2 Trends and impacts of FDI in Chile

This chapter examines FDI trends in Chile in terms of sector, regional distribution, country of origin and mode of entry of the foreign investors (i.e. greenfield FDI, M&As). It also analyses how FDI contributes to important sustainable development priorities in Chile, namely trade and GVC integration; productivity and innovation; job quality and skills, including for women; and the low-carbon transition. It also discusses how FDI can help diversify the Chilean economy towards sectors with better prospects for sustainable development.

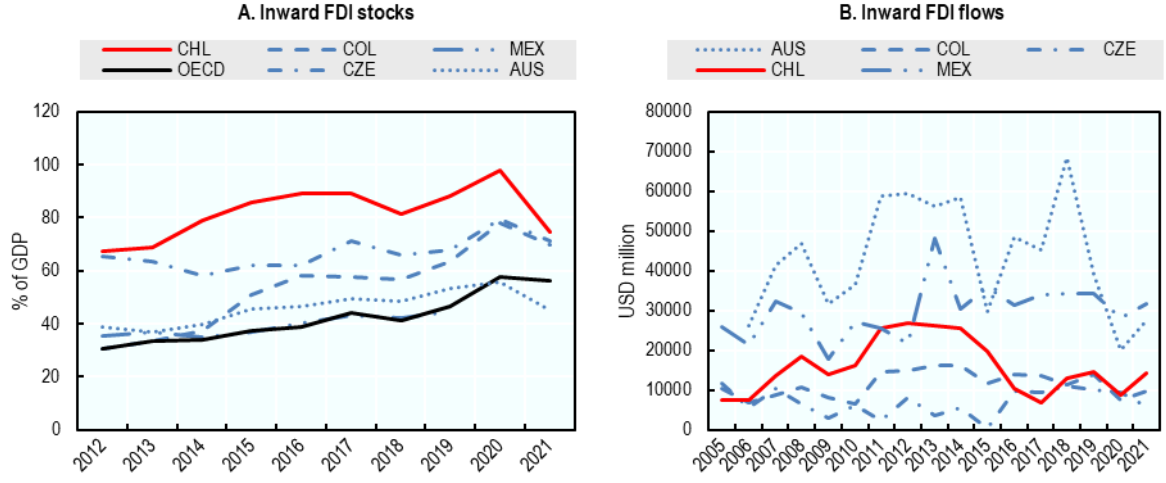
2.1. Trends and characteristics of FDI in Chile

2.1.1. The importance of FDI for the Chilean economy has increased over the past decade

A small, open economy rich in natural resources, Chile is a particularly attractive destination for foreign direct investment (FDI). The relevance of FDI for the Chilean economy is shown by the FDI to GDP ratio, which has grown significantly over the last decade, reaching 98% in 2020. Chile has one of the highest FDI to GDP ratios in the OECD area, above those of other Latin American and Caribbean (LAC) countries such as Colombia and Mexico and other OECD countries of similar economic size, such as the Czech Republic, and rich in natural resources, such as Australia. In 2021, the FDI to GDP ratio decreased due to the relatively larger decline in FDI flows compared to GDP during the COVID-19 crisis, similar to what was observed in other countries (Figure 2.1, Panel A).

FDI flows to Chile have been declining since 2012 (Panel B). This negative trend, observed in many other countries, is partly attributable to a slowdown in international production and the retrenchment of global value chains (UNCTAD, 2018[1]). The COVID-19 pandemic and its disruptive effects on the activities of multinational enterprises (MNEs) have further contributed to the decline in FDI flows globally. In Chile, as in the rest of Latin America, the decline was particularly pronounced due to the collapse of commodity prices and the economic recession that followed the COVID-19 crisis (UNCTAD, 2021[2]). Data for 2021 show a slight recovery of FDI flows to Chile, however.

Figure 2.1. The FDI to GDP ratio has increased over the last decade, despite the decline in FDI flows



Source: OECD (2022[3]), FDI Statistics, https://stats.oecd.org/.

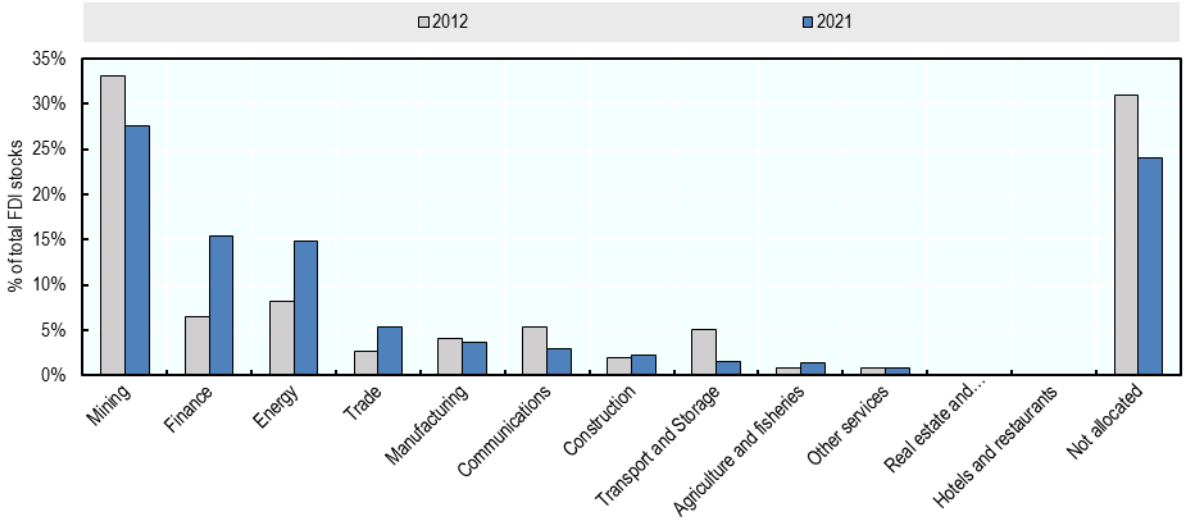
2.1.2. FDI is largely concentrated in mining, energy and finance

Chile's endowment of natural resources explains the large share of FDI in the mining sector (Figure 2.2). In 2021, 28% of FDI stocks were in the mining sector, particularly metals. While the stocks of FDI in mining has remained more or less unchanged since 2012, the relative share has decreased by 6 percentage points. Meanwhile, FDI in financial services and energy, particularly renewable energy, has gained importance in the Chilean FDI landscape. Over the 2012-21 period, the share of FDI stocks in financial services increased from 6% to 15%, while the share in the energy sector grew from 8% to 15%. It is

possible, however, that some of these shares are underestimated as a significant amount of FDI stocks provided by the Central Bank of Chile is 'not allocated' (24% in 2021).

Figure 2.2. Mining, finance and energy receive the bulk of FDI

Inward FDI stocks by sector

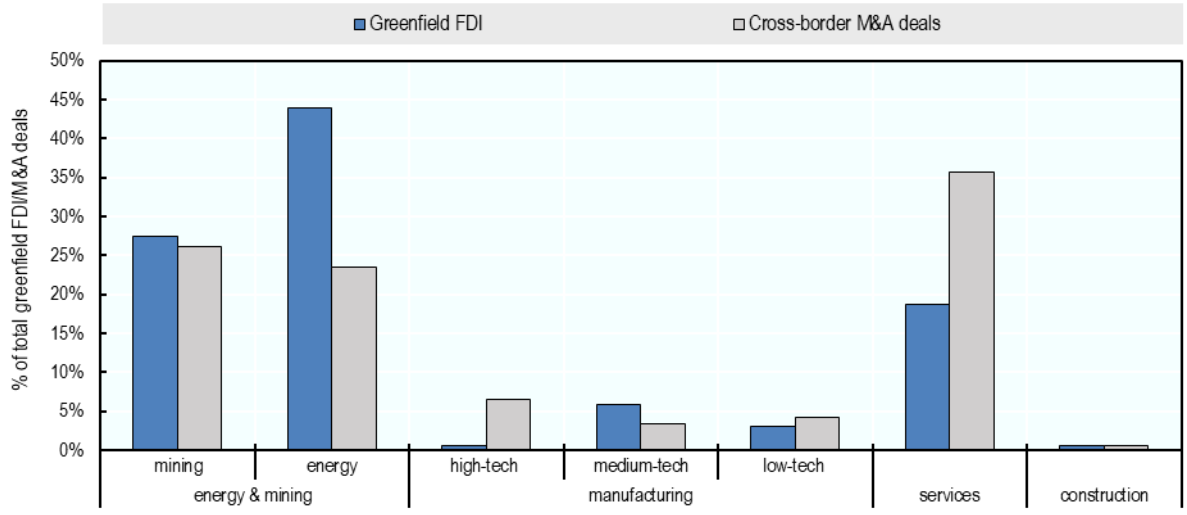


Source: OECD elaboration based on Central Bank of Chile (2022[4]), Foreign Direct Investment, https://www.bcentral.cl/en/home

With respect to the mode of entry of foreign investors, the data show significant differences between greenfield FDI (i.e. the creation of new business enterprises in the host economy and additional injection of funds to existing ones.) and merger and acquisitions (M&As) (Figure 2.3). Greenfield FDI is concentrated in the energy sector (44%), especially renewables, and mining (coal, oil and gas and metals extraction) (27%). Smaller shares go to the services sector (19%) and manufacturing (9%). Within services, most greenfield FDI is directed to communications, business services, transportation, and finance, while the main targets in manufacturing are medium and low-tech industries such as metals, chemicals, and food. A very small share of greenfield FDI (1%) is channelled to construction. M&A deals are concentrated in services (36%), especially finance and transportation, mining (26%) and energy (23%). A smaller share goes to manufacturing (14%), in particular to medium- and low-tech chemical and food products and high-tech pharmaceuticals. A negligible share of M&A transactions are concluded in construction (1%).

Figure 2.3. Greenfield FDI and M&A deals prevail in energy, mining and services

Cross-border greenfield FDI and M&A deals cumulated over 2010-21



Note: Sectors are classified based on their technology intensity according to OECD (2011[5])
Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/; and Thomson Reuters (2022[7]), Mergers & Acquisitions, https://legal.thomsonreuters.com/en.

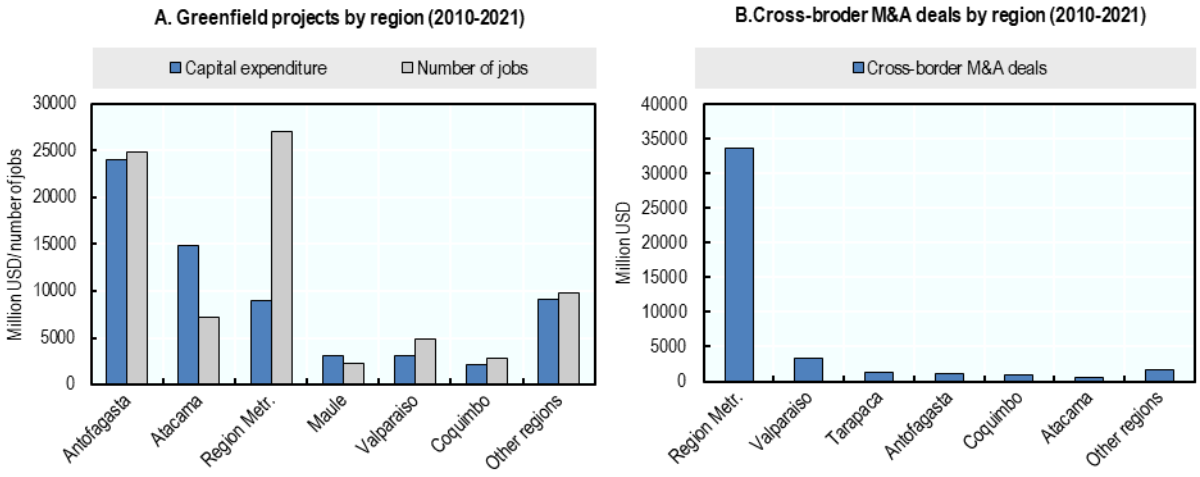
2.1.3. Antofagasta, Atacama and Santiago attract most FDI

Regardless of the mode of entry, FDI appears to be concentrated in a few regions. Between 2010 and 2021, greenfield FDI was mainly directed to three regions: Antofagasta, Atacama and the Metropolitan Region (Santiago) (Figure 2.4). This is not surprising considering that mines are located in Antofagasta and Atacama and that Santiago is the main economic centre of Chile.[1] While in Antofagasta and Atacama greenfield investments were mainly directed at the mining and energy sectors, in the Metropolitan Region they covered a wider range of sectors, such as communications, financial services, restaurants and hotels, transportation services and the food industry. A considerable number of jobs in the Metropolitan Region have also been created in renewable energy.

Most of the cross-border M&A transactions in the period 2010-21 also took place in the Metropolitan Region (Panel B). It is likely, however, that this figure is overestimated because in the data available for this study, the location of M&As is often based on the company's headquarters (HQ), even if the company's facilities are located in other regions. This is the case of several mining companies whose headquarters are located in Santiago, while their mining facilities are located in Antofagasta and Atacama. In addition, information on the location of the acquired or merged company was not provided for about 36% of the M&A transactions that materialise during this period.

Regional disparities in FDI are much higher in Chile than in other OECD countries. Moreover, disparities in FDI remain considerable even when population density is taken into account, i.e. when FDI is considered in per capita terms. A recent OECD study shows that regional disparities in FDI are correlated with labour productivity discrepancies, suggesting that there is a strong link between foreign investment and the level of productivity at the regional level (OECD, Forthcoming[8]).

Figure 2.4. Greenfield FDI and M&A deals are concentrated in a few regions



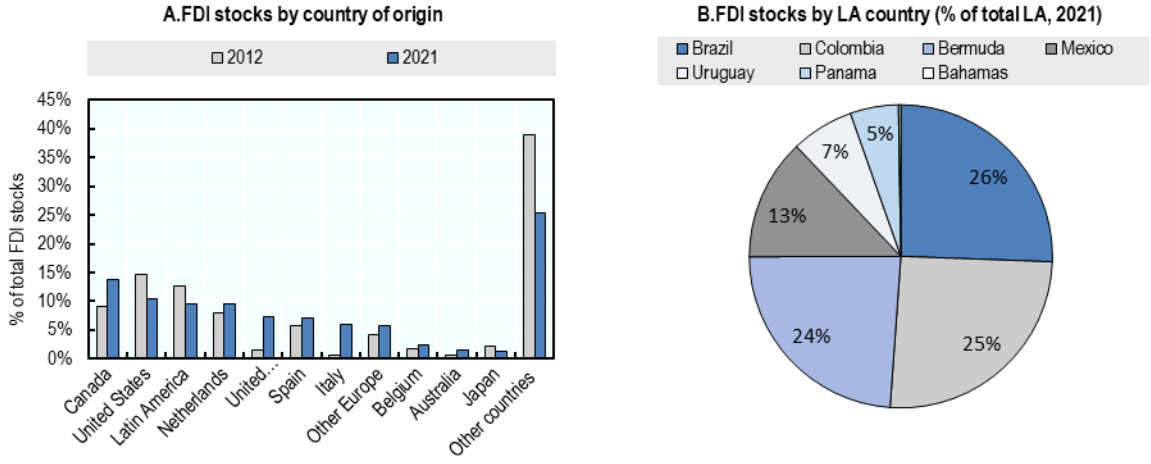
Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/; and Thomson Reuters (2022[7]), Mergers & Acquisitions, https://legal.thomsonreuters.com/en.

2.1.4. Companies from Europe and Northern America are the leading investors

More than 62% of the FDI stocks are investments from Europe, particularly the Netherlands, the United Kingdom, Spain and Italy, and North America, namely Canada and the United States (Figure 2.5, Panel A). About 13% came from Latin America, a much smaller share considering the geographical proximity. The main investors from Latin America and the Caribbean were Brazil, Colombia, Bermuda and Mexico (Panel B). Moreover, while FDI stocks from Canada, Spain, the United Kingdom and Italy grew between 2012 and 2021 in both absolute and relative terms, those from the United States and Latin America declined. Negative FDI stocks were recorded for Argentina and Peru.[2]

The low importance of South American partners for Chile is a long-term issue. The low economic and trade integration of Latin American countries appear to be explained by high costs of trade within the region, due to poor transport and logistics infrastructure, complicated and non-transparent non-tariff measures (e.g. product standards), regulatory constraints on trade in services, as well as the low degree of participation in GVCs of some partners (e.g. Argentina and Brazil) (Gonzalez, 2017[9]; OECD, 2015[10]).

Figure 2.5. More than 60% of FDI stocks originate from Europe and North America



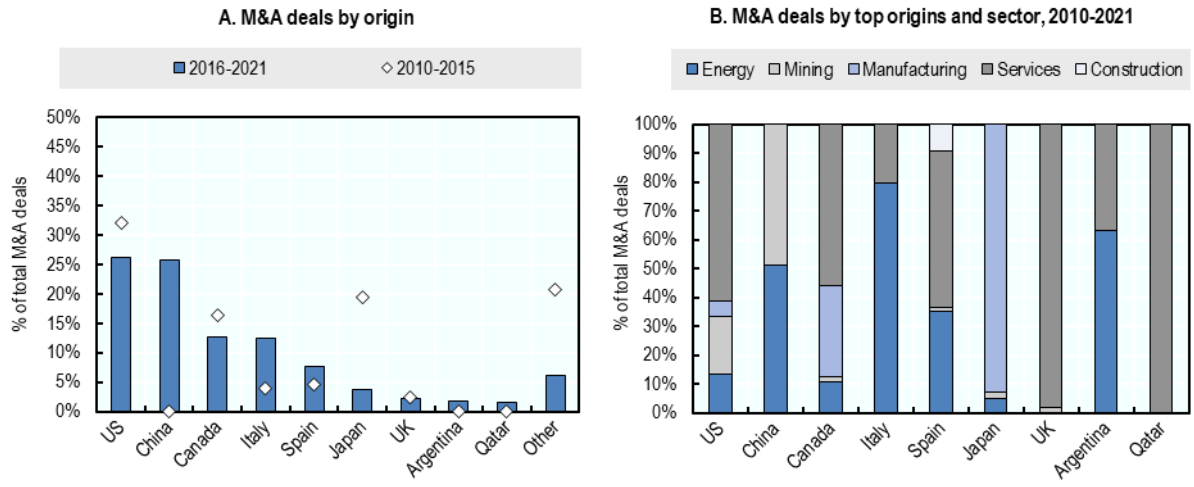
Source: OECD elaboration based on Central Bank of Chile (2022[4]), Foreign Direct Investment, https://www.bcentral.cl/en/home

About 25% of FDI stocks in 2021 provided by the Central Bank of Chile cannot be allocated to a specific country, however. Thus, it is possible that the shares for some countries are underestimated. Moreover, as the FDI data of the Central Bank of Chile follow the principle of the immediate investor (and not that of the ultimate investor), they do not provide an accurate picture of the origin of investments when a parent (ultimate) company invests in Chile through another (immediate) subsidiary in a third country.

Thomson Reuters' M&A deals provide a more accurate picture of the origin of these investments, as they distinguish between ultimate and immediate investor. The data show that most of the cross-border M&A transactions in Chile in the last decade were concluded by European and North American firms, roughly confirming the picture that emerges from the Central Bank of Chile's FDI data (Figure 2.6, Panel A). The data also show that in recent years a significant share of M&A transactions in Chile have been concluded by Chinese companies. Although growing rapidly, FDI from China remains marginal in the Chilean landscape (around 0.2% in 2021 according to the Central Bank of Chile's FDI data). However, it is also possible that some Chinese companies invest via other countries (e.g. the Cayman Islands) and that such flows are not allocated to China (Sutherland, El-Gohari and Matthews, 2010[11]). The sector of the investment varies greatly depending on the country of origin of the companies. US, Canadian, Spanish, British and Qatari companies concluded M&A deals mainly in the service sector, in particular finance, telecommunications and transport (Panel B). The M&A transactions of Chinese, Italian and Argentinean companies mainly concerned the energy sector, while those of Japanese investors the mining sector.

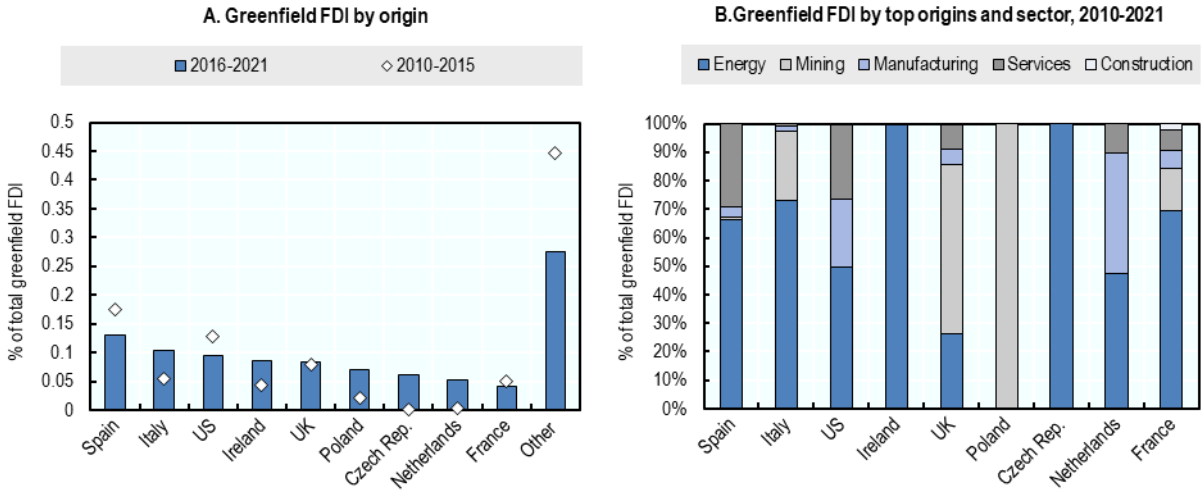
The predominant role of European and North American companies is also confirmed by greenfield FDI data (Figure 2.7, Panel A). The data also show that China's greenfield investment was 10 times higher in 2016-21 than in 2010-15. China's share in total greenfield FDI received by Chile between 2016 and 2021 is still small (about 2%), however. Most of the top investors favoured energy, particularly renewable energy, and mining (Panel B).

Figure 2.6. M&A deals by Chinese companies have grown dramatically over the past five years



Source: OECD elaboration based on Thomson Reuters (2022[7]), Mergers & Acquisitions, https://legal.thomsonreuters.com/en.

Figure 2.7. Greenfield FDI from the top investors favour energy and mining



Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

2.2. FDI supports trade and integration in global value chains

2.2.1. Chile participates in GVC mainly through its forward linkages

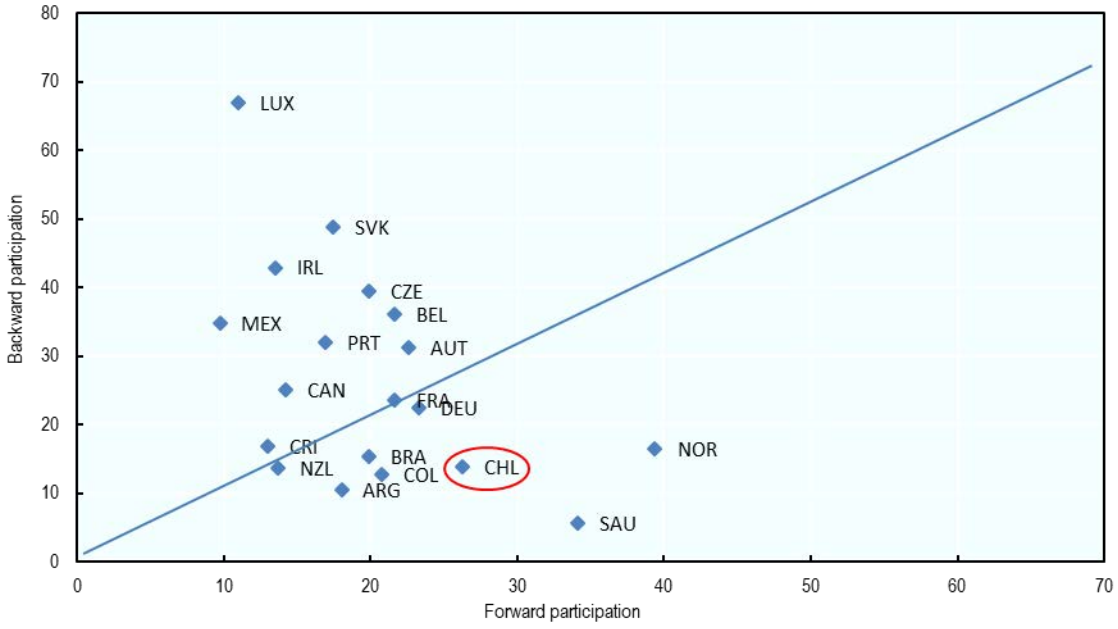
Participation in GVCs brings new opportunities for productivity growth and innovation. Countries participate in GVCs by using imported inputs in their exports (backward participation in GVCs) or by providing intermediate inputs to third country exports (forward participation). Productivity spillovers can occur from both backward and forward participation in GVCs. Backward participation enables countries to use inputs that are not available in the domestic economy or that have an advantage in terms of price or quality, while upstream participation allows countries to acquire technology and knowledge from export destinations (Criscuolo and Timmis, 2017[12]).

Chile's level of forward integration into GVCs is high, as would be expected from a net exporter of natural resources. Like many natural resource producers, Chile exports mainly primary and intermediate products, which are then further processed and exported by other countries. Its level of forward integration in GVCs, measured by its share of value added in other countries' exports, is 26%, which is higher than most OECD countries and similar to other natural resource producers, notably Saudi Arabia (34%) and Norway (39%) (Figure 2.8). In contrast, Chile's level of backward participation captured by the share of foreign value added in its exports, is 14%, which is lower than most OECD countries, although in line with its market size, export basket and distance from the main manufacturing hubs (OECD, 2015[10]).

Chile's high level of forward participation and low level of backward participation suggest a relatively upstream position in GVCs: the country specialises in the early stages of the production process, i.e. the extraction of raw materials (Antràs et al., 2012[13]). Other Latin American countries such as Brazil, Colombia and Argentina also appear to position themselves relatively upstream in GVCs, while Mexico and Costa Rica position themselves further downstream, probably due to their greater specialisation in processing and assembly (OECD, 2015[10]).

Given Chile's remote location and its ambition to further tap into and upgrade in GVCs, improving the competitiveness of backbone services (e.g. telecommunications, air and rail transport) and logistics will be crucial. OECD estimates show that logistics accounts for about one-fifth of the total value of output in Chile's manufacturing sector, which is over two times higher than the OECD average (OECD, 2015[10]). This suggests that a reduction in logistics costs is estimated to have a greater impact on Chile's total manufacturing output than in most OECD countries. The availability and sustainability of energy, water and transport services are also key considerations for the future growth of the mining sector in Chile.

Figure 2.8. Chile has an upstream position in GVCs



Note: Backward participation in GVCs is foreign value added embodied in a country's gross exports, as a percentage of the country's total gross exports; forward participation is domestic value added embodied in other countries' gross exports, as a percentage of the country's total gross exports. Data refer to 2020
Source: OECD (2021[14]), TiVA indicators, https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm

2.2.2. Chile has a comparative advantage in natural resources, medium- and low-tech manufacturing and some services

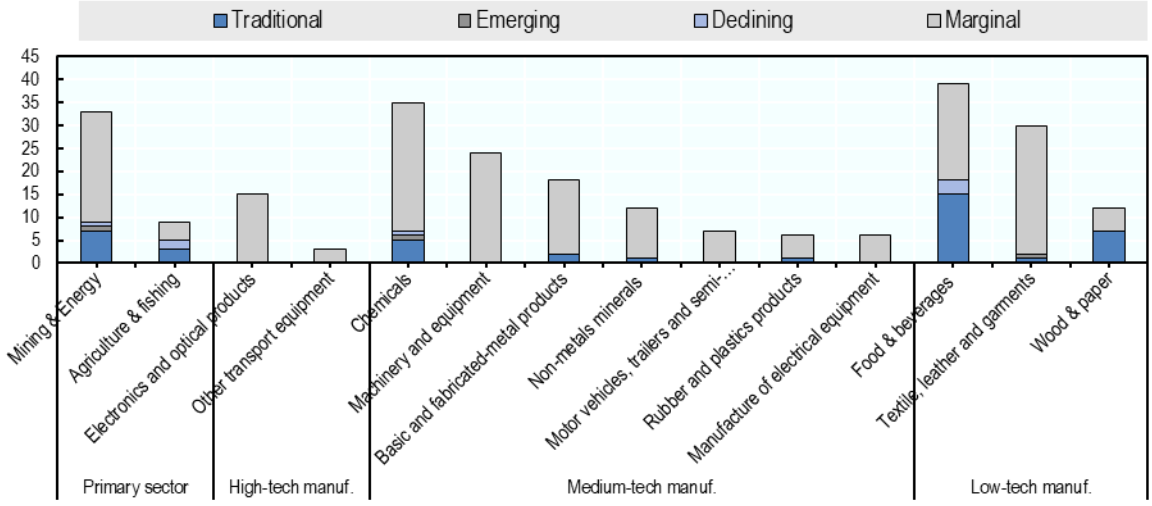
Chile has a comparative advantage in several activities in the natural resources sector and medium- and low-tech manufacturing, i.e. it exports relatively more in these activities than the rest of the world (Box 2.1). In particular, the country has a traditional comparative advantage in the production and exports of metals (copper; iron; silver and platinum; lead), several agriculture and fisheries products (fish; vegetables; fruit; and nuts), chemical products (fertilisers; inorganic chemicals); basic and fabricated-metal products (crude iron, spiegeleisen, sponge iron, iron or steel granules and powders and ferroalloys; metal containers for storage or transport); non-metallic minerals; food and beverages (processed foods, animal oils and beverages); textiles and clothing (wool and other animal hair); and wood and paper (wood, pulp, cork and paper (Figure 2.9).

It also has an emerging comparative advantage in some activities in metals (ferrous waste and scrap; remelting scrap ingots of iron or steel), textiles and clothing (worn clothing and other worn textile articles) and chemicals. In addition, it has a declining comparative advantage in agriculture (unmilled maise and cereals); food and beverages (dairy products; meat products; tobacco); metals (ores and precious metal concentrates); and chemicals (starches, inulin and wheat gluten, albuminoid substances, glues). It has no traditional or emerging comparative advantage in any of the high-tech activities, nor in most of the medium-tech activities. Chile has a strong comparative advantage also in several service sectors, particularly in transport, travel, other business services and insurance services (Figure 2.10). At the same time, it has a higher opportunity cost than its trading partners in computer and information services, personal, cultural and recreational services, and financial services.

Overall, Chile seems to be far from developing comparative advantages in high-tech and knowledge-intensive sectors (e.g. Electronics and optical products, other transport equipment, computer and information services) which offer greater opportunities in terms of sustainable development. These sectors contribute more in terms of added value and innovation and tend to create more skilled and better paid jobs.

Figure 2.9. Chile has a comparative advantage in natural resources and several medium-low-tech industries

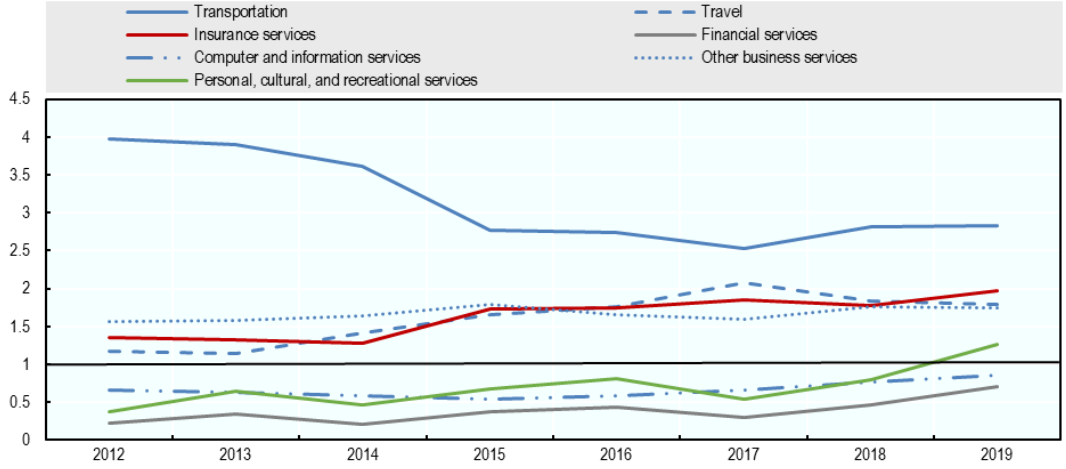
Number of sub-sectors by Revealed Comparative Advantage (RCA) category



Note: Exports of goods are classified according to ISIC Rev. 4 (3 digits).
Source: OECD elaboration based on UN Comtrade (2022[15]), exports of goods, https://comtrade.un.org/data

Figure 2.10. Chile has a comparative advantage in transportation, insurance services, travel and other business services

RCA >1 indicates a comparative advantage



Note: Exports of services are classified according to EBOPS 2002.
Source: OECD elaboration based on UN Comtrade (2022[15]), exports of services, https://comtrade.un.org/data

Box 2.1. Assessing Chile's revealed comparative advantage: methodology and data

The revealed comparative advantage (RCA) measures the relative advantage or disadvantage of a country in a given sector, as evidenced by its trade flows. RCA is based on the Ricardian comparative advantage concept and was introduced by Balassa (1965[16]). It is calculated following the approach of Feenstra (2016[17]) and export data from the UN Comtrade database.

Given that exports of goods and services follow different sector classifications, the RCA analysis is carried out separately. The analysis of exports of goods is carried out for more than 250 sub-sectors in 14 broader sectors classified according to SITC Rev 4 (3-digit). Chile has a RCA in a sector if it exports relatively more in that sector than the rest of the world. Given the high number of sub-sectors, it is useful to classify them into traditional, emerging, declining and marginal:

- **Traditional** subsectors are those in which Chile has had a RCA in at least three years in both five-year periods used in the analysis: 2012-16 and 2017-21. Traditional sub-sectors are thus those in which Chile has traditionally had a comparative advantage in exports.
- **Emerging** sub-sectors are those in which Chile has gained a comparative advantage more recently; that is, Chilean producers had a RCA in at least three years in 2017-21, but in less than three years in 2012-16. Consequently, emerging sectors can be considered as potential new growth pools.
- **Declining** sub-sectors are sectors where Chile has lost comparative advantage in the last decade. These sub-sectors had a comparative advantage in the past, but experienced a RCA in less than three years in 2017-21.
- **Marginal** sub-sectors are those that did not have a RCA in at least three years in both periods. These sectors may therefore be further away from gaining a competitive advantage in Chile.

The analysis for exports of services is based on a smaller group of sub-sectors classified according to (EBOPS 2002) for the period 2012-19. Chile has a comparative advange in a service category if the RCA is above 1 in all years of the 8-year analysis period.

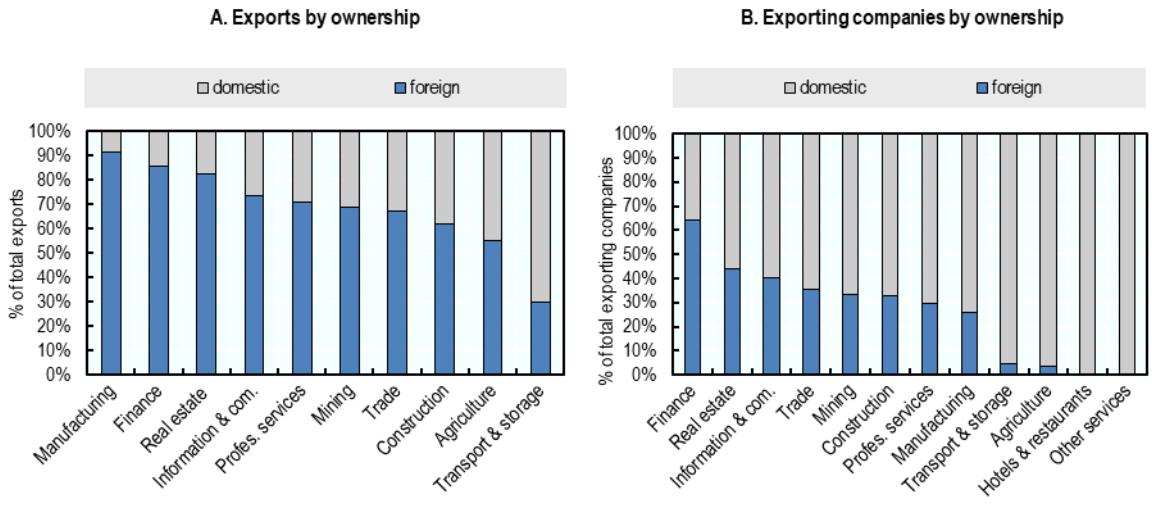
2.2.3. Foreign firms support Chile's exports, including in high-tech and knowledge-intensive sectors

According to the Sexta Encuesta Longitudinal de Empresas (ELE6), in 2019 foreign companies contributed more than 50% of total exports in almost all sectors covered by the survey (Figure 2.11, Panel A). For example, foreign firms were responsible for about 90% of total exports in manufacturing, 85% in finance, 83% in real estate, and 73% in information and communication. The data also show that foreign affiliates accounted for a significant share of exporting firms in many sectors. For instance they represented 64% of all exporting firms in finance, 44% in real estate, and 40% in information and communication (Figure 2.11, Panel B).

The importance of foreign companies for Chile's exports is confirmed by information provided by the Internal Revenue Service of Chile. According to data from the Internal Revenue Service, in 2020 foreign firms contributed more than 50% of total exports in most sectors including knowledge-intensive and high-tech sectors. For example, they accounted for approximately 80% of exports in telecommunications and in information service activities, 55% in computer activities, 50% in electronics, machinery and equipment, and chemicals. Moreover, they also accounted for about 30% of exports in scientific research and development.

Data from the Internal Revenue Service also reveal that foreign companies in Chile are more export-oriented than domestic companies, as they export a larger share of their sales (Figure 2.12). In 2020, in almost all sectors, with the exception of hospitality, health and social work, and energy, foreign firms exported a greater share of their sales than domestic firms. Higher differences between foreign and domestic firms are observed in defence and mining. A regression analysis based on ELE6 confirms the existence of a foreign premium in relation to export intensity regardless of firm size and sector. In particular, the econometric findings show that foreign ownership increases export intensity by 32% (Annex 2.B).

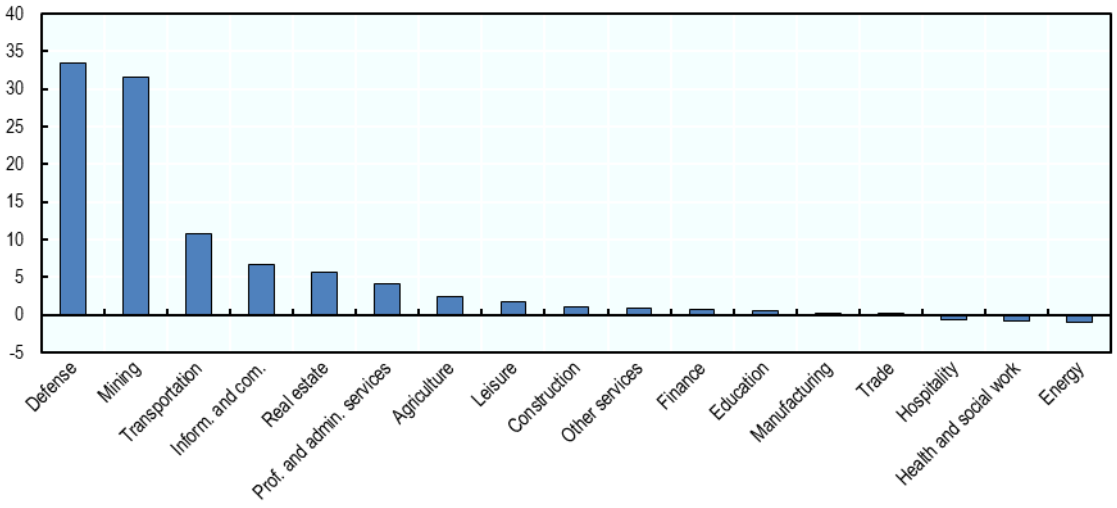
Figure 2.11. Foreign firms contribute significantly to Chilean exports in many sectors



Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

Figure 2.12. Foreign affiliates are more export-oriented than Chilean firms

Relative difference between export intensity of foreign and domestic firms (>0 if foreign firms are more export-intensive than domestic firms), 2020



Note: Results are based on a subsample of firms with median sales >= USD 100 000 and median number of workers >= 5. Export intensity: gross exports over sales. The indicator measures the relative difference between export intensity of foreign and domestic firms. Values above 0 indicate that foreign firms are more export oriented than domestic firms and vice versa.
Source: OECD elaboration based on information compiled by the Internal Revenue Service of Chile.

2.2.4. The extent of linkages between foreign and domestic firms is significant

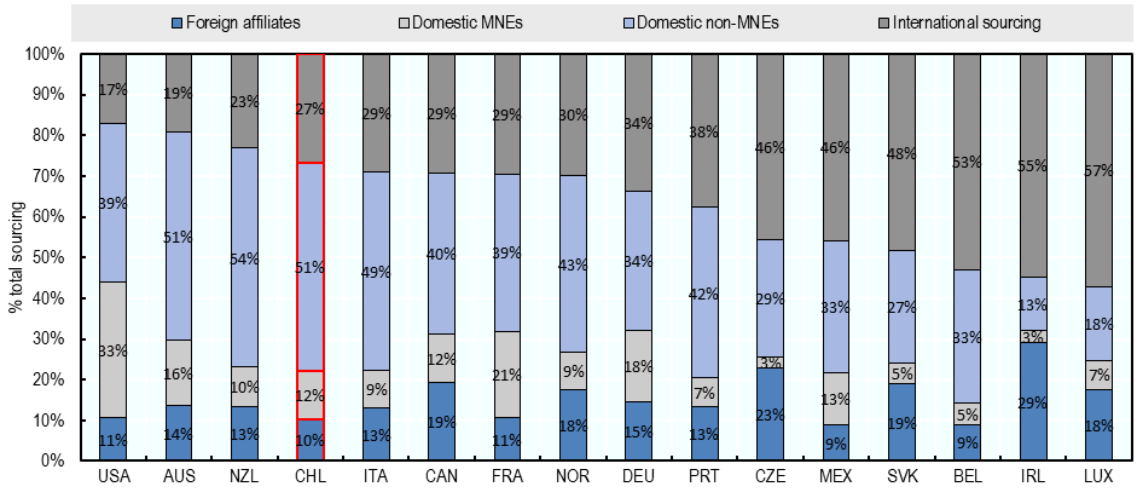
While foreign firms foster integration into GVCs through their import and export activities, their participation in domestic value chains can also contribute to the productivity growth of domestic firms (OECD, forthcoming[18]). In particular, buyer-supplier relationships (so-called value chain linkages) can enable productivity improvements through access to new technologies, knowledge and better or cheaper inputs (Alfaro-Ureña, Manelici and Vasquez, 2022[19]).[3]

Indicators based on the OECD's AMNE analytical database show that, in 2016, foreign firms in Chile purchased most of their intermediate goods locally (73% of total intermediate goods), while a smaller share was purchased internationally (27%) (Figure 2.13). The share of locally sourced inputs is higher than in other small open EU economies, for example Portugal (62%), the Czech Republic (54%), the Slovak Republic (51%), and Ireland (45%)This is not surprising considering the geographical distance between Chile and its main economic partners and the more central location and greater involvement in GVCs of these EU countries. In general, this share tends to be higher in larger economies, as foreign affiliates in those countries can rely on a larger domestic market for intermediate goods. This is for example the case in the United States (82%), Italy (71%) and France (70%).

Chilean-owned firms benefited the most from local sourcing of foreign affiliates. The majority of locally sourced inputs were purchased from domestic firms (supplier linkages): 63%, of which 12% from domestic MNEs and 51% from domestic non-MNEs, which include many small and medium enterprises (SMEs). A smaller share, 10%, was bought from other foreign firms established in Chile. The data also reveal that foreign affiliates in Chile rely less on international sourcing (27%) than in other small open OECD economies, for instance Portugal (38%), the Czech Republic (46%), and the Slovak Republic (48%). Normally, the share of inputs bought internationally tends to be higher in small economies due to their smaller domestic market for intermediate goods.

Figure 2.13. In Chile, foreign firms source inputs mainly from Chilean firms

Sourcing structure of foreign affiliates by country, 2016

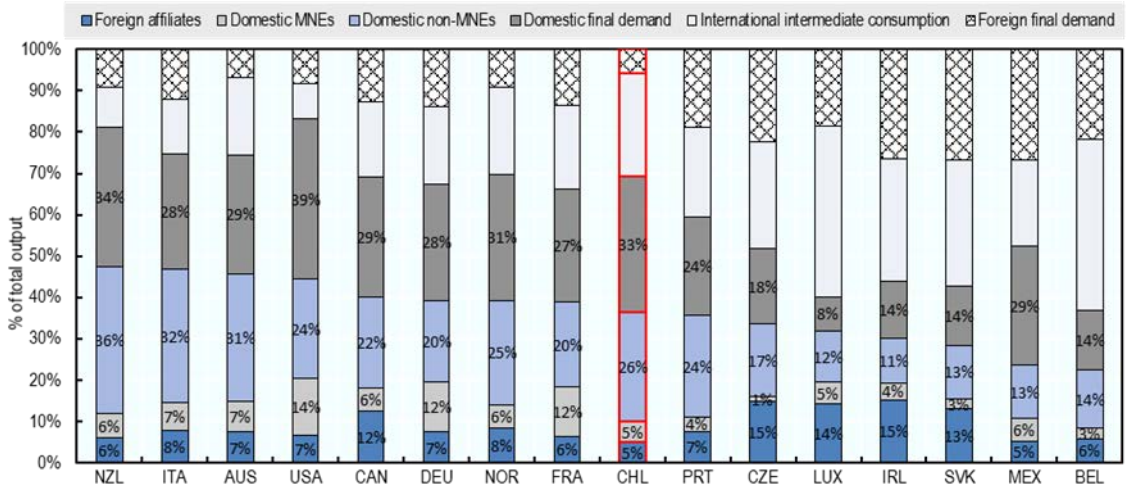


Source: OECD (2018[20]), Analytical AMNE database, https://www.oecd.org/sti/ind/analytical-amne-database.htm.

The indicators also show that in Chile almost 70% of foreign affiliates' output feeds back into domestic value chains. In 2016, 36% of the output of foreign affiliates was used as input by local firms, and 33% was sold in the domestic market for final goods and services (Figure 2.14). The share of foreign affiliates' output that stays in Chile is higher than in other small open economies such as Portugal (60%), the Czech Republic (52%), Ireland (44%), the Slovak Republic (43%) and Belgium (37%).

Figure 2.14. Foreign firms sell intermediate products mainly to Chilean firms

Output use of foreign affiliates, Chile vs other OECD economies, 2016



Source: OECD (2018[20]), Analytical AMNE database, https://www.oecd.org/sti/ind/analytical-amne-database.htm.

Moreover, the share of output sold to Chilean firms (buyer linkages) is significant: in 2016, intermediate products sold by foreign affiliates to domestic firms accounted for 31% of their output (26% was sold to non-domestic MNEs and 5% to domestic MNEs), while inputs sold to other foreign firms located in Chile

corresponded to 5% of output. The extent of sell linkages is greater in Chile than in other small open economies, for example Portugal (28%), the Czech Republic (18%), Luxembourg (17%) and Ireland (15%). In general, the importance of buyer-supplier linkages in Chile suggests that foreign affiliates are well integrated into the domestic economy. Nonetheless, further analysis is needed to understand the implications of such value chain linkages, for instance, in which sectors they occur and whether they act as a channel for FDI spillovers.

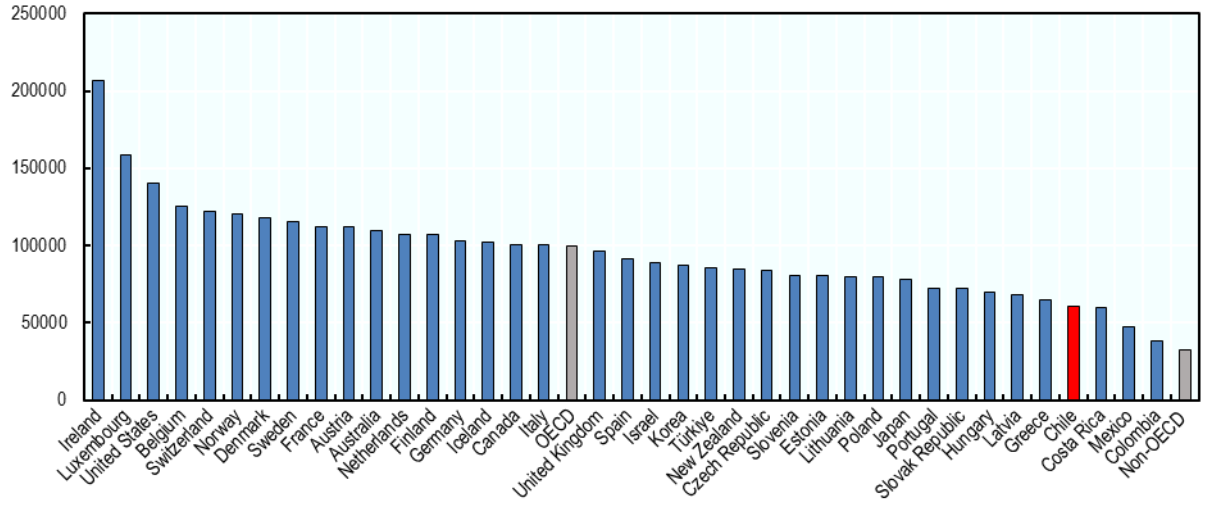
2.3. FDI fosters productivity, innovation and can support economic diversification

2.3.1. Chile's labour productivity is among the lowest in the OECD

Chile's labour productivity, measured as output per person employed, is among the lowest in the OECD (Figure 2.15). Labour productivity is less than two-thirds the average of OECD economies and only higher than that of other LAC countries such as Costa Rica, Mexico and Colombia. Moreover, labour productivity growth in recent years has been modest. Between 2010 and 2020, productivity grew by an average of 0.8%, a much low rate compared to the 5% peaks reached during the 1990s.

Figure 2.15. Chile's labour productivity is among the lowest in the OECD

GDP per person employed, USD, current PPPs, 2020



Source: OECD (2022[22]), Productivity Database, https://stats.oecd.org/

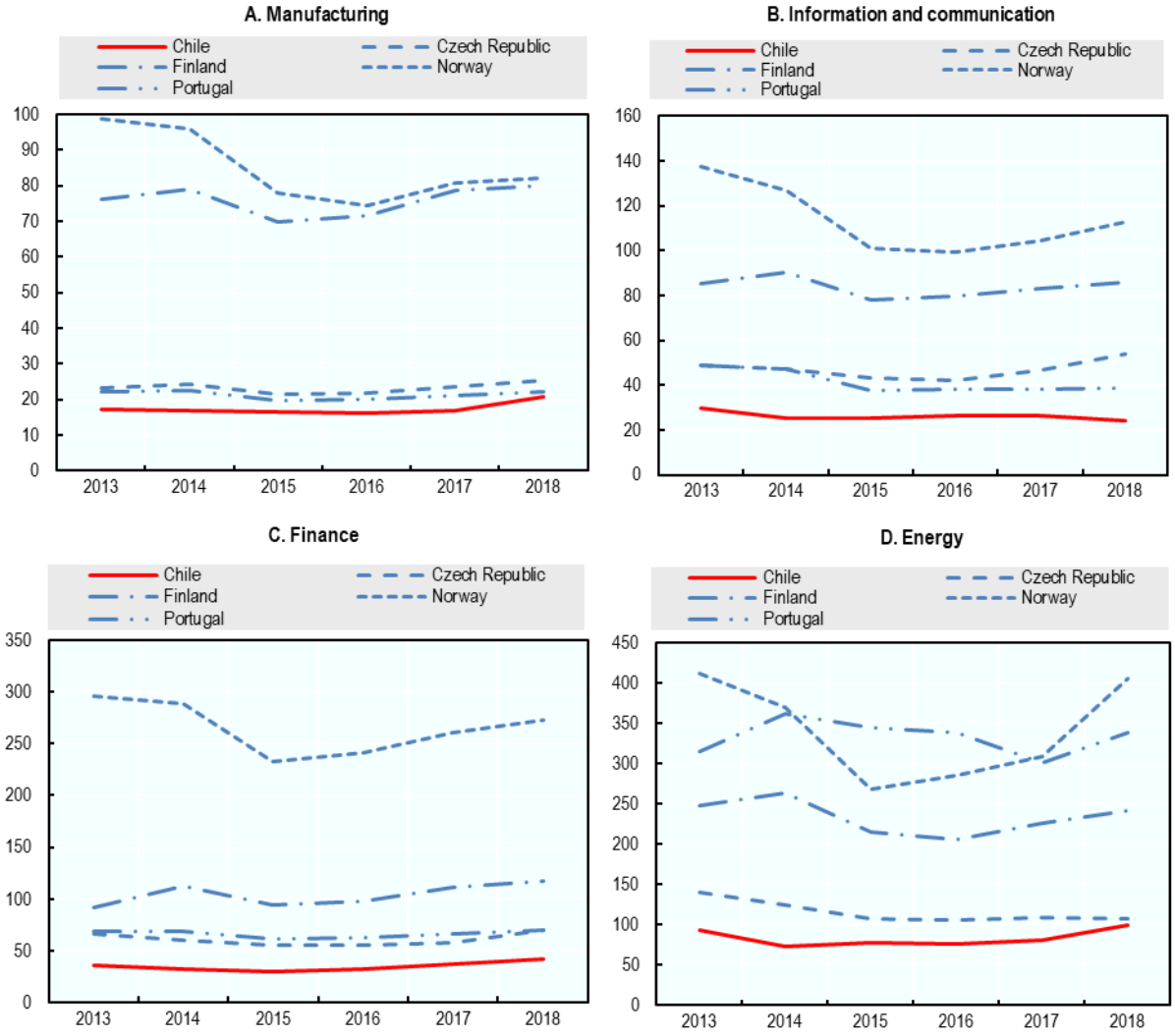
Comparing Chile's productivity levels with those of other OECD countries with similar economic size or endowments of natural resources, it can be seen that Chile lags behind in many sectors, including manufacturing, information and communication, finance and energy (Figure 2.16). Low productivity levels, particularly in the energy and finance sectors that receive significant FDI flows, also raise the question of whether domestic firms able to benefit from the positive spillovers of foreign firms.

The low levels of labour productivity in Chile are due to both economic and regulatory factors. Low business investment in R&D and innovation and a fragmented public system for innovation are crucial factors behind Chile's stagnant productivity. Moreover, regulatory barriers create skill imbalances, which reduce productivity and leave many workers in low-wage and temporary jobs (see Chapter 3) (OECD, 2018[22]).

Low productivity is also linked to business polarisation. Chile has a persistent division between a small number of large and productive firms and a long tail of small and medium-sized firms with significantly lower productivity performance. The lack of a cohort of medium-sized enterprises is an obstacle to business dynamism and competitive pressure (OECD, 2021[23]). Regulatory barriers, including market access restrictions, that hinder competition in many key sectors, such as telecommunications, maritime services and railways, also limit the entry of firms and reduce productivity. Chile's low productivity is also linked to the low sophistication of its economy, understood as a wealth of diverse and internationally competitive firms in a wide range of productive sectors (OECD, 2021[23]).

Figure 2.16. Chile's productivity performance is weak in many sectors

Value added per hour worked by activity



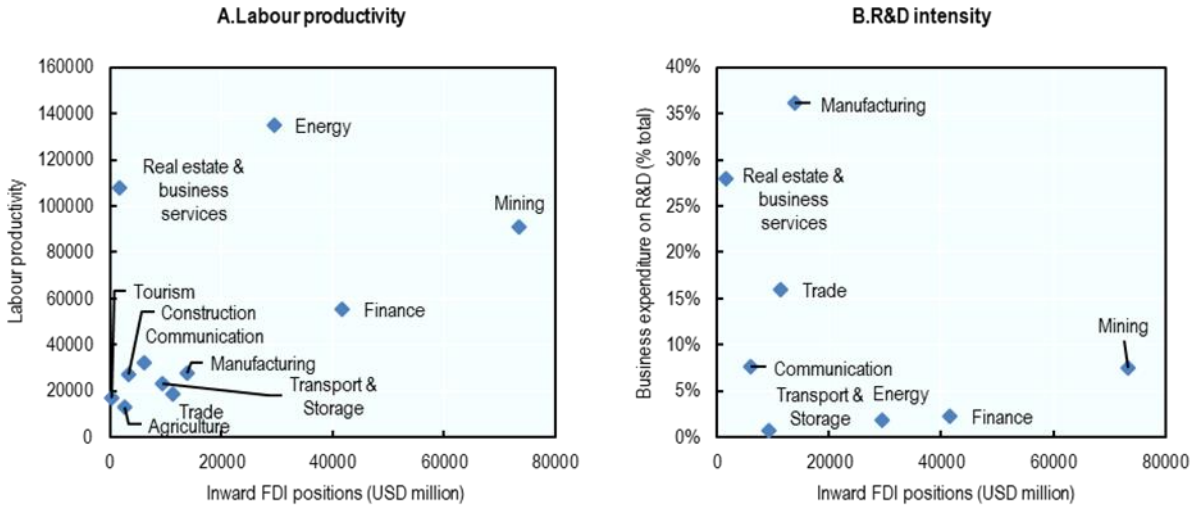
Source: OECD (2022[24]) Annual National Accounts, https://stats.oecd.org/.

2.3.2. FDI is concentrated in capital-intensive and more productive sectors

In Chile, FDI is concentrated in the capital-intensive mining and energy sectors and in financial services, which are relatively more productive, i.e. where an hour of labour produces more value added on average

than in other sectors (Figure 2.17, Panel A). Smaller shares of FDI go to sectors with lower average labour productivity levels, such as agriculture, manufacturing, construction, tourism, trade, transport and communications. The exceptions are real estate and business services, which, despite being highly productive, receive a low share of FDI. A positive relationship between FDI and productivity at the aggregate level is not unusual in countries that are important producers of natural resources (OECD, 2019[25]). Sectors that attract more FDI – mining, energy and financial services – have lower R&D intensity, i.e. they spend less on R&D as a percentage of sales, however (Panel B). Conversely, sectors that receive smaller shares of FDI, notably business services and manufacturing, have higher R&D intensity. A negative correlation between FDI and R&D intensity is observed in other natural resource-rich countries (OECD, 2019[25]).

Figure 2.17. FDI is concentrated in sectors that are more productive, but spend less on R&D



Note: Panel A: labour productivity is value added per hour worked; Panel B: R&D intensity is expenditure on R&D over sales.
Source: OECD elaboration based on OECD (2022[24]), Annual National Accounts, https://stats.oecd.org/; Central Bank of Chile (2022[4]), Foreign Direct Investment, https://www.bcentral.cl/en/home; and Chile's R&D Expenditure and Personnel Survey (2018[26]), https://www.minciencia.gob.cl.

These correlations, however, do not establish a cause-and-effect link between FDI, productivity and R&D intensity. For example, the positive correlation between FDI and productivity does not make it possible to say whether FDI contributed to a higher level of productivity in a sector or whether FDI went to that sector because it was more productive. Several studies have attempted to measure the impact of FDI on productivity and innovation in Chile. Most of these studies point out that FDI has had a positive effect on productivity and innovation in Chile (Table 2.1). For example, Fernandez and Paunov (2012[27]) find that FDI in services contributed to increasing the productivity of the manufacturing sector in Chile during the period 1992-2004.

Table 2.1. Studies on the impact of FDI on productivity and innovation in Chile

Authors	Variable of interest	Main findings
Trojette (2016[28])	GDP growth	FDI enhanced GDP growth during 1984-2013 in countries with good institutional quality, including Chile.
OECD (2015[10])	Labour productivity	Foreign firms in Chile are more productive and capital -intensive than domestic firms.
Ilboudo (2014[29])	Total factor productivity	FDI is positively and significantly correlated with TFP in the mining sector in

Authors	Variable of interest	Main findings
		Chile.
Castillo et al. (2014[30])	Total factor productivity	Using firm-level data for Chilean companies, they find a positive productivity spillovers from FDI.
Fernandez and Paunov (2012[27])	Labour productivity growth	FDI in services significantly and positively affected productivity growth of Chilean manufacturing plants during 1992-2004.
Ramirez (2006[31])	Labour productivity growth	FDI had a positive and economically significant effect on the rate of labour productivity growth in Chile during 1960-2000.
Chowdhury and Mavrotas (2005[32])	GDP growth	They find no relationship between FDI and GDP growth in Chile during 1969-2000.
Alvarez (2001[33])	Technology innovation indicators	FDI increases some technology innovation (e.g. design, packaging) in Chile in the 1990s.

2.3.3. Foreign firms are more productive and engage more in R&D activities

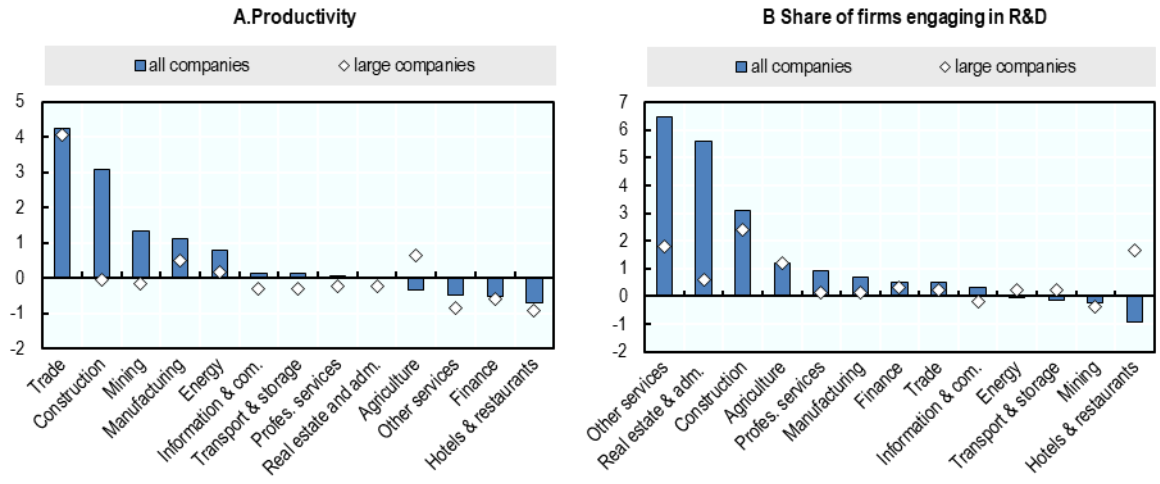
The Sexta Encuesta Longitudinal de Empresas (ELE6) provides information on the performance of foreign and domestic firms in Chile in 2019 (Annex 2.A). Data on sales, cost of intermediate goods and employment are used to calculate firm productivity. Based on this information, an indicator is constructed that measures the relative productivity gap between foreign and domestic firms. The indicator shows that foreign firms have a productivity premium in most sectors (Figure 2.18, Panel A). Such premium is particularly high in trade, construction, mining, manufacturing and energy. When comparing large firms (84% of foreign firms and 39% of domestic firms), productivity gaps narrow significantly or disappear. [4]

In most sectors, foreign firms are also more likely to engage in R&D activities than domestic firms (Panel B).[5] Among the few exceptions, the mining sector is an interesting case, given the significant share of FDI attracted and the capital intensity of the sector. The lower R&D propensity of foreign mining firms could be explained by the fact that these firms carry out R&D in other countries, e.g. in their home country or closer to major R&D centres. Moreover, when comparing large companies, the gaps narrow with a few exceptions.

Additional empirical analysis confirms the existence of a foreign premium in relation to productivity (Annex 2.B). The analysis allows to single out the impact of foreign ownership on firm's performance by taking into account factors such as size and sector. The results show that foreign ownership is positively and significantly correlated with productivity, regardless of size and sector. In particular, foreign ownership has an impact of about 80% on firm productivity (i.e. increases firm productivity by 80%). These results are overall consistent with the predictions of economic theory: due to the sunk costs of investing abroad, foreign firms are on average more productive and export more intensively than purely domestic firms export more intensively than purely domestic firms (Melitz, 2003[36]; Helpman, Melitz and Yeaple, 2004[37]).

Figure 2.18. Foreign firms are more productive and are more likely to engage in R&D activities

Relative gap between foreign and domestic firms (if >0 foreign firms are more productive/engage more in R&D activities than domestic firms)



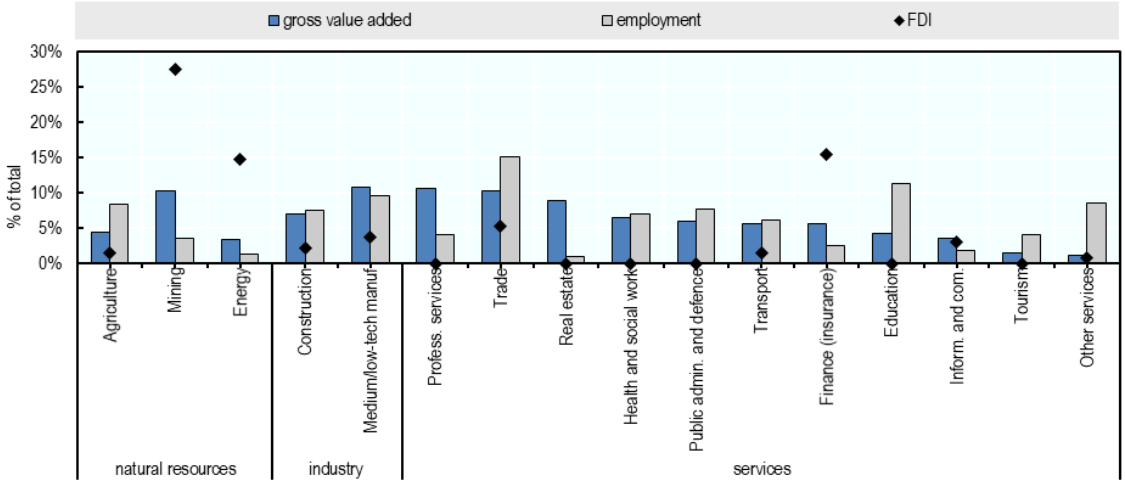
Note: Labour productivity is value added per hour worked. Productivity data refer to 2019, R&D data to 2017. Large companies are companies whose sales exceed 100 001 UF. Firms engaging in R&D are firms with positive expenditure on R&D. The indicators in Panel A and B show the relative gap between foreign and domestic firms, e.g. (productivity of foreign firms – productivity of domestic firms)/ productivity of domestic firms. Positive values indicate that foreign firms perform better (e.g. are more productive) than domestic firms and vice versa. The indicators are calculated for all companies and for large companies only.
Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

2.3.4. Foreign firms can enhance the economic diversification of the Chilean economy

Diversifying the economy away from natural resource activities has been a long-term goal for Chile. Since the 1970s, with different emphasis, policies have sought to strengthen the role of the private sector and increase the sophistication of exports. Although these policies have helped diversify Chile's production base and export basket, economic activity is still largely concentrated in the primary sector (mining, agriculture and fishery), low value-added manufacturing and services (e.g. public sector). Dependence on the export of raw materials, especially copper, and the lack of a strong policy framework for innovation/research, development, and human capital development, as well as some regulatory barriers, have contributed to hindering further economic diversification towards high-tech and knowledge-intensive activities.

As shown earlier in this chapter, foreign investment in Chile is also concentrated in a few sectors. These are natural resources (mining and energy), finance, trade and medium and low-tech manufacturing industries (food, chemicals). Foreign investors have traditionally been attracted by the country's vast endowment of natural resources, particularly metals (copper) and coal. More recently, Chile's commitment to a green transition has created the basis for attracting foreign capital to green energy industries. Chile's environmental goals and its unique geography, making it one of the countries in the world with the highest potential for renewable energy development, explain the increasing share of FDI in renewable energy projects. Beyond natural resources, however, foreign investors favour a small number of sectors where they can rely on well-developed domestic capacities, including existing pools of local suppliers and expertise (Figure 2.19).

Figure 2.19. There is potential to enhance FDI diversification



Note: About 24% of FDI are 'not allocated', thus some sectoral shares may be underestimated.
Source: OECD elaboration based on OECD (2022[24]), Annual National Accounts, https://stats.oecd.org/, Central Bank of Chile (2022[4]), Foreign Direct Investment, https://www.bcentral.cl/en/home.

Attracting FDI in a larger range of sectors, especially high-tech and knowledge intensive sectors, can help Chile become a more diversified, resilient and knowledge-intensive economy. Foreign firms have access to better technologies and can disseminate them in the host economy. They can also act as a gateway to international markets and foster integration into GVCs. The results presented earlier in this chapter show that foreign firms are more likely to engage in innovation activities and contribute significantly to exports, including in high-tech and knowledge-intensive sectors. Foreign firms are on average more productive than domestic firms, thus contributing positively to the productivity of the sector in which they directly operate. At the same time, foreign firms can help the domestic economy to become more productive through spillovers to domestic firms, i.e. through the transfer of technology and knowledge. The analysis presented in the chapter highlights the presence of significant linkages in the value chain between foreign and Chilean firms, which can be an important channel for FDI spillover.

Attracting more FDI in high-tech manufacturing and knowledge-intensive sectors requires co-ordinated policy action by various institutions, particularly with regard to FDI promotion and facilitation, innovation/R&D policies, and skills policies. Chapter 3 analyses Chile's policy framework for productivity, innovation and skills development in depth and provides policy guidance on how to exploit opportunities brought by foreign investment.

2.4. FDI promotes a more quality jobs and green economy

2.4.1. FDI is directed to sectors with less potential for job creation

Between 2010 and 2020, greenfield FDI in Chile generated more than 106 000 jobs (Table 2.2). About 34% of these jobs were created in mining and energy, a rather small share considering that almost two-thirds of greenfield FDI went to these sectors. About 32% of jobs were created in manufacturing, 26% in services and 7% in construction. These shares are significant given that only a quarter of greenfield investments went to these sectors (10% in manufacturing, 19% in services and 1% in construction). Although these data provide only a partial picture of the employment impact of FDI in Chile, as they do not take into account jobs created through mergers and acquisitions (M&A) and expansion projects, they indicate that a large share of FDI is directed towards sectors with less potential for job creation.

Table 2.2. Between 2010 and 2020, about 32% of jobs created by greenfield FDI were in manufacturing

Greenfield FDI jobs and capital expenditure cumulated between 2010-20

Sector	Number of jobs	Greenfield FDI (million USD)	Jobs (% of total)	Greenfield FDI (% total)
Energy	15 131	35 884	14%	44%
Mining	21 675	22 395	20%	27%
Manufacturing	34 532	7 767	32%	10%
Services	27 847	15 182	26%	19%
Construction	7 076	419	7%	1%

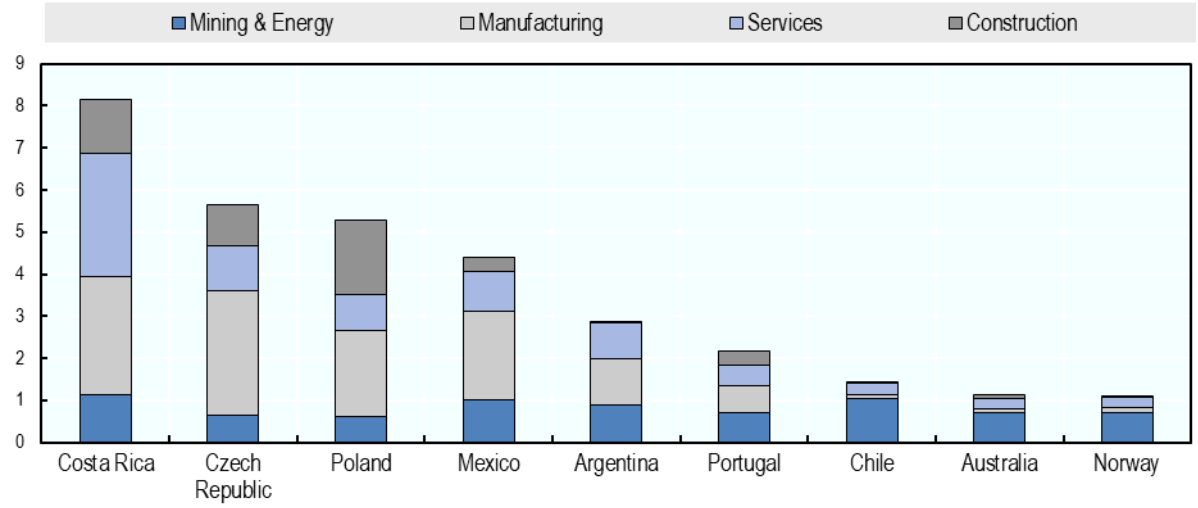
Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

One million dollars greenfield FDI creates fewer jobs in Chile than in other comparator economies, including LAC countries like Costa Rica and Argentina and other small open OECD economies such as the Czech Republic, Poland and Portugal (Figure 2.20). In these comparator countries, an important share of FDI is directed towards manufacturing, services and construction, sectors with higher employment potential. For instance, between 2010 and 2020, about 50% of all jobs created by greenfield FDI in Costa Rica were in the IT and business services and medical devices, which receive about a quarter of greenfield FDI. At the same time, the number of jobs created by greenfield FDI in Chile is similar to that created in other natural resource-rich countries, notably Australia and Norway, which also receive significant shares of greenfield investments in mining and energy.

Information collected by the Chile's Internal Revenue Service shows that foreign firms contribute significantly to employment in all sectors of the economy (Figure 2.21). Unsurprisingly, the contribution to employment is greatest in sectors that receive a higher amount of FDI. In 2020, foreign firms were responsible for about 50% of employment in mining and 44% in finance, sectors that receive important shares of FDI (28% mining and 15% finance according to Central Bank of Chile' data). A significant contribution to employment is also observed in hospitality (41%), information and communication (35%) and energy (35%), while smaller shares are found in education (18%), defence (16%), agriculture (14%) and construction (14%).

Figure 2.20. Greenfield FDI creates less jobs in Chile than in other peers

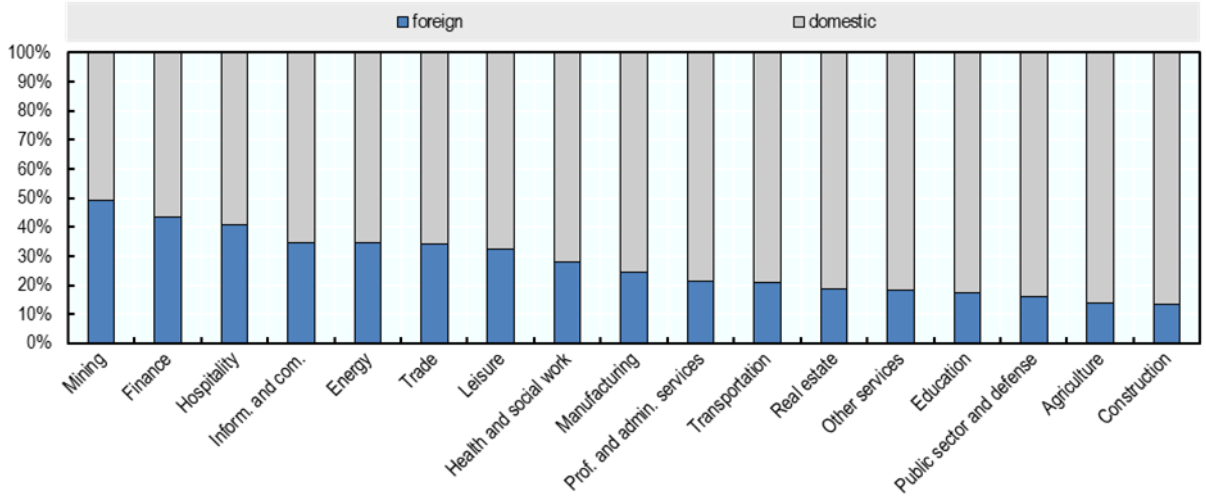
Jobs created by 1 million dollar greenfield FDI between 2010-20 by sector



Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

Figure 2.21. Foreign firms contribute significantly to employment in all sectors

Number of employees by firm ownership (% of total), 2020



Note: Results are based on a subsample of firms with median sales >= USD 100 000 and median number of workers >= 5.
Source: OECD elaboration based on information compiled by the Internal Revenue Service of Chile.

2.4.2. Attracting FDI into high-tech manufacturing and knowledge-intensive services can create better quality jobs

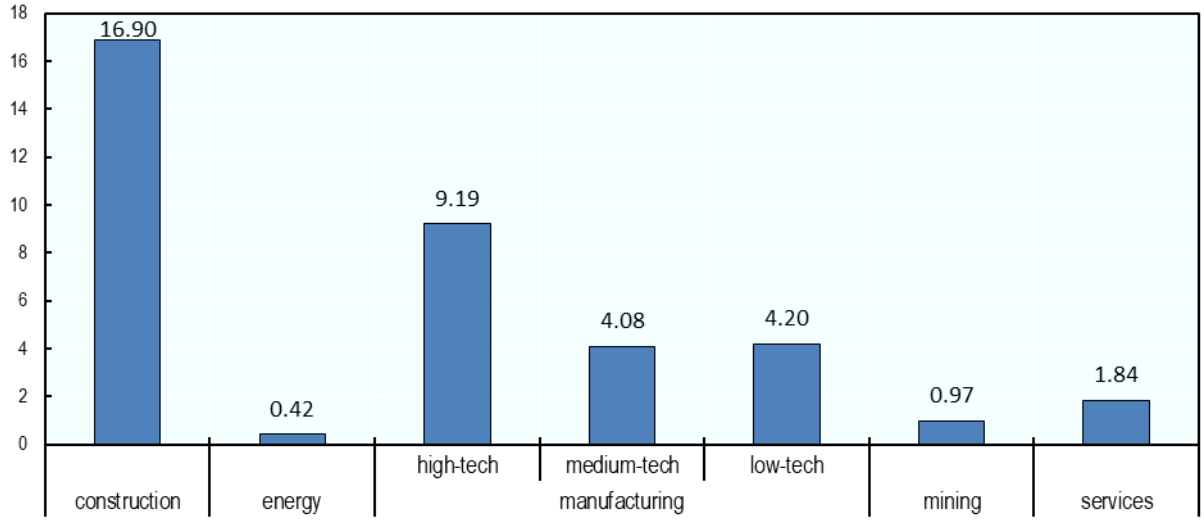
A closer look at the data shows that 1 million dollars greenfield FDI invested in Chile between 2010 and 2021 created the most jobs in the construction sector (around 17 jobs per million greenfield FDI invested), followed by high-tech manufacturing (9), low-tech manufacturing (4) and medium-tech manufacturing (4) (Figure 2.22). Relatively fewer jobs were created in services (2), mining (1) and energy (less than 1). These

aggregate figures hide large heterogeneity within sectors, however. For example, in high-tech manufacturing, 1 million greenfield FDI invested created about 20 jobs in consumer electronics, but only two jobs in biotechnology (Annex 2.C). In medium-tech manufacturing, the highest number of jobs was generated in automotive components, nine jobs, while the lowest number was created in building materials, about two jobs for 1 million greenfield FDI invested. In the service sector, 1 million greenfield FDI created 13 jobs in hotels and tourism and nine jobs in software and IT services, figures well above the sector average of two jobs.

On average, jobs created in high-tech industries and knowledge-intensive services tend to be more skilled than those created in medium- or low-tech manufacturing, mining and construction (although even within these sectors some of the jobs created are highly skilled). Diversifying FDI towards high-tech- and knowledge-intensive activities is therefore likely to create better paid jobs, on average. The analysis conducted with fDi Markets' data shows that within these high-tech and knowledge-intensive sectors some activities have higher job creation potential than others (e.g. consumer electronics or software and IT services), suggesting that attracting more FDI in these activities would not only create more jobs, but also quality jobs.

Figure 2.22. On average, 1 million dollars greenfield FDI creates more jobs in construction and high-tech manufacturing

Jobs created per million dollars greenfield FDI invested by sector



Note: Sectors are classified based on their technology intensity according to OECD (2011[5])
Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

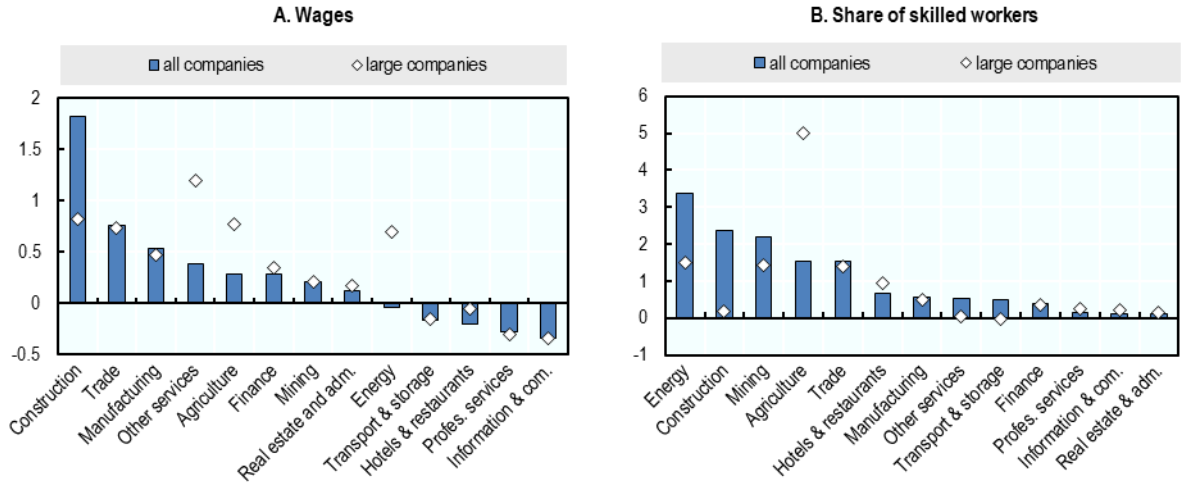
2.4.3. Foreign companies offer better paid and more skill-intensive jobs, including for women

Earlier parts of this report show that foreign companies are on average more productive than Chilean companies. The higher productivity of foreign companies is explained by the fact that they have access to better technology of the parent company. Higher productivity can translate into higher average wages for workers. In addition, the use of more advanced technologies may induce the foreign company to hire more skilled employees or to invest more in training to enable employees to learn or keep up with those technologies.

Analysis based on ELE6 shows that, on average, foreign companies pay higher wages than domestic companies in most sectors (Figure 2.23, Panel A). Interestingly, this result holds even if only large firms are compared.[6] These wage premia are particularly high in construction, trade and manufacturing. The results also show that foreign firms tend to have higher shares of skilled workers than domestic firms in all sectors, particularly in energy, construction and mining (Panel B). These premia persist if only large firms are considered.

Figure 2.23. Foreign firms pay higher wages and are more skill-intensive than domestic firms

Relative gap between foreign and domestic firms (if >0 foreign firms pay higher wages/are more skill intensive than domestic firms)



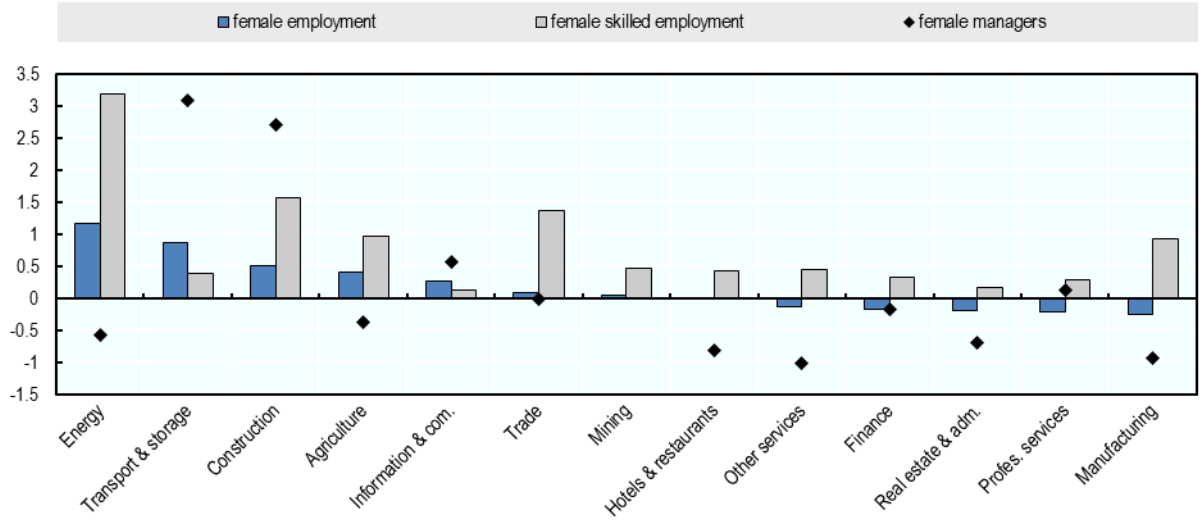
Note: Panel A: Wages: labour costs divided by total number of employees. Panel B: Skilled employees are employees with a university degree or higher. The indicators in Panel A and B show the relative gap between foreign and domestic firms, e.g. (wages of foreign firms – wages of domestic firms)/ wages of domestic firms. Positive values indicate that foreign firms perform better (e.g. pay higher wages) than domestic firms and vice versa. The indicators are calculated for all companies and for large companies only.
Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

The results also show that foreign firms employ higher shares of women than domestic companies in most sectors (Figure 2.24). They tend to employ higher shares of women in energy, transport and storage, and construction, which are typically male-dominated. Moreover, foreign companies have higher shares of skilled female workers (with a university degree or higher) than domestic companies in all sectors. The gap with domestic firms is particularly high in the male-dominated energy and construction sectors, as well as in trade and manufacturing. At the same time, foreign companies have a higher share of female managers than domestic companies in only a few sectors, namely transport and storage, construction, information and communication, and professional services.

An econometric model similar to that used for productivity and export intensity is used to examine whether these foreign premia with respect to employment practices are statistically significant, after controlling for factors such as sector and firm size (Annex 2.B). The analysis shows that foreign ownership has a positive and significant impact on wages, skill intensity and the share of skilled workers, regardless of sector and firm size. In particular, foreign ownership has an impact of about 70% on wages (i.e. foreign firms pay on average 70% higher wages than domestic firms), 88% on skill intensity and 66% on skilled female workers. On the other hand, foreign ownership does not have a significant impact on female employment and the share of female managers, once factors such as sector and company size are controlled for.

Figure 2.24. Foreign firms positively contribute to several gender equality outcomes

Relative gap between foreign and domestic firms (if >0 foreign firms have higher shares of female employees/skilled female employees/female managers than domestic firms)



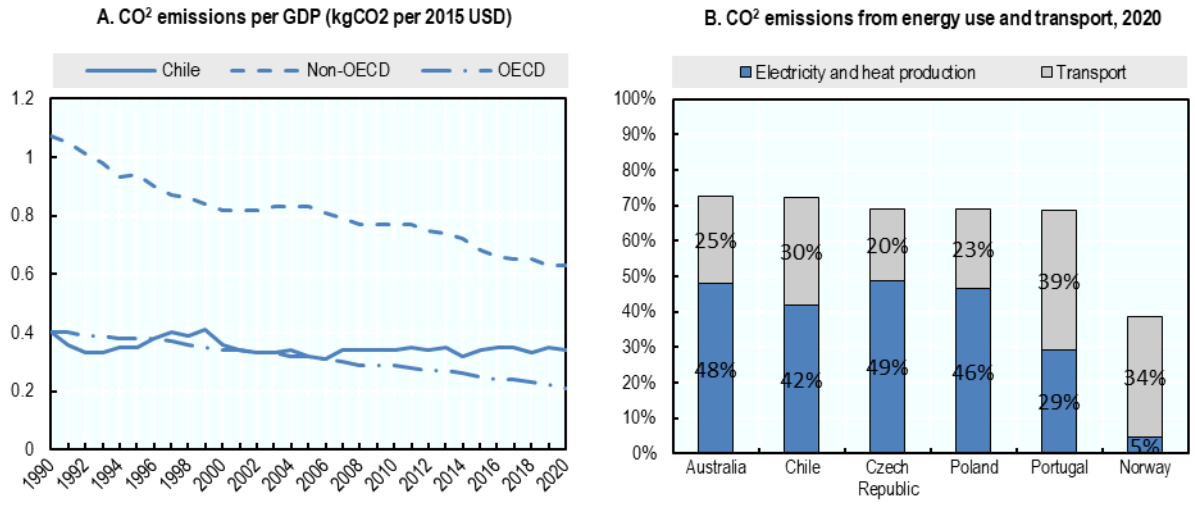
Note: Share of female employees: female employees over total employees; share of female skilled employees: female skilled employees over total skilled employees; share of female managers: female managers over total managers.
Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

2.4.4. FDI growth in renewables is helping Chile curb CO2 emissions

In the past three decades, the level of carbon emissions per unit of output in Chile has been similar to that of the average of OECD countries (Figure 2.25, Panel A). However, while carbon emissions as a percentage of GDP in the average of OECD countries have decreased, they have remained stable in Chile. As a result the divergence between the average of OECD countries and Chile has gradually increased since 2008. During the same period, carbon emissions of the average of non-OECD countries, although higher as a percentage of GDP, have also decreased. The combustion of oil products and coal has been responsible for more than 80% of the carbon emissions generated in Chile over the last decades (IEA, 2022[38]). From a sectoral perspective, electricity and heat production and transport account for the bulk of emissions in Chile: over 70% of all carbon emissions in 2020 (Panel B). These shares are similar to those of other comparator countries.

When divided among end-users, manufacturing industry and construction are responsible for the largest share of carbon emissions from electricity and heat use (60%), followed by the residential sector (20%) and services (15%) (Figure 2.26, Panel A). As emissions from heat account for a minor share, increased reliance on clean energy sources for electricity generation and electrification of the transport sector can lead to significant emission reductions. The rapidly falling costs associated with these technologies open up investment opportunities for the private sector, including foreign companies. The sectoral distribution of greenfield FDI flows in Chile shows an important participation of foreign companies in the electricity sector. In particular, between 2010 and 2020, about 47% of greenfield FDI flows were directed to electricity generation (Figure 2.26, Panel B).

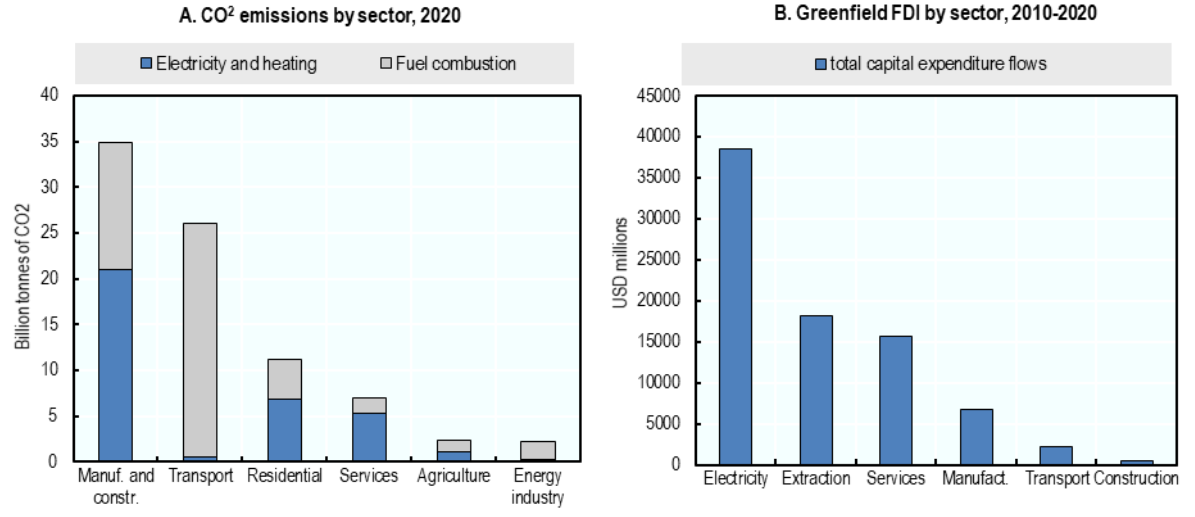
Figure 2.25. Chile's CO2 emissions as a share of GDP have been constant over time



Source: OECD elaboration based on International Energy Agency (IEA) (2022[38]), CO^2 emissions, https://www.iea.org/

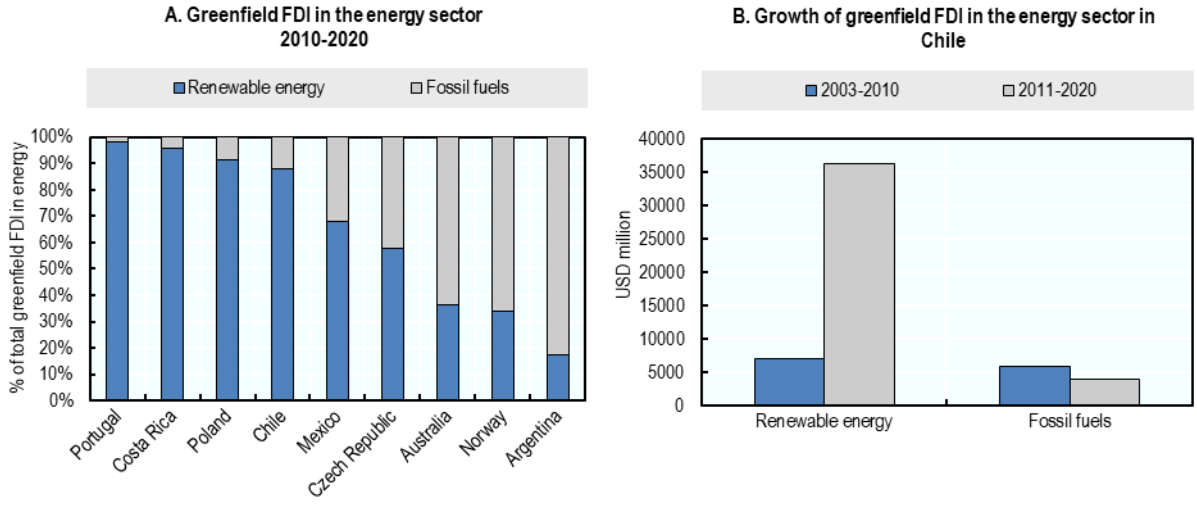
The impact of foreign investors on Chile's carbon footprint depends on whether they promote a shift towards renewable energy. Greenfield FDI data show that between 2010 and 2020, around 88% of greenfield investment flows in Chile's energy sector went to renewable energy, suggesting that foreign companies contribute to the reduction of carbon emissions (Figure 2.27, Panel A). A similar share of greenfield investment in renewable energy is observed in other small open OECD economies, notably Portugal, Costa Rica and Poland, while a higher share is observed in natural resource-rich economies such as Norway and Australia. Furthermore, greenfield investment in renewable energy in Chile has grown significantly over the last decade, while investment in fossil fuels has declined (Figure 2.27, Panel B).

Figure 2.26. Foreign companies invest significantly in electricity generation in Chile



Note: Residential: an energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances.
Source: OECD elaboration based on International Energy Agency (IEA) (2022[38]), CO^2 emissions, https://www.iea.org/; and fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

Figure 2.27. The bulk of greenfield FDI in Chile's energy sector goes to renewables



Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

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Annex 2.A. Sectoral distribution of Chilean and foreign companies in ELE6

ELE6 covers 4 006 Chilean and 391 foreign companies. Chilean companies are concentrated in trade, real estate and administrative services, professional services, and manufacturing. Foreign companies are prevalent in trade, professional services, and finance. Sampling weights provided by ELE6 are used to calculate statistics and indicators as well as in the regression analysis.

Annex Table 2.A.1. Number and percentage of companies in ELE6 by ownership and sector of activity

	Foreign companies		Domestic companies	
Sector	*number*	*percentage*	*number*	*percentage*
Agriculture	7	2%	303	8%
Mining	16	4%	132	3%
Manufacturing	36	9%	407	10%
Energy	11	3%	42	1%
Construction	9	2%	281	7%
Trade	116	30%	1032	26%
Transport & storage	16	4%	227	6%
Hotels & restaurants	4	1%	84	2%
Information & communication	20	5%	120	3%
Finance	55	14%	254	6%
Real estate & administrative services	37	9%	496	13%
Professional services	57	15%	453	11%
Other services	7	2%	175	4%
Total	391	100%	4006	100%

Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

Annex 2.B. Regression results on the effect of foreign ownership on firm performance

Regression analysis is used to examine the impact of foreign ownership on firm performance controlling for sector of activity and firm size. The model is as follow:

$$\log(y_i) = \beta_0 + \beta_1 x_i + \sum_{n=1}^{N} \gamma_n + \sum_{l=1}^{L} \delta_l + \varepsilon_i$$

Where y_i is the performance outcome (e.g. productivity) of firm *i*; x_i is a dummy variable which takes value 1 if firm i is foreign-owned (10% or more of its shares belong to a foreign company) and 0 otherwise; γ are sector-fixed effects (13 sectors), δ captures firm size (5 class sizes) and ε_i is the error term associated to firm i.

Annex Table 2.B.1. Foreign ownership is significantly and positively associated to most performance variables

	log(productivity)	log(export intensity)	log(labour cost per person)	log(share of skilled employees)	log(share of skilled female employees)	log(share of female employees)	log(share of female managers)	log(energy efficiency)
Foreign ownership	0.590*** (0.0788)	0.277*** (0.0994)	0.533*** (0.0529)	0.632*** (0.0751)	0.509*** (0.0713)	0.0829 (0.0513)	-0.158 (0.124)	0.597*** (0.145)
Firm size	-0.267*** (0.0175)	-0.0753*** (0.00961)	-0.238*** (0.0118)	0.242*** (0.0198)	0.295*** (0.025)	0.175*** (0.0145)	0.133*** (0.0307)	-0.214*** (0.032)
Constant	7.764*** (0.15)	0.0629** (0.0318)	7.002*** (0.103)	1.912*** (0.209)	3.030*** (0.246)	2.462*** (0.149)	-0.598** (0.266)	3.794*** (0.441)
Observations	3 701	4 397	3 700	2 710	2 127	3 136	265	2 728
R-squared	0.225	0.067	0.309	0.248	0.183	0.244	0.136	0.273
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES

Note: Sampling weights provided in the Sexta Encuesta Longitudinal de Empresas (ELE6) are used in all regressions. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

The percentage impact of foreign ownership on y_i can be calculated as 100*[exp*(β_1)-1].

Annex Table 2.B.2. Percentage impact of foreign ownership on firm performance

Log(y)	% impact of foreign on Y	Confidence intervals (95%)
productivity	0.80	0.55 – 1.11
labour cost	0.70	0.54 – 0.89
export intensity	0.32	0.09 – 0.60
skill intensity	0.88	0.62 – 1.18

Log(y)	% impact of foreign on Y	Confidence intervals (95%)
skill intensity female employees	0.66	0.46 – 0.91
share of female employees	0.09	-0.02 – 0.20
share of female managers	-0.15	-0.33 – 0.09
energy efficiency	0.82	0.37 – 1.41

Source: OECD elaboration based on Sexta Encuesta Longitudinal de Empresas (2019[8]), https://www.ine.cl/estadisticas/economia/ciencia-y-tecnologia/encuesta-longitudinal-de-empresas.

Annex 2.C. Job creation potential of greenfield FDI

Annex Table 2.C.1. Activities by number of jobs created for 1 million greenfield FDI invested

Sector	Activity	Jobs created per million greenfield FDI
Construction	Hotels & tourism	18.27
	Real estate	13.78
Energy	Renewable energy	0.42
Mining	Metals	1.17
	Coal, oil & gas	0.28
High-tech manufacturing	Consumer electronics	20.34
	Electronic components	12.03
	Pharmaceuticals	4.99
	Business machines & equipment	3.99
	Aerospace	2.94
	Biotechnology	2.34
Medium-tech manufacturing	Consumer products	11
	Automotive components	8.89
	Plastics	6.74
	Minerals	6.10
	Non-automotive transport OEM	5.86
	Engines & turbines	5.09
	Rubber	4.97
	Industrial equipment	4.85
	Automotive OEM	3.9
	Semiconductors	3.89
	Metals	3.33
	Ceramics & glass	3.18
	Chemicals	2.97
	Building materials	2.36
Low-tech manufacturing	Wood products	9.18
	Textiles	5.02
	Food & Beverages	4.44
	Paper, printing & packaging	1.45
Services	Hotels & tourism	13.2
	Software & IT services	8.93
	Healthcare	8.7
	Financial services	2.54
	Business services	2.45
	Real estate	2.02
	Transportation & Warehousing	1.86
	Communications	0.9

Source: OECD elaboration based on fDi Markets (2022[6]), greenfield FDI, https://www.fdimarkets.com/.

Notes

[1] The amount of investments which went to Antofagasta, Atacama and Santiago might be underestimated, since for about 23% of the greenfield projects realised in the period 2010-21, the location is not reported.

[2] Negative FDI positions largely result when the loans from the affiliate to its parent exceed the loans and equity capital given by the parent to the affiliate OECD (2022[42]).

[3] Supplier relationships – when foreign firms purchase inputs from domestic firms – can be a channel for technology and knowledge transfer, for example when foreign firms train suppliers to ensure a certain level of input quality (Javorcik, 2004[40]). Buyer relationships – when foreign firms sell their production as inputs to domestic firms – can help the latter to become more productive mainly through access to better quality inputs (Criscuolo and Timmis, 2017[12]). Many foreign firms in industries such as machinery and the digital economy also offer training to their customers on the use of their products and information on international quality standards (Jindra, 2006[41]).

[4] An earlier version of the report based on the previous version of the survey (ELE5 for 2017) shows slightly different results. According to the indicator based on the ELE5, foreign companies have a productivity premium in all sectors, with the exception of hotels & restaurants and energy. The differences observed between the two surveys are probably related to the different time periods covered and differences in the distribution of companies across sectors. Overall, the results of the two surveys are consistent, as they show that foreign firms are on average more productive in most sectors of the economy. A foreign productivity premium across almost all sectors of the economy is also found using information collected by Chile's Internal Revenue Service. Results are available upon request.

[5] ELE6 does not provide information on R&D activities, so the indicator for R&D activities is constructed using an earlier version of the survey, ELE5 for 2017.

[6] A foreign wage premium is found in most sectors also when using information collected by Chile's Internal Revenue Service. Results are available upon request.