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Experience in Chilean FDI measurement: better data for better interpretation¹

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¹ This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

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ABSTRACT

Foreign Direct Investment (FDI) is very relevant in both the Chilean Balance of Payments (BOP) and International Investment Position (IIP). However, relationship complexity that defines ownership structures of multinational companies, together with transaction multiplicity that takes place under these structures, hinder the level of coverage and accuracy in measurement using available sources of information. This article's objective is to share Chilean experience regarding methods employed to ensure information quality provided by the sources. Along with this, we submit the Chilean FDI collection frameworks, the Central Bank's role and information sources, in terms of its main characteristics, use and statistical data treatment which guarantees a good measurement.

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1. INTRODUCTION

A. MOTIVATION

Foreign Direct Investment is a variable of great interest to economic analysts and the general public. In Chile, investment by non-resident foreigners has a strong impact on productive sectors: Mining, Financial services, Electricity, Gas and Water, Transportation and Industries. On the other hand, Chilean investments abroad, though to a lesser extent, have been introduced into other economies, particularly Latin American ones, in areas such as Mining, Business, Services and Trade.

Cross-border transactions generated by these investments are most relevant in the Chilean Balance of Payments financial account (BOP) and have a similar impact in the International Investment Position (IIP) and in the current account investment's primary income. However, measuring these investments in both flows and stocks is not simple. The complexity of relationships defining multinational corporate structures, coupled with the multiplicity of transactions that materialize under these structures, hinder their degree of coverage and accuracy that can be captured through sources available for this purpose.

The Central Bank of Chile, responsible for the calculation and dissemination of FDI statistics, has developed a compilation strategy to ensure this measurement's quality and accuracy. In methodological terms it means the application of statistical techniques for analysis, validation and imputation of data in order to provide basic information with robustness. The exercise is based on a structured set of related data that provides background information on companies and their corporate structure, which are used as benchmarks in the decision-making process of compilation and gathering. In addition, it has a monitoring and contact policy with the most important companies in order to achieve highest data accuracy from the source. The following article aims to share Chilean experience in these matters.

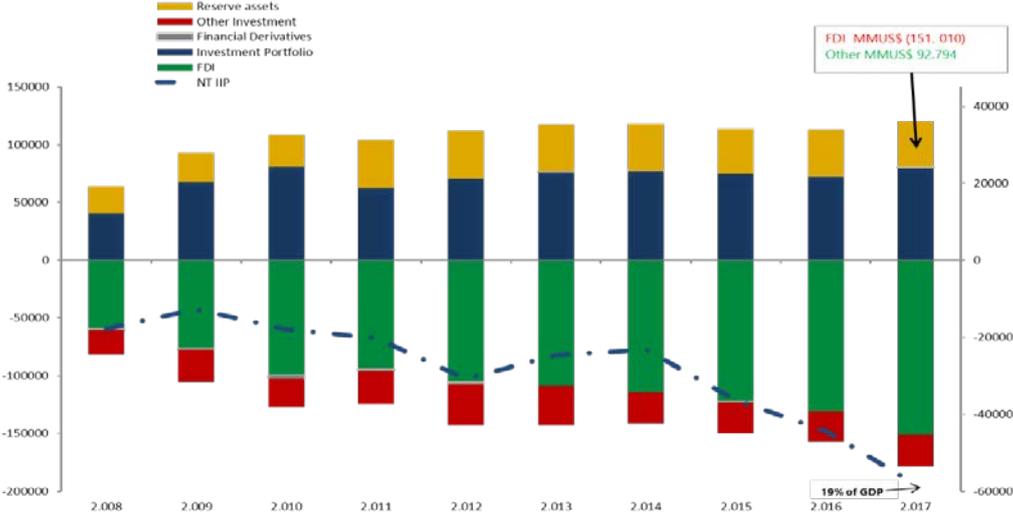
B. CHILEAN FDI IN NUMBERS

In Chile, foreign direct investment is a relevant indicator for the national economy. Large investments that have entered the country to finance production and services projects (financial services mainly), have supported the development of these sectors. On the other hand, to a lesser extent, direct investment abroad has also reached interesting levels in recent years, although it does not reach investment magnitude that comes to the country from abroad.

a. FDI determines the International Investment Position (IIP)'s net debit balance in Chile^{1,2}

International Investment Position (IIP) in Chile reflects a net debit balance which is explained by the FDI, as shown by the series presented in graph number 1. In 2017 this balance reached US\$ 58,216 million, representing GDP 19.9%. Of this total, the FDI's negative net balance was US\$ 151,010 million, which was not compensated by the positive net balance of other functional categories as a whole (US\$ 92,794 million).

Graph N° 1
Chile's International Investment Position by Standardized Components
(Millions of US\$)



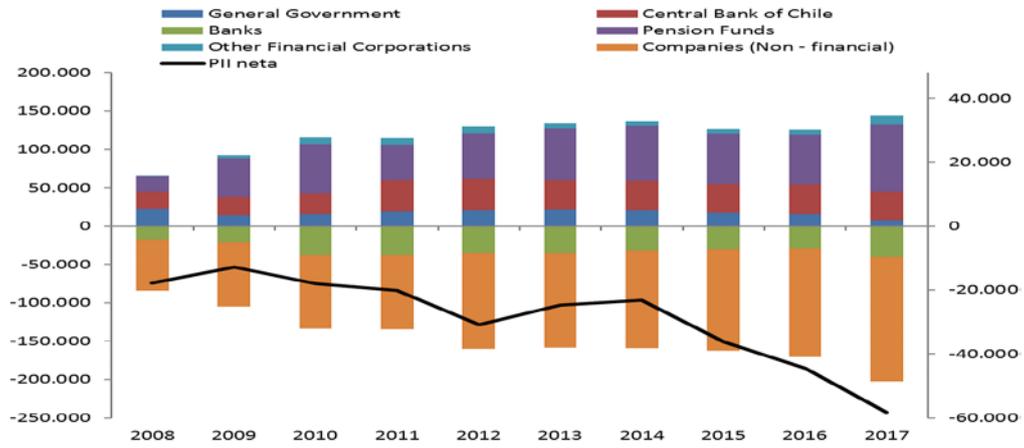
Source: Central Bank of Chile

Institutional sector which explains the IIP's net debit balance are non-financial companies who are, indeed, the largest recipients of foreign investment in the country. In 2017, the IIP's net debit balance in this sector was US\$ 162,483 million (graph 2), of which US\$ 122,949 million corresponds to direct financing from abroad. Regarding the type of financing that Chilean subsidiaries receive from their foreign investors, the majority corresponds to capital contributions, although since 2013 there has been financing by debt, as can be seen in graph 3.

¹ Balance of payments (BOP) and international investment position (IIP) statistics are compiled according to criteria and recommendations of the Balance of Payments and International Investment Position Manual, 6th version (BPM6) of the International Monetary Fund (IMF).

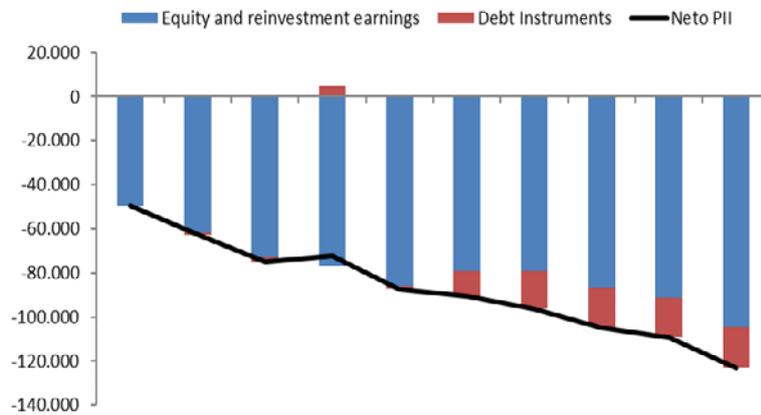
² The aggregated FDI statistics are disseminated with the monthly publication of Balance of Payments Financial Account and quarterly along with the Balance of Payments and International Investment Position. These figures are reviewed in accordance with the Central Bank's policy. The publications calendar and revision policy are available in: <http://www.bcentral.cl/web/guest/calendario-estadistico>

Graph N° 2
Chile's International Investment Position by Institutional Sector
(Millions of US\$)



Source: Central Bank of Chile

Graph N° 3
Chile's International Investment Position of Companies Sector by Instrument
(Millions of US\$)



Source: Central Bank of Chile

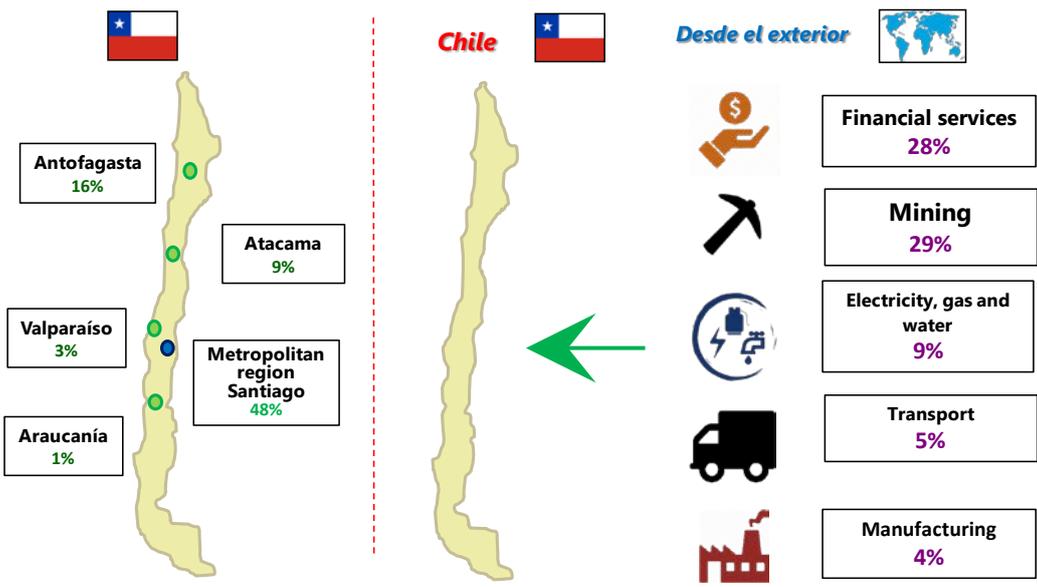
b. Detailed FDI statistics³

In addition to aggregated FDI statistics regularly disseminated by the Bank, detailed information is published annually which allows us to better characterize and understand this phenomenon in the country.

In Chile investment projects are carried out throughout the territory, however, according to 2016 results, country regions where foreign direct investment is mainly reflected are: Metropolitan (capital), the regions of Antofagasta and Atacama (North) and, to a lesser extent, in Valparaíso and La Araucanía. By economic sector, the main activities financed by foreign capital in our country are Financial services and Mining. Other sectors such as Electricity, Gas and Water (EGW), Transport and Industry also benefit from this financing (See figure 1).

Although there are no crossed statistics (published) for these two variables (economic sector and region), it is possible to relate the fact that the North's main investments are precisely mining, given region conditions, while the financial sector stands out in the capital.

Figure N° 1
Chile's 2016 FDI by Region and Economic Sector
(Percentage of total FDI Stock in Chile)

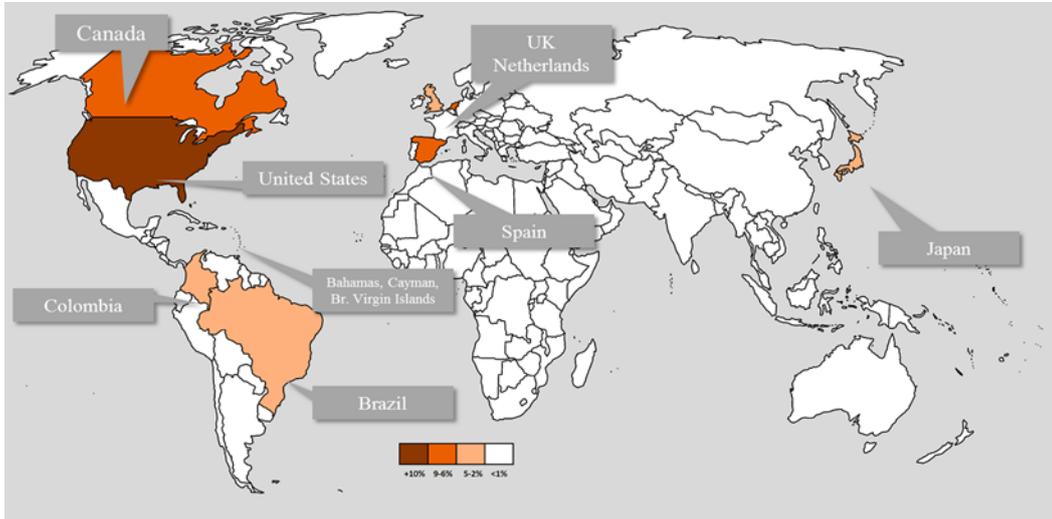


Source: Central Bank of Chile

In terms of investment origin, the main countries from which these investments come from are, as shown in figure 2: Canada, United States, Spain and some regional partners such as Brazil and Colombia.

³ FDI statistics by partner country and by industry are compiled under recommendations of the OECD Benchmark Definition of Foreign Direct Investment, fourth version (BMD4) and published annually on the Bank's website, in the following link: http://si3.bcentral.cl/estadisticas/Principal1/Excel/SE/BDP/xls/IED_pais_sector_region.xlsx

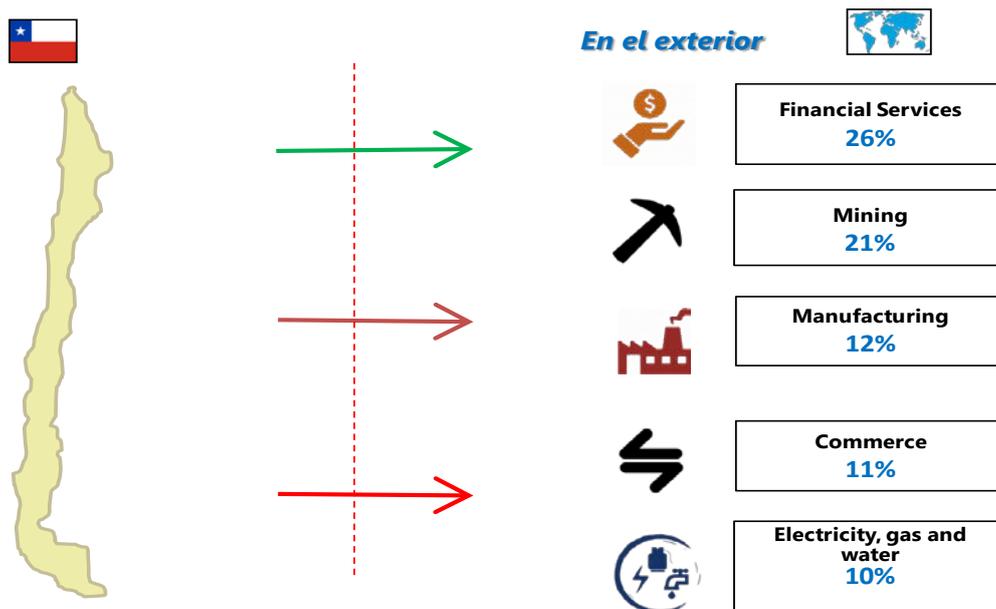
Figure N° 2
Chile's 2016 FDI by Country of Origin
(Percentage of total FDI Stock in Chile)



Source: Central Bank of Chile

Regarding investments maintained by Chile abroad, these are mainly concentrated in the Financial and Mining Sectors. They are followed by Industry, Commerce and EGW in relevance. Figure 3 shows the relative importance of each sector according to 2016 results

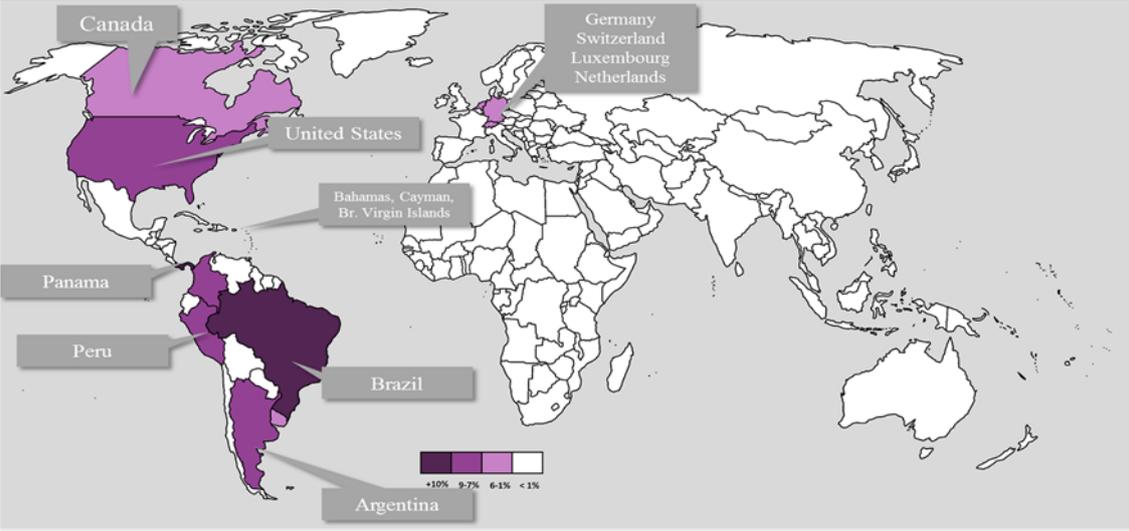
Figure N° 3
2016 FDI abroad by Economic Sector
(Percentage of Total FDI Stock in Chile)



Source: Central Bank of Chile

By geographical destination, the investment of our economy's residents is preferably done in Latin America, as can be seen in figure 4.

Figure N° 4
Chile's 2016 FDI by Country of Destination
(Percentage of total FDI Stock in Chile)



Source: Central Bank of Chile

In the remainder of this document we will see framework for FDI data collection in the Chilean economy and the Central Bank's role (section 2) and then, in section 3, review sources of information used in the compilation of these statistics. Section 4 describes strategies the Bank has adopted to ensure FDI measurement quality, particularly foreigner investment made in the country, and project improvement regarding the subject. The document ends with a summary of the main points addressed in section 5's closing comments.

2. FRAMEWORK FOR COLLECTION OF INVESTMENT DATA IN CHILE

A. CENTRAL BANK'S ROLE IN THE ELABORATION AND DISSEMINATION OF MAIN MACROECONOMIC STATISTICS

The Central Bank of Chile (CBCH) is an autonomous body governed by its 1989 Organic Constitutional Law (LOC) N° 18,840, which establishes its nature, objectives, faculties and responsibilities, as well as its power and available resources to meet these objectives and functions.

The LOC (Article 53) and National Statistical Compilation Plan⁴ establish that the Central Bank is responsible for compiling and publishing the country's main macroeconomic statistics in a timely manner, including National Accounts, Balance of Payments, Monetary Statistics or other global systems of economic or social accounting. This LOC also establishes public entity obligation to report to the Central Bank. However, there are no legal precepts that force private institutions to report to it for statistical purposes, except in matters pertaining exchange regulation.

In Chile there is freedom of exchange, thus every natural or legal person can freely carry out international exchange operations. These include the purchase and sale of foreign currency, as well as acts and conventions that create, modify or expire a payable obligation in foreign currency, though they do not necessarily involve transferring funds or money orders from Chile abroad or vice versa. The above notwithstanding, Bank may impose exchange restrictions under certain circumstances, such as an obligation to use the Formal Exchange Market (FEM)⁵ and report in case of specific transactions.

Regulation of international exchange operations is expressed in the Compendium of International Exchange Regulations (CIER), which we will address in point B, below.

B. COMPENDIUM OF INTERNATIONAL EXCHANGE REGULATIONS (CIER)

The CIER corresponds to an integrated information framework associated with international exchange transactions, which includes: (i) the code system for daily reports of these transactions being carried out in the Formal Exchange Market (FEM), (ii) additional questionnaires used for consulting further detail on specific operations, and (iii) instructions and regulations. Corresponds to a simile of what is known as the International Transaction Reporting System (ITRS).

In 2001 capital controls in Chile were liberalized, resulting in the reformulation and adaptation of the old Exchange System Position to serve its new role in support of the Bank's regulatory tasks in exchange matters and as a source of information for statistical purposes. Among the adaptations made to the CIER are balance, flow and income reports from investments abroad, as well as transport and insurance services.

In 2010 some modifications associated to forms that collect foreign direct investment information were incorporated in order to capture background information recommended in the OECD's Benchmark Definition of Foreign Direct Investment (version 4). Information collected based on reformulated questionnaires was applied for the first time in the 2012 compilation, year of MBP6's implementation.

⁴ The National Plan of Statistical Compilation, annually published by the National Statistics Institute of Chile, accounts for responsibilities of public institutions (and select private ones) in the country's compilation of statistics.

⁵ FEM entities that can operate in Chile are listed in Chapter I Annex 5, Index of the Compendium of International Exchange Regulations (CIER). Chapter III of the same compendium, Annex 1, establishes the requirements to be part of Chile's FEM.

The CIER⁶ is structured in chapters and annexes according to the different exchange issues it addresses. It includes a description and instruction manual along with specific questionnaires for operations in which the Bank requests further detail. Chapters XII and XIV manage regulations associated with investments abroad, as well as investments from abroad. This framework provides, in the Chilean's case, information for the compilation of direct foreign investment as explained in the following section.

3. DATA SOURCES FOR MEASUREMENT IN CHILE OF DIRECT FOREIGN INVESTMENT

Basic information for the compilation of Chilean Foreign Direct Investment (FDI) statistics mainly comes from data collected in the exchange regulation framework carried out by the Central Bank through CIER. Although this is a fundamental tool in data collection, in some cases it does not cover the level of detail required by the compilation, so additional collection instruments are necessary to cover the measurement, as is the case of surveys.

In the following section we will review FDI compendium consultation forms, structure and coverage, and the annual FDI survey in Chile.

A. CIER QUESTIONNAIRES ASSOCIATED WITH INVESTMENTS IN CHILE AND ABROAD

a. Investments abroad – CIER Chapter XII

CIER's Chapter XII establishes rules applicable to currency remittance or disposition of funds that people residing in Chile send or use abroad for the purpose of making investments, establishing deposits or granting credits. These operations must be carried out through the Formal Exchange Market (FEM).

Chapter XII includes the following documentation: a section with the general dispositions and 4 forms (questionnaires) through which details of foreign exchange investment transactions of Chilean residents abroad are requested, particularly direct foreign investment.

General dispositions indicates regulations related to procedures, terms, conditions and forms that people must use to provide the Bank with information on the operations referred to in Chapter XII of the compendium.

Foreign exchange transactions associated with foreign investment are collected through certain codes⁷ when transactions are carried out through the FEM. Requested annexes associated with these operations are:

- Annex 1: Investments made and payments received directly abroad.
- Annex 2: Investments of insurance, mutual and investment fund companies abroad.

⁶ The CIER standard and forms are available on the Central Bank's website:

<http://www.bcentral.cl/web/guest/politica-financiera>

⁷ Exchange position codes employed to record these operations in the FEM are detailed in Annex 1 of CIER's Chapter I: http://www.bcentral.cl/documents/20143/32019/bcch_archivo_091606_es.pdf/cd2db162-5cf3-48e7-eef0-db6c834a6ff0

- Annex 3.1: Report of investments abroad.
- Annex 3.2: Supplementary information on assets informed in this manual's Chapter XII, Annex 3.1.

Annexes 3.1 and 3.2 are key in FDI data collection. Through them, information is collected on abroad investments of the companies' sector, both direct foreign investment as well as of other types maintained abroad: investment in shares, loans granted, deposits, etc. While annex 3.1 collects aggregated information and has a higher periodicity, annex 3.2 queries additional information on operations reported through annex 3.1 on an annual basis. Table 1 summarizes information that is collected from these forms, their periodicity and some characteristics⁸.

Table N° 1
Information Compiled Through Annexes 3.1 and 3.2 of CIER's Chapter XII

Annex	Data collected	Other characteristics
Annex 3.1	1) Equity and debt instruments 2) Stocks at the beginning and end of period 3) Transactions (contributions/withdrawals) 4) Utilities/losses 5) Dividends/Interests	- Reports are submitted to the Bank on a quarterly basis (45 days after quarterly closing and 60 days after in the year end). - Reports are accumulated to each period. - The report is divided into two sections, one for FDI and the other covers remaining instruments. - Queried regarding relationship with the investment's counterpart.
Annex 3.2	Detail by instrument: 1) Annual stocks by country 2) Annual stocks by economic sector	- The report is annual (60 days after the year's end). - Queried regarding relationship between investment reporter and counterpart.

Source: Self made

b. Investments from abroad - CIER's Chapter XIV

CIER's Chapter XIV regulates normative pertaining to international exchange operations related to loans, bonds, deposits, investments and capital contributions that generate obligations for Chilean residents with the abroad⁹. That is to say, it regulates investments that non-resident foreigners make in the country, as well as debt operations that national residents contract with other economies.

⁸ The annexes associated with this chapter are available on the Bank's website:
<http://www.bcentral.cl/web/guest/cnci-manual-de-procedimientos>

⁹ More information on Chilean investment entry mechanisms in the document "Direct Foreign Investment in Chile: Input Mechanisms and Compilation for the Balance of Payments" of Chackiel and Orellana, 2014. Economic and Statistical Studies N.°109 - November 2014.

<https://si3.bcentral.cl/estadisticas/Principal1/Estudios/SE/BDP/see109.pdf>

Chapter XIV includes the following documentation. A section with general dispositions and 6 forms (annexes) through which details of exchange operations related to resident obligations with the abroad are requested.

The main requested annexes associated with these operations are:

- Annex 1: Information on credits, bonds and payment plans.
- Annex 2: Information on payments of external credits made directly abroad.
- Annex 4: Investments, deposits and capital contributions not entered into the country and/or paid abroad.

Unlike what happens with Annexes 3.1 and 3.2 of Chapter XII, the forms associated with Chapter XIV do not provide details for operations pertaining to FDI equity contributions collected through codes of exchange positions¹⁰. Specific information of these questionnaires is associated mainly with foreign debt operations.

To complement Chilean FDI information, the Annual Survey of Foreign Investment in the economy is used, which will be detailed below.

B. ANNUAL FOREIGN DIRECT INVESTMENT SURVEY IN CHILE

The FDI survey complements information needs not covered by data collected under CIER's chapter XIV.

Here are some characteristics of the survey:

- a. The survey is carried out annually and aimed at companies that receive direct investment. They are consulted regarding their external liabilities of the period prior to the consultation year.
- b. In 2017, 462 companies were consulted regarding their results in 2016 with a response rate of 77%. The FDI stock of these companies represented 80% of total FDI stocks in the country, collected in the BOP's aggregate measurement.
- c. Enquiring about investment sector, the country's region where project investment is materialized, transactions and equity and debt positions are carried out with the headquarters and related enterprises.
- d. The latest series of detailed FDI statistics published covers the 2009 to 2016 period. These figures are published with annual lag.
- e. The questionnaire currently used was implemented in the IMF's BPM6 adoption exercise, and recommendations of the OECD BMD4, criteria that Chile incorporated from official 2012 BOP and IIP measurements. The main criterion incorporated in the form was the Framework for Direct Investment Relations¹¹ (FDIR).

¹⁰ The codes of exchange position used to record these operations in the FEM are detailed in Annex 1 of CIER's Chapter I:

http://www.bcentral.cl/documents/20143/32019/bcch_archivo_091606_es.pdf/cd2db162-5cf3-48e7-eef0-db6c834a6ff0

¹¹ This framework indicates criteria to determine if a financial transaction on cross-border property becomes a direct foreign investment relationship. In addition to the parent company's relationship with its subsidiary, it recognizes the subsidiary relationships with parent and related companies, that is, those that have the same direct or indirect investor, but none of which is an immediate or indirect investor of the other.

- f. The first consultation carried out under this framework was in 2010. In 2014, two modifications were incorporated into the questionnaire. The first to collect further detail regarding the investment's economic sector and the second is an additional query that requests information regarding the country regions where investment projects are located.

Table 2 shows survey structure with a brief description of these. See main sections detailed in annex 1.

Table N° 2
Sections of the FDI Survey in Chile (2017 version)

Section	Description	Comment
Section A	Company background and who answers the survey.	This information feeds the directory of companies.
Sections B and C	Unit of measurement and patrimony.	
Sections D and E	Economic activity and region where the investment project is located.	Reporting company is asked to classify at least three levels of activity and sub activity according to ISIC rev. 4. In addition, they are asked to indicate the main country region where investment is made.
Section F	Contributions of capital from the parent company or related.	Reporting company is asked to report its capital and debt identifying the FDI relationship it maintains with its foreign counterpart.
Section G	Debt (bonds, loans, commercial loans and other payable bills) with headquarters or related.	
Section H	Respondent's comments or observations.	Reporter is asked to give more details about their answers in prior sections or to express any information they consider relevant.

Source: Self made

Sections F and G are the heart of the form as they collect data on FDI equity and debt with country breakdowns and identifying relationships. Section F has two subsections, F.1 and F.2, to distinguish between equity contributions with both the parent and related companies. While section G separately enquires through different debt instruments: bonds, loans, credits between suppliers (foreign trade) and other liabilities. For simplicity's sake, both sections integrated in table 3 are presented.

Table N° 3
Sections F and G of Chile's FDI Survey

	Beginning Balance	Contributions/ Disbursements	Withdrawals/ Payments	Other Variations	Final Balance	Profits/Losses or Interest	Percentage regarding final balance		
							Direct/indirect controller	Subsidiaries	Related Company
Country 1									
Country 2									
Country 3									

Source: Self made

Data collected through survey sections provides a very complete, consistent and comprehensive FDI information database at the microdata level. However, all basic information requires statistical processes and analysis to ensure data validity. In the annual FDI survey's case, these processes are aimed at validating: (i) that elementary relationships are met (Final Balance = Beginning Balance + transactions +

other variations, or that the other variations are kept at reasonable levels regarding initial stock, for instance); (ii) that changes in the investment's country of origin are well registered (that both rebates of positions in the country of investment exit and transactions that explain liabilities that come from a new country of origin are recorded accurately); or (iii) ensure report continuity (companies do not respond every year, generating information discontinuity), among other things.

To ensure the integrity and consistency of background data collected through survey, the Bank's external statistics area applies a very thorough analysis and validation process to information, thus ensuring both basic data quality and robustness of the compilation. Process is explained in section 4.

4. STRATEGIES TO ENSURE FDI MEASUREMENT QUALITY IN CHILE

The FDI survey is a base for detailed measurements of direct foreign investment in Chile, as noted in previous sections.

Like any data collection instrument, before being used in the compilation it requires information validation processes and estimates of missing data or corrections.

Below we present the statistical process followed in the detailed calculation for Chile's FDI, whose purpose is to optimize basic information and deliver a quality measurement through 3 areas of work: method, information and continuous improvement.

A. COMPILATION METHOD AND PROCESS FOR EXECUTING THE CALCULATION

Validations and imputations

In terms of methods and processes, the most important tasks have been carried out at the microdata level through validation, imputations and analysis of basic data procedure.

First of all, there is a standardized exercise to diagnose basic data, using predefined criteria to accept, eliminate and replace information from the source, according to survey field and section. Together with this, references were established to be used in comparison, validation and decision making.

Sources or references used in the procedure include:

- Company historical background, which are part of the external statistics records (information from previous surveys, past and current corporate structures).
- Reports, company's financial statements and administrative records such as: Internal Revenue Service (IRS) and the Financial Market Commission (FMC)¹².

Table N°4 presents the main validation and attribution mechanism according to survey field and section.

¹² The Financial Market Commission (FMC) is a body of the public sector whose mission is to ensure the proper functioning, development and stability of the financial market, in addition to ensuring that the people or entities audited, from its induction until the end of its liquidation, comply with laws, regulations, statutes and other provisions that govern them.

Table N° 4
Review, Validations and Imputations Outline Carried Out on Basic Information
Reported in the Survey.

Section	Field	Validation	Reference	Type of check	Imputation/Decision
B, F and G	Currency	The measurement unit used in answers in sections F and G does not correspond to the one declared by company in section B.	Previous surveys.	Comparison of measurement unit used in previous surveys.	Correct according to history and coherence.
D	Economic sector	Companies' self-classification check.	Economic classifiers used in macroeconomic measurements (CAE, see note 17), Internal Revenue Services (IRS).	Company information is compared with standardized classifications and activity category according to IRS.	Classification is updated in case of inaccuracy.
F and G	Stocks	Consistency: "Final Balance = Beginning Balance + Transactions + Other Variations"	Survey data.	If equality is not met, the equation is adjusted.	Differences are imputed to transactions.
	Continuity	Some companies do not answer every year.	Previous surveys, information from Internal Revenue Services (IRS) or Financial Market Commission (FMC)	It's validated, using information from IRS and FMC, if the company is operating in the period analysed. Continuity is reviewed at the country level.	Imputation of stocks at the country level are attributed according available data from surveys.
	Countries	Changes in countries from which the investment originates.	Previous surveys.	Historical country structure and company background are compared (corporate structures, company geographic disposition).	If country change is consistent, stock rebates and increases are adjusted through flows. If it is not coherent, country historical structure of countries is attributed.
F.2 and G	Relationships	Changes in historical relationships.	Previous surveys.	Historical country structure and company backgrounds are compared (corporate structures, company geographic disposition).	If relationship change is consistent, the information is updated. If it is not coherent, historical relationship is attributed.

Source: Self made

Methodology

Methodologically speaking, the latest method optimizations have pertained primary income calculation and reinvestment of earnings for non-mining companies and not belonging to the banking sector¹³, together with debt improvements. In the first case, income and reinvestment of earnings, estimation of these variables for companies without information was refined, structuring the process and establishing reference groups for said estimation. At the same time, in order to maintain consistencies between external sector measurements, FDI debt from the compilation of External Debt was correlated with

¹³ Mining sector and bank income is derived from the aggregate BOP calculation, which is based on accounting information from these sectors. The distribution by countries in both cases is achieved using survey structures.

calculation of FDI debt stocks from the detailed calculation (country - sector) that the survey information is based on. This last exercise was carried out for loans and bonds.

a. Primary income calculation and reinvestment of earnings.

In the Chilean balance of payments, calculation of reinvestment of earnings is residual, first estimating incomes and then, by difference, between the period's profits and dividends paid. In the case of the calculation detailed by country and sector, a similar calculation is made, but at company level, based on information provided by the survey. In cases where the survey does not provide any background information, missing utilities are estimated based on information available in the same survey.

The calculation is based on two aspects: (i) considers additional sources to complete missing data and (ii) estimates by sector, as described below.

a.1. Basic information corresponds to company income and dividends reported through the survey, which is grouped by company and economic sector. When data is not available from the survey, information is supplemented with financial statement data. In the case of paid dividends, information on change position (ITRS) is also used.

a.2. For the cross of sector i with company j , profit ratio is defined as: $ratio_{ij} = profit_{ij}/(initial\ equity\ stock)_{ij}$. Extreme ratio values for sector i are eliminated, and a representative ratio for the sector is calculated as a median, based on calculated ratios. This value, the median, is used to estimate company income in sector i , without information. Implicitly reinvestments are obtained (primary income - paid dividends).

a.3. If the number of companies by sector with income information turns out to be unrepresentative, an average ratio based on the companies' annual sample is used as an estimate, excluding the sector.

b. FDI debt

The calculation of External Debt identifies debt derived from direct investment. There is information of debt stock by company associated with FDI for bonds and loans ¹⁴.

For consistency purposes in the calculation of external statistics, obligations pertaining loans and bonds obtained from the survey are replaced by external FDI debt statistics¹⁵. Debt associated with commercial loans, financial leasing and other payable bills is taken from what is reported in the annual FDI survey.

Systematization

In terms of information management, there is a data storage system organized in databases (ACCESS bases) that stores all information gathered from surveys, as well as imputations made to basic information at microdata level.

The information is codified (each survey section and field), versioned according to survey and review year. It should be noted that a homologation progress of survey fields and sections has also been carried out since the structure has been modified over the years (point f on survey characteristics in section 3, subsection B). Base keeps track of changes and of analyst responsible for updates.

Data is accessed through predefined queries according to aggregation or desired detail. It is expected to pass these processes to more efficient statistical programs such as SAS¹⁶ in the mid-term.

¹⁴ The basic data on debt in loans and bonds contracted with external creditors originates from annexes 1, 2 and 4 of CNCI's chapter XIV referred to in section 3.

¹⁵ There are no relevant inconsistencies between data, CNCI and Survey in general.

¹⁶ SAS (Statistical Analysis System) is a software for data analysis consisting of module sets capable of delivering results from different processes such as regression, variance analysis, basic statistics, frequency distribution,

B. DIRECTORY OF COMPANIES AND CORPORATE STRUCTURE INFORMATION.

The advantages of having a good company directory are important in the context of macroeconomic measurements, such as having good methods and calculation processes.

Indeed, a good directory can be used in the measurement of all products in a statistical area allowing homogenous information for all, avoiding duplicated information or partial data updates. Ensures consistency in definitions, in methodologies and classifications used; it is the basis for sample selection (sample used in the annual FDI survey, for instance), and the identification of subgroups with specific characteristics.

Within the agenda of the external statesmen area, directory maintenance is carried as a part of permanent team tasks. Each of these exercises aims to add tool potential, thus the most recent maintenance has been focused on: modernizing the repository that stores this information, incorporating background information to better characterize companies and updating activity classifiers in line with those used in National Accounts.

Directory of External Statistics Companies

The directory is based on information regarding companies that carry out international exchange operations through the formal exchange market. It is reviewed and updated in terms of eliminating duplicate information, completing pending information and incorporating new information.

Information stored for each company considers: company identification number (ID), company name, validity (start date/expiration date), FDI company (start/end), resident (yes/no), institutional sector, public/private company, active/liabilities, economic activity (CAE¹⁷, ISIC), export/import, responsible (in case of modifications).

The storage of information is handled in a database under a star model, which can be defined as a central set of considered as main variables connected to classification boards that allow adding and crossing information in different ways. Currently information is worked with ACCESS database, but is planned to transfer to another platform, probably SAS.

Corporate structure

The way multinational companies organize themselves largely determines how capital flows move between investors and direct investment companies. For this reason, it has been deemed important to understand their corporate structure, amongst aspects to be known about the companies, and handling this precedent linked to characterization managed by the directory of enterprises.

There have been three corporate information collection exercises of FDI companies in Chile (2015, 2016 and 2017). In the first two exercises, 2015 and 2016, a set of corporate diagrams of Chile's main investment companies was achieved. In the last exercise of 2017, it was sought to manage storage and characterization system that would allow the automated structure schematization and a follow-up and

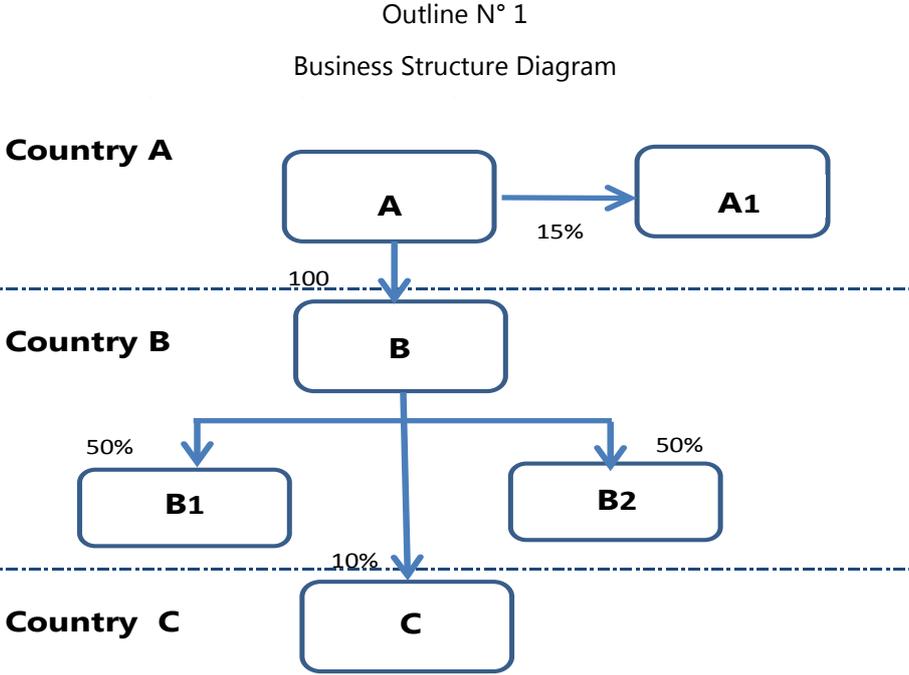
multivariate procedures capable of handling large information volumes. The Central Bank Statistical Division is in a plan to integrate its collection and compilation processes in SAS

¹⁷ CAE (Economic Activity Classifier). This classifier sorts companies according to their economic activity and corresponds to the official used in the compilation of National Accounts in Chile. It is based and correlated to the International Standard Industrial Classifier (ISIC review 4).

updating protocol was defined, so that it would be a tool of permanent use in decision making regarding gathering and compilation processes.

Characteristics of the corporate structure's base

- a. It feeds off of information from company reports and financial statements, backgrounds (news, company websites or other) taken from the Internet, administrative records (IRS, FMC). With this information, a series of indicators are constructed to identify the role played by companies that are part of a corporate group.
- b. Company groups and subgroups are defined identifying their relationship, that is, whether they are investors or investment companies regarding the company in Chile.
- c. The information, for now, is stored codified and organized in Excel files. Through a process, related information is unified in such a way that a special program (VISIO¹⁸) uses it to generate diagrams with the society structure of the group or subgroup.
- d. Let's suppose we have company A in country A, which has subsidiary B in country B (compiling economy) and subsidiary A1 in the same country (A). In turn, company B has direct investments in country C, materialized in company C, and investments in its own country (B) in companies B1 and B2, as shown in outline 1.



Source: Self made.

¹⁸ VISIO is an Office tool that enables, simplifies and communicates complex information with diagrams of linked data.

- e. To be able to represent these outlines in an automated way through the VISIO program, some indicators of position and relation between companies were defined and the new dataset was stored in a matrix manner as shown in outline 2.
- f. Main indicators are "group_ID" that defines the corporate group to which companies belong and "ID_geo" that indicates where they are geographically, that is, whether in the compiling economy (code 0) or outside the country. If it is outside the country, code 1 will indicate that it's a foreign investor and code 2 is a subsidiary company for the compiling economy, country B in our example. In outline 2 we can see that matrix 1 reflects this background and that matrix 2 records company relationships through voting power percentage that parent companies maintain with their subsidiaries. Both matrixes are correlated and provide information to draw the corporate outline.

Outline N° 2
Information Matrixes

Matrix 1

Comany name	ID	Country	ID_group	IED_geo
Company A	11111	A	25	1
Company A1	11143	A	25	1
Company B	22222	B	25	0
Company B1	22254	B	25	0
Company B2	22286	B	25	0
Company C	33333	C	25	2

Matrix 2: Relationship between companies

	Company A	Company A1	Company B	Company B1	Company B2	Company C
Company A	-	15%	100%	50%	50%	10%
Company A1	-	-	-	-	-	-
Company B	-	-	-	50%	50%	10%
Company B1	-	-	-	-	-	-
Company B2	-	-	-	-	-	-
Company C	-	-	-	-	-	-

Source: Self made

C. REVIEW OF FDI SURVEY FORMS - EVALUATION STAGE

Along with maintaining measurement standards (methodologies) and updated information (directories) that ensure compilation quality, it is also important to continuously monitor the information collection instruments. This is how the FDI survey has not been a static instrument over time, but has undergone modifications in order to capture more and better information on Chile's FDI. Such was the case of incorporating consultations on economic activity with a higher level of sector specification and consultations on the region where the investment project was carried out in 2014. All of which makes the captured data a powerful and reliable element that responds to analyst and user demands.

Following above considerations, the form is being reviewed again in order to continue improving and enhancing it. This time focus is on facilitating respondent reports in the following areas:

- A simpler and more direct in line form with the company's accounting record.
- Improve form's online interface by providing the respondent with better descriptions and information that simplifies survey completion.
- Strengthen closeness with respondent through contact that allows supporting them by answering questions about the form (meetings with leading companies, for example).

As part of the project definition, starting an evaluation stage that will lead to the definition of what should be part of the work plan has been considered beforehand.

This stage, currently under development, has considered training compilers in matters of accounting regulation. Understanding accounting systems is basic for the connection between compiler and reporter, and fundamental in the definition of a simplified questionnaire such as the one proposed. In this sense, training activities have already been organized for analysts on these issues, taking advantage of external experiences as Bank interns.

On the other hand, meeting cycles have been organized with the main companies receiving foreign investment in Chile, collecting their opinions on the survey which will be an input in defining an updated form.

At the end of this phase an evaluation will be carried out and define an implementation plan according to what the evaluation indicates.

5. CLOSING COMMENTS

- Foreign direct investment (FDI) is a relevant statistic in the globalized economy, especially linked to the financing of Multinationals. The different ways in which these companies who cross production frontiers are organized have an impact on FDI measurements.
- In Chile, FDI is particularly relevant within macroeconomic variables that impact the country's economy, specially investment that comes from abroad. In terms of results, investment of non-residents in the country are so relevant that they determine IIP net debit balance.
- Central Bank is responsible for the compilation and timely publication of the country's main macroeconomic statistics: National Accounts, Balance of Payments and Monetary Statistics. Although there are no legal precepts that obligate private institutions to report to the Bank for statistical purposes, exchange regulation allows consulting for specific details in certain operations. Within this framework it is possible to have information for the statistical investment compilation in Chile and abroad.
- In the case of investment in Chile, questionnaires under the foreign exchange regulation (Compendium of International Exchange Regulations, CIER) do not allow sufficient detail in the case of financing operations through capital contributions. For this reason, we have a complementary collection tool such as the annual survey of direct foreign investment.
- FDI survey queries the investment sector, country region where the investment project is carried out, transactions and equity positions and debt with the parent and related companies. Data collected shows results of the period prior to the consultation year.
- Like any data collection instrument, before being used in the compilation, collected data goes through a process of validation and analysis in order to ensure measurement quality. This process includes a structured exercise of validations and imputations, calculation automation and continuous methodology improvement.
- Together with the above, an up-to-date directory of companies and information on corporate structures applied in decision-making at the stages of gathering and compilation are maintained.
- Lastly, tasks to improve the FDI survey in Chile form are developed in order to maintain an updated collection tool that allows gathering better information to answer to user and analyst demands.

6. BIBLIOGRAPHY

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- 2) OECD Benchmark Definition of Foreign Direct Investment, 4th Edition, 2008.
- 3) Central Bank's Organic Constitutional Law, 1989 (www.bcentral.cl)
- 4) Foreign Direct Investment in Chile: Input Mechanisms and Compilation for the Balance of Payments, Chackiel J.E. and Orellana V., 2014. Economic and statistical studies N.º109 - November 2014.
(<https://si3.bcentral.cl/estadisticas/Principal1/Estudios/SE/BDP/see109.pdf>)

I. General Background

A. Company Identification

A.1. Company Name		A.2. ID Company
<input type="text"/>		<input type="text"/>
A.3. Address	A.4. Commune	
<input type="text"/>	<input type="text"/>	
A.5. City	A.6. Central phone	A.7. Reported period
<input type="text"/>	<input type="text"/>	<input type="text"/>
A.8. Name of respondent		A.9. Position
<input type="text"/>		<input type="text"/>
A.10. Direct phone	A.11. E-mail	
<input type="text"/>	<input type="text"/>	
A.12. Headquarter name in Chile		A.13. ID Headquarter
<input type="text"/>		<input type="text"/>
A. 14. Accounting currency		
<input type="checkbox"/> National currency (Chilean pesos)	<input type="checkbox"/> Foreign currency (USA dollar)	
<input type="checkbox"/> Foreign currency (Euro)	<input type="checkbox"/> Foreign currency (Other). Specify:	<input type="text"/>

ANNEX 1: QUESTIONNAIRE OF THE FOREIGN INVESTMENT SURVEY IN CHILE (2).

II. Specific Background. Indicate the amounts according to the accounting currency of the company reported in A.14.

B. Currency unit

B.1. Indicate the unit of currency in which the information is expressed (mark with an x as appropriate)

- | | | |
|---------------------------------------|---|--|
| <input type="checkbox"/> Pesos (\$) | <input type="checkbox"/> Thousands of pesos | <input type="checkbox"/> Millions of pesos |
| <input type="checkbox"/> Dollar (USA) | <input type="checkbox"/> Thousands of dollars | <input type="checkbox"/> Millions of dollars |
| <input type="checkbox"/> Euros | <input type="checkbox"/> Thousands of Euros | <input type="checkbox"/> Millions of Euros |

C. Company's Equity

C.1. Indicate the company's equity

D. Economic Sector and Recipient Company Region

D.1. Indicate your main economic activity (without considering subsidiaries)

Level 1 Sector

Level 2 Subsector

Level 3 (Optional)

D.2. Indicate the main region where the foreign investment materializes

ANNEX 1: QUESTIONNAIRE OF THE FOREIGN INVESTMENT SURVEY IN CHILE (3).

E. Economic Activity and Region of Subsidiaries

E.1. Indicate the number of direct subsidiaries in Chile ¹

E.2. Indicate additional information about its direct subsidiaries in Chile

N°	ID	Name	Total equities of the subsidiary	Share%	Level 1 Sector	Level 2 Subsector	Level 3 (Optional)	Region of materialization
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

¹ Companies over which your company has a stake equal to or greater than 10% of the property.

ANNEX 1: QUESTIONNAIRE OF THE FOREIGN INVESTMENT SURVEY IN CHILE (4).

F. Equity shares

F.1. Shares and equity interests greater than or equal to 10% of the voting power (direct investor)

F.1.1. Country of the immediate investor	F.1.2 Final investor country ²	F.1.3 Beginning Balance	F.1.3.b. Difference between initial balance and previous period final balance (+/-)	F.1.4. Purchases / capital contributions (+)	F.1.5. Withdrawals of capital (-)	F.1.6 Other variations (+/-)	F.1.7. Profits or losses accrued in the period	F.1.8. Dividends paid in the period	F.1.9. Final Balance

F.2. Shares and other equity interests of less than 10% of the voting power

F.2.1. Country of residence of the related company	F.2.2. Beginning Balance	F.2.2.b. Difference between initial balance and previous period final balance	F.2.3. Purchases / capital contributions (+)	F.2.4. Withdrawals of capital (-)	F.2.5. Other variations (+/-)	F.2.6. Final Balance	F.2.7. Profits or losses accrued in the period	F.2.8. Percentage regarding final balance		
								F.2.8.1. % Indirect controller	F.2.8.2. % Subsidiaries	F.2.8.3. % Related company

² This information is not considered in the measurement, because this question has a low answer rate.



Irving Fisher Committee on
Central Bank Statistics

BANK FOR INTERNATIONAL SETTLEMENTS

IFC - Central Bank of Armenia Workshop on "*External Sector Statistics*"

Dilijan, Armenia, 11-12 June 2018

The measurement challenges of FDI in Chile: searching for better data for a better interpretation¹

María Isabel Méndez Ferrada,

Central Bank of Chile

¹ This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.



The measurement challenges of FDI in Chile: searching for better data for a better interpretation

Balance of Payments Department
Management in Macroeconomic Statistics
Statistics Division



Agenda

- I. Context
- II. The Chilean FDI in numbers
- III. FDI data compilation framework in Chile
- IV. FDI annual survey in Chile
- V. Strategies to ensure the quality of the measurement



Context

FDI in the global economy



FDI a relevant statistic in the globalized economy



Multinationals the power unit of the system

- Production of goods and services outside of the compiler economy.
- Capital flows go beyond the frontiers to finance production.



Corporate networks difficult to understand

- The multinationals are organized in different, diverse and curious ways.
- The capital flows move from the matrix to the investment company through countries and intermediate companies in very diverse ways (SPEs is an example).



The data collection to measure FDI is not easy

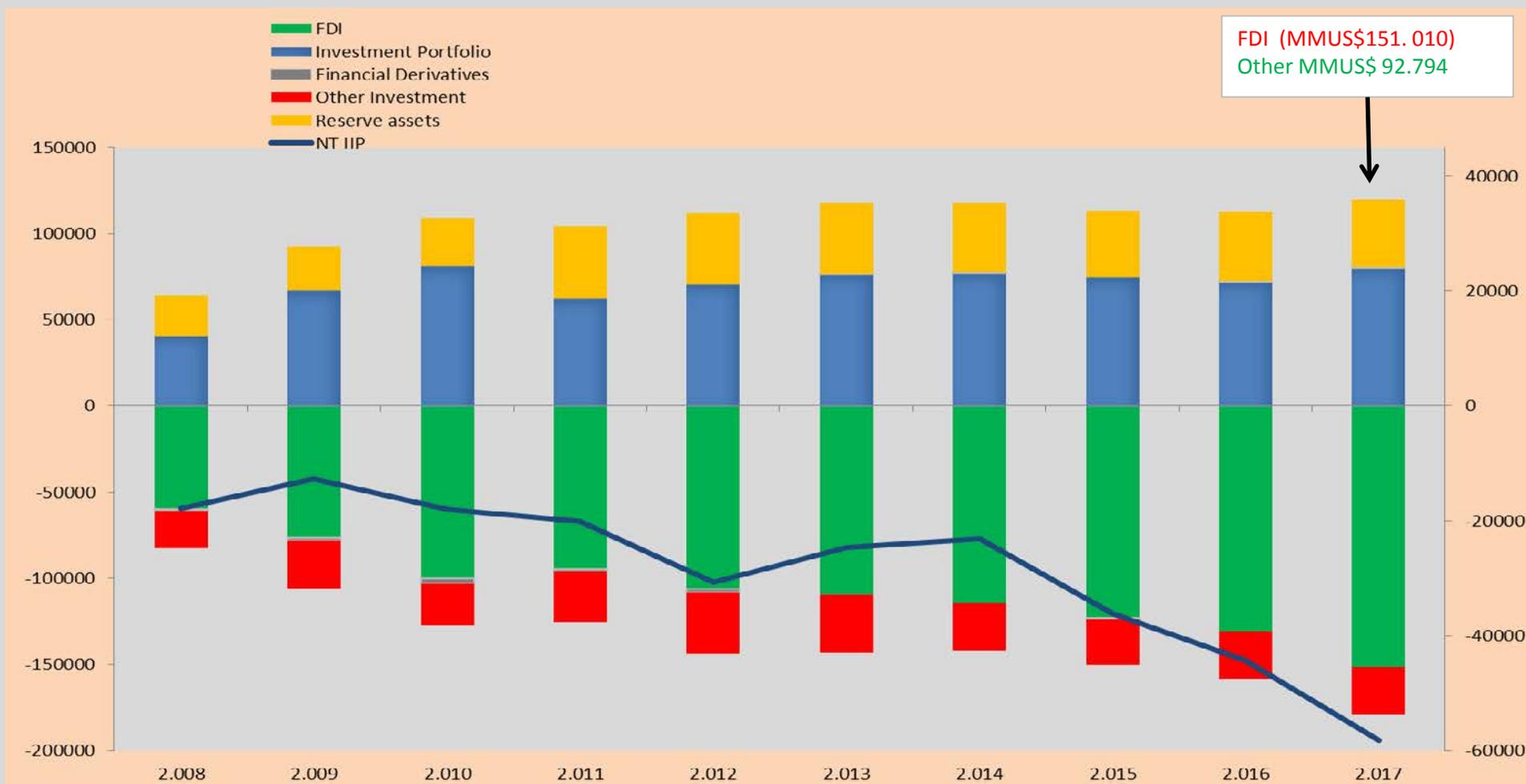
- The sources and records are not able to capture all business dynamic.
- The respondents do not relate the company accounting with statistical records well.

Chilean FDI in numbers

In Chile the FDI is the most important account in both BOP and IIP



FDI determines the Chilean net debtor position

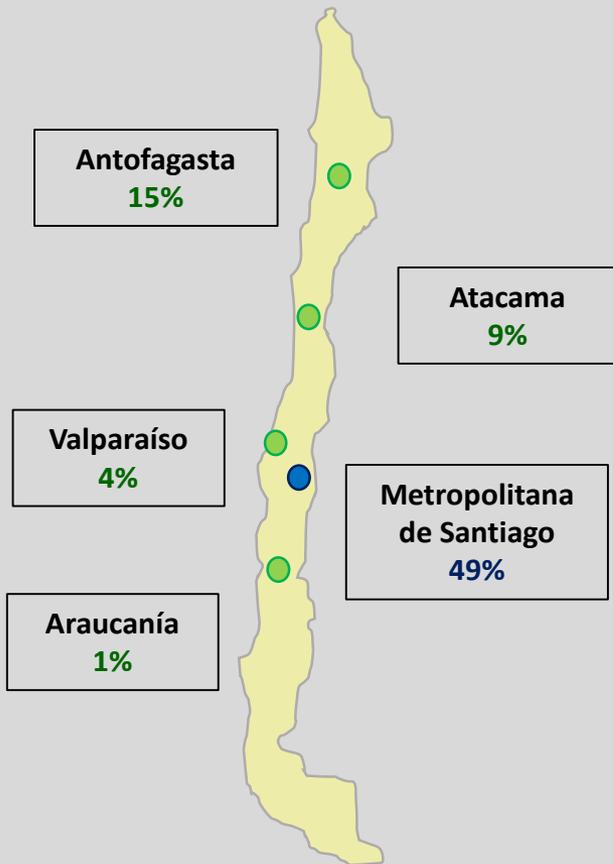


Source: Central Bank of Chile



FDI in Chile by region and by industry...

Chile 



Chile 



Foreign 



Financial services
30%



Mining
28%



Electricity, gas and water
9%



Transport and Storage
6%

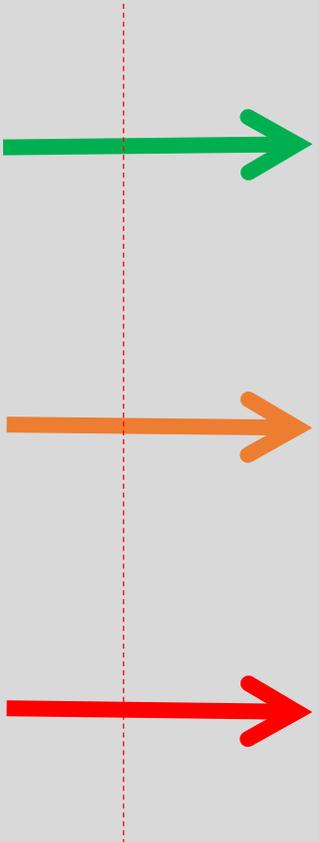


Manufacturing industry
4%



Chile invests abroad mainly in financial services, mining, industry, commerce

Chile



Foreign



Financial services
26%



Mining
20%



Manufacturing industry
12%



Commerce
11%

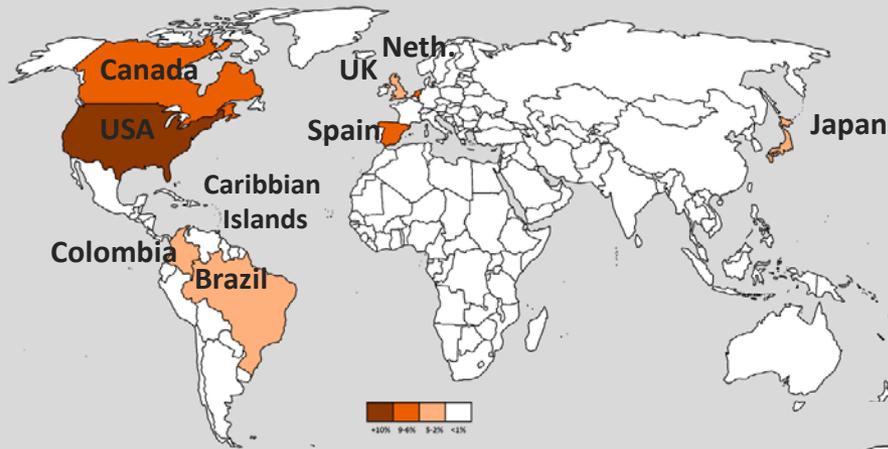


Electricity, gas and water
10%

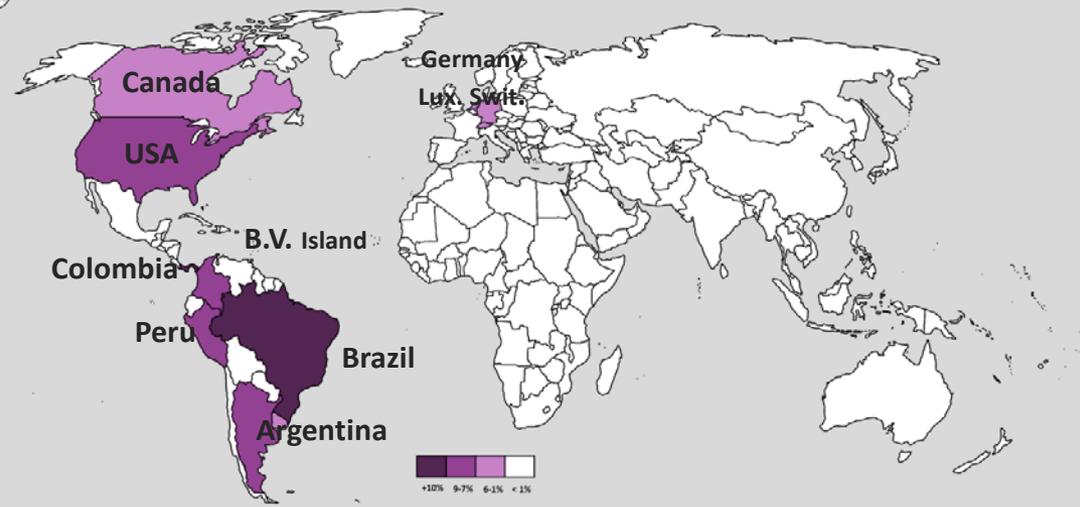
Source: Central Bank of Chile

FDI by partner country

FDI in Chile



FDI abroad



FDI data compilation framework in Chile

According to its Organic Law and to the National Statistics Compilation Plan, the CBCH is responsible for the timely compilation and publication of Chile's main national macroeconomic statistics



There is no obligation to inform for statistical purposes, but a collaborative statistical culture exists in the economy agents

- The Central Bank is an autonomous body governed by its Constitutional Organic Law 18.840 of 1989 (COL, LOC in Spanish). Provisions for producing statistics are included in the COL.
- The National Statistics Compilation Plan assigns the CBCH the task of compiling and disseminating NA, monetary, and BOP statistics. Article 53 establishes mandatory data reporting by public entities to the CBCH.
- There are no legal precepts empowering the CBCH to require private institutions to respond to data requests solely for statistical purposes, except for information on foreign exchange transactions.
- Although the regulations of the issuing institute are based on the general basis of freedom in exchange matters, the Central Bank may impose exchange restrictions under certain circumstances: the obligation to report certain transactions and the use of the Formal Exchange Market.
- The regulation of international exchange operations is expressed in the Compendium of International Exchange Regulations (CIER).



Mechanisms for reporting data on investment in the CBCH

Entry of investment in the economy

- The investments that enter to the country for an amount greater than US\$ 10.000 must be duly reported to the BCCH and made through the FEM, as well as, the operations with funds disposed abroad and the payments or remittances of foreign currencies corresponding to said operations.
- All regulations on this matter are found in chapter XIV of the CIER.
- Until December of 2015, the DL600 also governed as an mechanism for the capital entries from abroad. The DL600 was a contract between the state and the investor that guaranteed rights and obligations for both parties. Guaranteed a special tax regime for investors, but prior authorization is needed to send remittances of capital and income abroad.

Investment abroad

- Investments, deposits and credits that residents in Chile maintain abroad must be reported to the Central Bank, with a threshold of US\$ 10.000. Investments with provision of funds abroad are included.
- The payments or remittances in currencies that the residents bring into the country or send to abroad, by their investments, must be made through the FEM.
- All regulations on this matter are found in chapter XII of the CIER.



FDI annual survey in Chile

Important tool that provides details by country, by industry and by region of the investments that come from abroad



Characteristics of the survey

- The survey is carried out annually, and it is aimed at companies that receive direct investment from abroad.
- In 2017, 462 companies were surveyed. They were asked for their results in 2016 with a response rate of 77%. The stocks of the companies that responded represent around 80% of the FDI total stock in Chile in 2016.
- Consultation on transactions and stocks by instrument (equities and debt), by partner country, by industry and by region.
- The information collected is the basis for compiling the report on FDI under the framework of the BDFDI4 criteria of OECD.
- The last published series covers the period 2009 - 2016. It is published with annual lag.



Section F.1 Equities from direct investor in direct investment enterprise

Beginning of period IIP	Equity contributions	Withdrawals of equity	Gains /losses	Paid Dividends	OCH	End of period IIP
-------------------------	----------------------	-----------------------	---------------	----------------	-----	-------------------

Country 1

Country 2

- 1) Data consistency: beginning of period IIP versus the end of the previous period IIP; report currency between periods; or unbalance between IIP (beginning and end of period), transactions and other variations.
- 2) Changes in the countries where the investment comes from without records of reduction of stocks.
- 3) Other changes of volume can contain income.
- 4) Companies do not respond every year. This situation produces discontinuity in information.



Section F.2 Equities between fellow companies and Section G Debts Instruments

Equities or Debts	Beginning of period IIP	Contrib. or Disbursement	Withdrawals or Payments	O CH	End period IIP	Gains /losses or Interests	Percentage in relation to end of period IIP		
							Indirect investor*	Affiliates	Fellow Company
C 1									
C 2									

1) The respondents get confused when trying to divide the final IIP (equities or debt) of the period according to the type of fellow enterprise.

2) Trade credit and advances are confused with other accounts payable.

* Indirect/direct investor in the case of debt instruments



Strategies to ensure the quality of the measurement

Validations and imputations; better information to characterize companies and review forms



Analysis of data and statistical tools help to give solution to the problems of the data collection

Validations and imputations

Based on historical background, administrative records, reports and financial statements of companies.

Units of measurement of the report, region, sector.

Depuration of stocks (OCH, incomes).

Continuity of the stocks by country.

Depuration of relationships.

Methodology

Income estimates based on average income: country * sector * company; sector * companies; company.

Use of external debt calculations for FDI debt.

Systematization

Use of data model and process automation.



Updating of directories and the base of corporate structures (work in progress)

Directory Review

Unique directory of companies and financial institutions.

Company characterizations: Company's effective date, FDI (yes/no), contact information, registration of updates, etc.

Integration to data model.

Corporate structure.

Based on financial statements, memories, Internet.

Three exercises have been made: 2015, 2016 and 2017.

It is linked as features to the business directory.

Groups of companies are built identifying their relationship, if they are investors or investment enterprise in regard to the company resident in Chile.

Storing in databases allows the schematization of information.



Mapping system

DataBase 1: Company Information

ID	ID_MAP	NAME	ID_GEOGRAPHIC	COUNTRY	VERSION
•	•	•	0	•	•
•	•	•	1	•	•
•	•	•	2	•	•

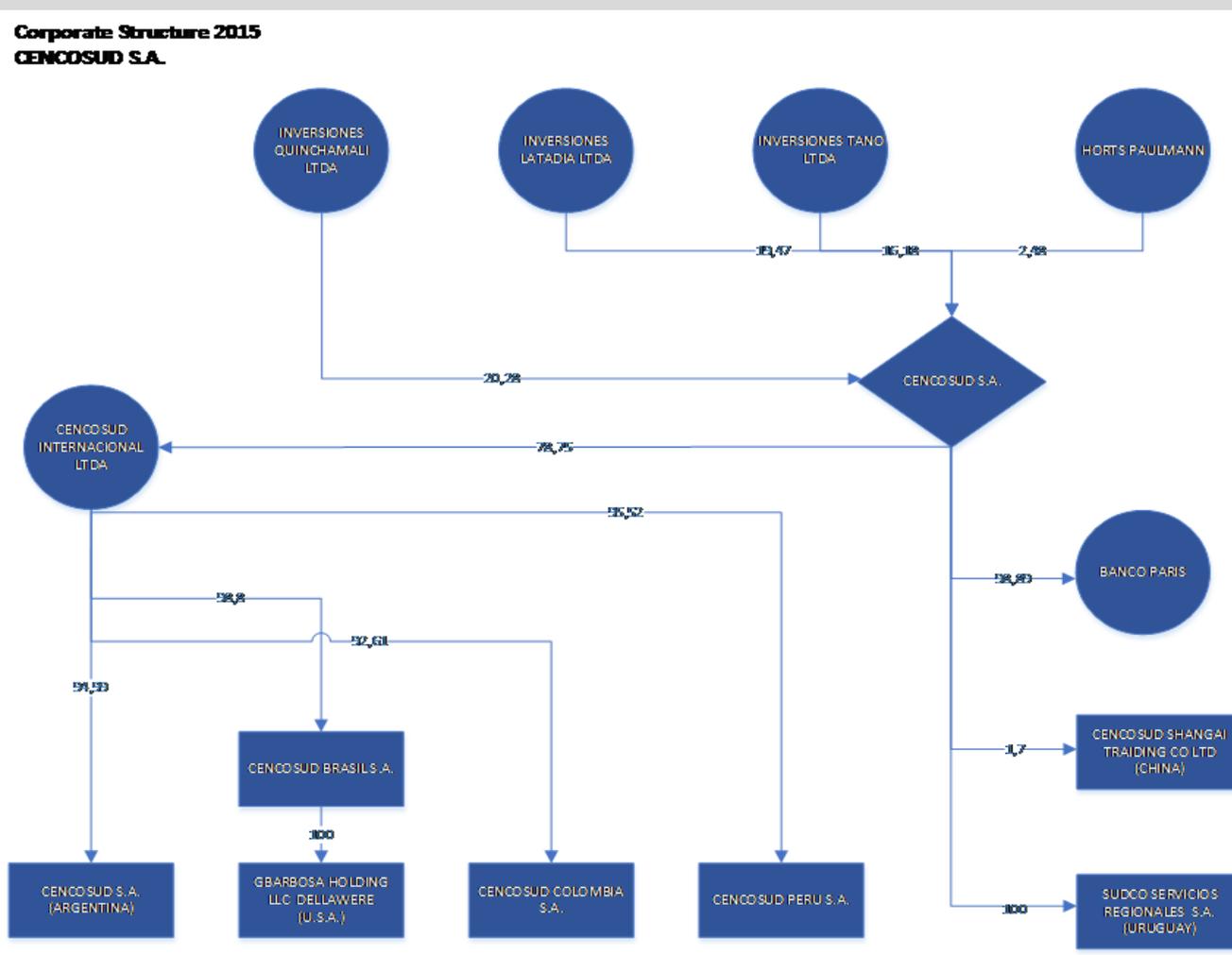


DataBase 2: Control over Subsidiaries

CONTROLLER	SUBSIDIARY	% FDI	GROUP
•	•	100%	•
•	•	43%	•
•	•	27%	•



Example of a corporate structure



Source: Elaborated based on the company financial state (2015)



Review of forms in evaluation stage

Objective

- i) Facilitate the responses with a more simple questionnaire.
- ii) Questions in line with business accounting.
- ii) Strengthen closeness with the respondent.

Workplan

- i) Training in accounting regulations.
- ii) Redefinition of the questionnaires.
- iii) Test of the questionnaires through a pilot plan with most important companies.
- iv) Strengthen data collection area.



Thanks for your attention!!!
María Isabel Méndez
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