointed to verify the data reported by the government and mining companies.
- Public Disclosure: EITI reports would be made publicly available, allowing for scrutiny and analysis by citizens and civil society organizations, helping to decrease the distrust in the population.
- Remediation: Identified discrepancies or areas for improvement would be addressed through corrective actions by the government and companies.

Chile initiated an approach during the 2023, with EITI authorities exploring the possibility of joining this body, but is still in conversations (EITI, 2023).

In conclusion, these policy recommendations provide a roadmap for Chile to navigate its energy transition and manage its geopolitical dynamics. By implementing these recommendations, Chile can harness its abundant energy resources, capitalize on its strategic partnerships, and pave the way for a sustainable and prosperous energy future.

CONCLUSIONS

This thesis has provided a comprehensive analysis of Chile's mining industry and its geopolitical dependence on three key global powers: the United States, the European Union, and China. Each of these entities has a unique relationship with Chile, shaped by distinct economic strategies and geopolitical interests.

The United States, with its direct investments in Chile's mining sector, represents a traditional form of economic engagement. The European Union, on the other hand, emphasizes sustainable trade and environmental standards, reflecting a more modern approach to international economic relations. China represents a new form of economic engagement that is driven by its domestic needs and global ambitions.

The analysis reveals that Chile is not under a form of green extractivism, at least in paper, thanks to the conditions set in international agreements and also national laws and policies. While the country is making strides towards sustainability and value chain integration, its economy remains heavily reliant on the extraction of natural resources for the production of renewable energy technologies. If these agreements are not apply properly and not audited accordingly, since this form of extractivism, while touted as 'green', still have potential to lead to environmental degradation and social inequality, perpetuating Chile's economic dependence on foreign investment and technology.

The agreements between Chile and its international partners, appear to be beneficial. They aim to promote sustainable mining practices, protect local communities, and enable Chile to participate more actively in the mining value chain. However, the effectiveness of these agreements is contingent on their implementation and enforcement.

Despite that, Chile is heavily reliant on China, since the country hasn't been able to diversify its exports, it has become dependent on China's needs and economic fluctuations. To avoid this, Chile must move away from the extractive economic model diversifying its source of income, so it's not reliant on the export of critical metals.

A key finding of this thesis is the need for a robust and independent auditing mechanism. Such a mechanism would ensure that the stipulated policies and agreements are effectively implemented and that they deliver the desired results. It would also hold both governments and companies accountable for their actions, thereby enhancing transparency and accountability in the mining sector, for example by joining the EITI.

As the demand for critical metals increases, Chile faces the challenge of retaining profits, preserving the environment, and protecting communities. Environmental laws and state-private agreements aim to balance these factors, but the path to increased profits while transitioning from an extractivist economy remains unclear. The dependency theory suggests that core countries make it difficult for extractivist nations like Chile to change their economic model. Despite significant economic gains from its historical extractivist model, Chile struggles to find a clear path away from it. The world is watching Chile's green hydrogen production, an industry at risk of becoming green extractivism if it doesn't learn from mining's lessons.

In conclusion, while Chile's energy transition presents significant challenges, it also offers opportunities for the country to redefine its relationships with global powers, transform its mining industry, and chart a path towards sustainable development. However, this requires a concerted effort from all stakeholders, including the government, mining companies, local communities, and international partners. It also necessitates a shift away from traditional extractivist practices towards a more sustainable and inclusive model of development.

This thesis has shed light on these complex dynamics, providing valuable insights for policymakers, industry stakeholders, and researchers alike.

Chile's energy transition presents a pivotal moment. By proactively addressing its dependence on resource extraction, embracing robust environmental practices, and fostering strong partnerships, Chile can become a global leader in the sustainable development and utilization of critical resources for the clean energy future.

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