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A 2017 Social Accounting Matrix for Chile

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Abstract

A detailed Social Accounting Matrix (SAM) for Chile is developed for the year 2017. The main data source for developing the SAM is the Central Bank of Chile, from which a 2017 Input-output Table (IOT), the national accounts and the Integrated Economic Table (IET) are obtained. Additional sources are used to disaggregate the accounts for the SAM, including household and labor surveys. The developed SAM includes 24 activities, 37 commodities, three production factors (capital and two types of labor classified by skill level), enterprises, households (disaggregated to five income quintiles), the government, 4 types of taxes, investment, stock changes, margins, and rest of the world. To allow detailed representation of the agricultural sector, agriculture is disaggregated into 12 activities and 24 commodities, while industry and services are represented by three and 9 subsectors, respectively.

Keywords: social accounting matrix, copper, agriculture, Chile

JEL: E16

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Acronyms and abbreviations

CASEN	National Socioeconomic Characterization Survey
FBS	Family Budget Survey
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
IET	Integrated Economic Table
INE	National Statistics Institute
IOT	Input Output Table
ISIC	International Standard Industrial Classification
NES	National Employment Survey
ODEPA	Office of Agrarian Studies and Policies
RoW	Rest of the World
SAM	Social Accounting Matrix
SIS	Supplementary Income Survey
WDI	World Development Indicators

1 Developing the 2017 Social Accounting Matrix for Chile

1.1 General rationale

A social accounting matrix (SAM) is a comprehensive accounting representation of the flow of goods and services as well as payments between sectors, economic actors, and other accounts in an entire economy (Breisinger et al., 2009). It is a consistent data system that provides an overview of the economy in a given year and constitutes the core source of a general equilibrium model. A SAM allows to observe the structure of the economy and the relations between the different accounts in a comprehensive way. It is a squared matrix in which each account is represented by a column and a row. Thereby, in the columns, the expenses of the single accounts are depicted, while the rows represent the incomes. A SAM is balanced, meaning that total expenditures match total income of each account.

The new SAM presented here, was developed with the objective of utilizing more recent data than the last publicly available SAM dating back to 1996 (Montero, 1996). The underlying data were derived, mainly from the Central Bank of Chile (Banco Central de Chile, 2020a, 2020b), which provides information in the form of Input-Output tables (IOTs) and specific surveys supplementing data on households and labor force. Based on these data, an extended IOT was already developed in a previous research by the authors to be included in the newest version of the Global Trade Analysis Project (GTAP) database (Gonzalez et al., 2020).

The SAM presented here was developed with a special focus on the agricultural sector, which employs 10% of the workforce and contributes to 3.5% of the GDP (Banco Central de Chile, 2020b; INE, 2018). Thus, the agricultural sector was disaggregated into 12 activities and 24 commodities to allow for a detailed analysis of this sector, while the industry and service sectors were aggregated to 3 and 9 activities, respectively (see Appendix 1).

1.2 Development of the macro SAM

In a first step, a Macro SAM to be used as a consistent basis for further disaggregation was developed. The data used to build the Macro SAM was obtained from the Central Bank of Chile (Banco Central de Chile, 2020a, 2020b). To compile the data into the different accounts, the approach by Fuentes (2017) was followed, using the Integrated Economic Table (IET) for 2017 published by the Central Bank of Chile as the main source. This was complemented with information on value-added tax and import tariffs based on the IOTs provided by the same institution (Banco Central de Chile, 2020a, 2020b). The final Macro SAM for Chile consisting of 14 accounts is depicted in Table 1.

Table 1. Macro SAM for Chile, 2017 (Billions of Chilean Pesos)

		Activities	Margins	Commodities	Factors		Enterprises	Households	Government	Value-added tax	Production tax	Import tariffs	Investment	Stock Changes	RoW	Total
					Labor	Capital										
Activities				310,310												310,310
Margins				26,544												26,544
Commodities		146,076	26,544					113,984	25,363				37,781	429	51,122	401,298
Factors	Labor	69,595													43	69,638
	Capital	90,440													5,486	95,926
Enterprises						59,836										59,836
Households					69,319	22,102	31,941		4,902						1,037	129,301
Government						1,344	8,032	2,920		14,705	4,200	817				32,017
Value-added tax				14,705												14,705
Production tax		4,200														4,200
Import tariffs				817												817
Investment							19,863	12,397	1,752						4,198	38,210
Stock Changes													429			429
RoW				48,923	319	12,645										61,886
Total		310,310	26,544	401,298	69,638	95,926	59,836	129,301	32,017	14,705	4,200	817	38,210	429	61,886	1,245,117

Source: own creation based on data from the Banco Central de Chile (2020b).

1.3 Development of the micro SAM

The IOT for the year 2017 was the primary source of data to construct the SAM (Banco Central de Chile, 2020b). Thereby, agricultural commodities and activities remained disaggregated, while the rest of the accounts were aggregated following the International Standard Industrial Classification (ISIC), Rev. 4 (United Nations, 2008). The 2017 IOT was complemented with survey-data. Therefore, the data from the Macro SAM was taken as reference and combined with the shares provided by the surveys. The sources used for compiling the single sections of the SAM and its structure is presented in Table 2 and Table 3, respectively.

Activities column

X1: Intermediate demand: refers to payments made by activities for goods and services to be used within the production process. These data were taken from the Banco Central de Chile (2020b).

X2: Compensation of employees: refers to payments made by activities for labor. This includes wages as well as social security contributions. The remunerations payments by activities were taken from the Banco Central de Chile (2020b). These data were disaggregated by labor type into low and high skilled labor. The National Employment Survey (NES) for the year 2017 (INE, 2017a) was used to obtain the number of people employed by the different activities according to their education by years of study. The employees were categorized into low skilled (from zero to 12 years of study) and high skilled (more than 12 years of study). This information was used to obtain their respective share by activity, which was combined with the information provided by the Banco Central de Chile (2020b) (see Appendix 2).

X3: Gross operating surplus: refers to the income derived from production that is paid to the capital factor. These data were directly taken from the Banco Central de Chile (2020b).

X4, X27: Production tax: refers to all tax payments to produce goods and services, including excise taxes. In Chile these include tobacco, alcohol, and gasoline, and on legal acts. These data were directly taken from the Banco Central de Chile (2020b).

Margins column

X5, X7: Margins: belongs to marketing margins and transport of goods and services. Margins must be properly assigned in their respective row and column for the SAM to be balanced. The values with negative sign (marketing margins of the trade sector), are recorded in the margin column with a positive sign. All margins corresponding to the other sectors were recorded in the margin row (Fuentes, 2017). These data were taken from the Banco Central de Chile (2020b).

Commodities column

X6: Domestic supply: refers to the domestic production of goods and services at basic prices. These data were taken from the Banco Central de Chile (2020b).

X8, X26: Value-added tax: corresponds to the value added tax paid by each commodity. The data were taken from the Banco Central de Chile (2020b).

X9, X28: Import tariffs: corresponds to the tax payments made for imported commodities. The data were taken from the Banco Central de Chile (2020b).

X10: Import payments: corresponds to payment for all imports to the rest of the world (RoW). The data were taken from the Banco Central de Chile (2020b).

Labor column

X11: Labor payments to households: corresponds to the income from employment paid to residents in the country (employees). The labor payments to households were disaggregated by skill level (low skilled and high skilled) as well as by quintile. The Supplementary Income Survey (INE, 2017b) was used to obtain the characterization of households by educational level according to deciles. With this information, the shares of low skilled and high skilled labor by quintile were derived. Furthermore, the CASEN (Socio-economic Characterization Survey) (Ministerio de Desarrollo Social y Familia, 2017) was used to obtain the average income of the main occupation by decile of households and the average number of employed persons per household decile. The shares obtained from both surveys were then combined to obtain the distribution of labor payments by household decile and skill level.

X12: Labor payments to rest of the world: corresponds to labor income paid to non-residents of the country. The data was taken directly from the Macro SAM. The total was taken from the Macro SAM and distributed using to determine the proportion of labor payments to low and high skilled labor derived as explained for X11.

Capital column

X13: Capital payments to enterprises: corresponds to the operating surplus, property income of companies and distributed income of companies. This value was taken directly from the Macro SAM.

X14: Capital payments to households: refers to the operating surplus, mixed income and property income of households, not including distributed income of companies. The value from the Macro SAM along with the Macro value of enterprise income to households (X17) was distributed in a way that the total income of households obtained by summing up all household income accounts, would match the income shares provided by the World Development Indicators (World Bank, 2021).

X15: Capital payments to government: refers to the payment obtained by the government through property income. This value was taken directly from the Macro SAM.

X16: Capital payments to RoW: corresponds to the property income from the rest of the world. This value was taken directly from the Macro SAM.

Enterprises column

X17: Enterprises payments to households: refers to all current transfers made from financial and non-financial corporations to households and includes the distributed income of companies. The aggregate value was obtained from IET 2017 of the Banco Central de Chile (2020a). Due to the lack of information regarding the payments from enterprises to specific household-groups, it is assumed that the payments received by households from enterprises have the same structure as households' income from capital (X14), which is progressive in nature. This means higher quintiles receive more income from enterprises.

X18: Enterprises payments to government: corresponds to the payment of income taxes by financial and non-financial companies. This value corresponds to the Macro SAM.

X19: Enterprises savings: this item considers the balance between income and expenses of financial and non-financial companies. This value corresponds to the Macro SAM.

Households column

X20: Household consumption: corresponds to the final consumption of goods and services by households and private non-profit institutions. The total consumption by commodity was taken from the IOT 2017 (Banco Central de Chile, 2020b). To disaggregate consumption by income-quintile, the VIII Family Budget Survey (INE, 2017c) was used. In this survey, the products were classified according to the commodities in the SAM. To generate the desired disaggregation the shares of household consumption by quintile were used.

X21: Direct taxes: refer to income taxes paid by households to the government. The income tax payment by decile were obtained from Cantallopts et al. (2007). This information was then combined with the average income of the main occupation of household deciles provided by the CASEN survey (Ministerio de Desarrollo Social y Familia, 2017) to obtain the respective share of tax payments. This was then multiplied by the total value from the Macro SAM.

X22: Private savings: this item refers to the difference between the income and expenses of households. To obtain the amount of savings by quintile, all income received, and expenses paid by households from the other accounts were cleared, such that the private savings represent a balancing item.

Government column

X23: Government expenditure: refers to the government's final consumption of goods and services. These data were taken directly from the Banco Central de Chile (2020b).

X24: Social transfers: corresponds to net social benefits to households such as payment of pensions and subsidies. To generate the desired distribution by household quintile the CASEN survey 2017 (Ministerio de Desarrollo Social y Familia, 2017) was used from which the shares

of subsidies from the government by quintile were derived. These shares were then multiplied by the total value from the Macro SAM.

X25: Fiscal surplus (internal balance): corresponds to the difference between government revenue and expenditure. These data were taken directly from the Macro SAM.

Investment column

X29: Investment expenditure: refers to the gross fixed capital formation and includes the acquisition of durable goods used in the production process as fixed assets. These data were taken from the Banco Central de Chile (2020b).

X30, X31: Stock changes: corresponds to the difference in the value between the inflows and outflows of stocks from one period to another valued at the respective prices at the time of entry and exit. These data were taken from the Banco Central de Chile (2020b).

Rest of the world column

X32: Export earnings: corresponds to the earnings generated by exports of goods and services. The data disaggregated by commodity was taken from the Banco Central de Chile (2020b).

X33: Labor income from RoW: corresponds to the remunerations paid to national residents working abroad or paid domestically by foreign employers. The shares used to determine the proportion of RoW payments to low skilled and high skilled labor were derived from X11. These shares were then multiplied by the total value from the Macro SAM.

X34: Capital income from RoW: refers to the payment of operating surplus plus property income. These data were taken directly from the Macro SAM.

X35: Foreign remittances: refers to the net current transfers from the rest of the world to households. Due to the lack of information regarding the transfers from RoW to households and given that X35 represents a very small percentage of total household income, it is assumed that the transfers received from abroad by the household quintiles are proportional to the total labor transfers received by each household quintile (X11). These shares were then multiplied by the total value from the Macro SAM.

X36: Current account (external) balance: corresponds to the flow of financial assets from the rest of the world to the country, such as deposits, stocks, long- and short-term loans and commercial credits. These data were taken directly from the Macro SAM.

Table 2. Structure and sources used for the 2017 SAM for Chile

	Activities	Margins	Commodities	Labor	Capital	Enterprises	Households	Government	Value-added tax	Production tax	Import tariffs	Investment	Stock Changes	RoW
Activities			X6: IOT											
Margins			X7: IOT											
Commodities	X1: IOT	X5: IOT					X20: IOT, FBS	X23: IOT				X29: IOT	X31: IOT	X32: IOT
Labor	X2:IOT, NES													X33: IET, SIS, CASEN
Capital	X3: IOT													X34: IET
Enterprises					X13: IET									
Households				X11: IET, SIS, CASEN	X14: IET, WDI	X17: IET, WDI		X24: IET, CASEN						X35: IET, SIS, CASEN
Government					X15: IET	X18: IET	X21: Cant., CASEN		X26: IOT	X27: IOT	X28: IOT			
Value-added tax			X8: IOT											
Production tax	X4: IOT													
Import tariffs			X9: IOT											
Investment						X19: IET	X22: Balancing item	X25: IET						X36: IET
Stock Changes												X30: IOT		
RoW			X10: IOT	X12: IET, SIS, CASEN	X16: IET									

Legend: X1-X36 – cell reference number; IOT – Input Output Table (Banco Central de Chile (2020b)); NES – National Employment Survey (INE, 2017a); IET – Integrated Economic Table (Banco Central de Chile (2020a)); SIS – Supplementary Income Survey (INE, 2017b); CASEN (Socio-economic Characterization Survey) (Ministerio de Desarrollo Social y Familia, 2017); FBS – VIII Family Budget Survey (INE, 2017c); Cant. – Cantallopts et al. (2007); WDI – World Development Indicators, World Bank (2021).

Source: own creation.

1.4 Estimation of the micro SAM: the cross-entropy estimation method

Since the information required to build the 2017 Chile SAM comes from a variety of sources, including national accounts data and several surveys, inconsistencies occur between the incomes and expenditures of many accounts. To solve this issue, there are several estimation techniques available that balance the accounts of a SAM. Among these techniques, the cross-entropy estimation method is generally preferred due to its flexibility in allowing to integrate different types of information (Breisinger et al., 2009), which is why this method was used to balance the 2017 Chile SAM. The version used, was developed by Robinson and McDonald (Robinson et al., 2000). The benefits of this method include that it allows incorporating errors on variables, inequality constraints, and prior knowledge about any part of the SAM, using only the information available (Robinson et al. 2000). For the SAM balancing process, the GDP at factor cost and market prices were calculated from and fixed to the values that were compiled in the Macro SAM based on the data of the Banco Central de Chile (2020a), as well as totals of sub-matrices, which were also fixed to the Macro SAM. These include X1-X3, X6, X10, X11, X14, X20-X24, X29 and X32 (see Figure 3 above). The standard errors were assumed 0.05 for macro aggregates and 0.25 elsewise. Given that the number of different sources used to develop the 2017 Chile SAM were limited, the imbalances encountered were minimal, thus providing high confidence in the data. There were small imbalances within the activity, commodity, and remuneration accounts (activities payments to labor) that had to be balanced. The maximum initial imbalance was 0.15% corresponding to the manufacturing activity/commodity. The largest percentage change of a cell in the final SAM from the proto-SAM was -53%, which corresponds to the margin of commodity table grape. However, there was no cell with large absolute and percentage change.

2 Structure of Chile's economy as depicted by the 2017 SAM

2.1 Contributions of sectors to GDP

At the aggregate level, the service sector accounts for 68% of the Chilean GDP, followed by industry with 28% and agriculture with 4%. The most important single activity as represented by the 2017 Chile SAM is personal services accounting for 13% of the GDP. The commerce, hotels, and restaurants sector (includes wholesale and automotive trade), business services, manufacturing, and copper mining follow in importance. Regarding agricultural activities, the cultivation of fruits is the most important contributor with 1.2% of GDP (Table 3). It is worth mentioning that the figures on agricultural activities only include the production of raw materials. It does not reflect the full contribution of agriculture to the economy as several products classified as manufactured have an agricultural origin. In fact, some studies estimate that agriculture's contribution to the GDP would increase to over 14% if backward and forward linkages are considered (ODEPA, 2019).

At the same time, the service sector employs 74%, of the workforce followed by the construction and manufacturing sectors, respectively. The shares of agriculture and mining in total labor employment is 3% and 4%, respectively. However, this represents the value-added of labor (compensation of employees), as opposed to the number of people employed in these sectors. According to the National Employment Survey (INE, 2018), the agricultural labor force accounted for 10% of the country's labor force in 2018, whereas mining accounted for 2.5%, which points at significant wage-differences between these two sectors. Regarding capital, on aggregate services employs the largest share (57%), followed by mining and manufacturing.

Table 3. Contributions of sectors to GDP (at factor cost), labor and capital (%)

Sector	% -Share in total			Sector	% -Share in total		
	GDP	Labor	Capital		GDP	Labor	Capital
Annual crops and fodder	0.2	0.2	0.2	Copper mining	9.8	3.5	14.7
Growing of vegetables and nursery products	0.4	0.2	0.6	Mining (excluding copper mining)	1.1	0.5	1.5
Grape cultivation	0.4	0.4	0.4	Manufacturing industry	9.9	8.2	11.2
Cultivation of other fruits	1.2	1.0	1.4	Construction	3.3	1.1	4.9
Breeding of cattle	0.3	0.4	0.2	Electricity, gas, water, and waste management	7.1	8.8	5.8
Pig farming	0.1	0.1	0.2	Commerce, hotels, and restaurants	12.8	15.1	11.1
Poultry breeding	0.2	0.1	0.3	Transport, communications, and information services	8.7	8.0	9.2
Breeding of other animals	0.0	0.0	0.1	Financial intermediation	5.0	5.3	4.8
Support activities for agriculture and livestock	0.2	0.2	0.2	Real estate and housing services	8.4	0.8	14.3
Forestry and logging	0.6	0.5	0.7	Business services	11.0	11.4	10.8
Aquaculture	0.4	0.2	0.6	Personal services	13.0	24.0	4.6
Extractive fishing	0.3	0.2	0.4	Public administration	5.4	10.0	1.9

Source: own creation.

2.2 Contribution of commodities to trade

Most of Chile's foreign exchange is generated by copper, accounting for 43% of total exports, followed by manufactured products with 33% (Table 4). Agricultural commodities account for about 7% of total exports. In contrast to its large contribution to GDP, services only account for 13% of exports. Conversely, manufactured products account for almost 78% of imports, seconded by services. Agricultural imports, in turn, only account for 1.5% of total imports, while mining imports are almost exclusively composed of non-copper minerals.

Table 4. Contribution of commodities to trade (%)

Commodity	Imports	Exports	Commodity	Imports	Exports
Wheat	0.4	0.0	Other animals and livestock products	0.0	0.0
Corn	0.4	0.1	Support services for agri-culture, livestock and forestry	0.0	0.0
Other cereals	0.0	0.0	Forestry and logging products	0.0	0.1
Tubers and legumes	0.1	0.0	Salmon and trout farming	0.0	0.0
Forage and other crops for industrial use	0.2	0.4	Other fish, shellfish and seaweed	0.0	0.2
Vegetables and mushrooms	0.0	0.1	Copper	0.2	43.2
Wine and Pisco grape	0.0	0.0	Minerals (excluding copper)	7.3	4.0
Table grapes	0.0	1.3	Manufactured products	77.6	33.2
Apples	0.0	0.8	Electricity, gas, water and waste management	0.0	0.1
Peaches and other stone fruits	0.0	1.0	Construction	0.0	0.0
Avocado	0.0	0.6	Trade, hotel and restaurant services	0.4	1.3
Kiwis and other tropical fruits	0.2	0.3	Transport, communications and information services	3.4	4.5
Blueberries and other berries	0.0	0.6	Financial services	1.6	0.7
Other fruits	0.1	1.4	Real estate and housing services	0.2	0.1
Cattle	0.0	0.0	Business services	2.7	0.5
Pigs	0.0	0.0	Personal services	2.0	1.2
Poultry	0.0	0.0	Public administration services	0.0	0.0
Raw milk	0.0	0.0	Other goods and services	3.1	4.3
Eggs	0.0	0.0			

Source: own creation.

2.3 Main sources of income to households and government

The most important source of income for households in the lower quintiles (1-4) is low skilled labor, whereas high skilled labor is the most important source of income for the fifth quintile, accounting for 33% of total income (Table 5). Capital/land is important for the three highest quintiles, and is the second most important source of income for aggregated households after low skilled labor. It should be noted that since the Central Bank of Chile does not provide land factor data, this is included within the capital account. Taking this into consideration may make the contribution of the capital/land factor to the income of the first quintile seem low. Yet, besides smallholder farmers this group also includes urban and rural landless households.

Government transfers are a relevant source of income for the first quintile accounting for 29% of total income, with this amount decreasing for the rest of the quintiles as they get wealthier, consistent with the progressive characteristics of these transfers. Remittances from RoW are slightly higher for poorer quintiles but are of lesser importance. Income from enterprise accounts for almost 25% of average household's total income.

Table 5. Main sources of income to households (%)

	Low skilled	High skilled	Capital/ land	Enterprises	Government	RoW	Total
Q1	61.5	8.4	0.01	0.01	29.1	1.0	100.0
Q2	55.8	10.3	9.4	13.5	10.0	1.0	100.0
Q3	43.5	12.5	15.8	22.8	4.5	0.8	100.0
Q4	33.1	17.5	19.1	27.6	1.9	0.8	100.0
Q5	17.3	32.7	20.0	28.9	0.3	0.7	100.0
Average	30.2	23.4	17.1	24.7	3.8	0.8	100.0

Source: own creation.

For the government, sales taxes are the largest source of income (Table 6), followed by income from enterprises and indirect taxes. Import tariffs contribute a minor share of total government revenue, while export tariffs are non-existent, reflecting the openness and export-oriented characteristic of the economy of the country.

Table 6. Main sources of government revenue (%)

Sources of revenue	Share (%)
Capital/land	4.2
Enterprises	25.1
Direct taxes	9.1
Sales taxes	45.9
Indirect taxes	13.1
Import taxes	2.6
Total	100.0

Source: own creation.

2.4 Domestic consumption and exports by commodity

Agricultural commodities considered staple foods such as wheat, corn, other cereals, tubers, and legumes, as well as vegetables are almost exclusively destined for domestic consumption (Table 7). An exception are wine grapes, which are mainly used as raw material for wine production. Conversely, the production of fruits such as table grapes, apples, avocados, kiwis, and other fruits are mostly exported. Among non-agricultural commodities, copper has the largest export-share. In contrast, manufactured products, and services are mostly oriented to the domestic market, while utilities are almost in their entirety consumed domestically.

Table 7. Shares of domestic consumption and exports by commodity (%)

Commodity	Domestic	RoW	Commodity	Domestic	RoW
Wheat	100.0	0.0	Other animals and livestock products	94.5	5.5
Corn	87.5	12.5	Support services for agriculture, livestock, and forestry	100.0	0.0
Other cereals	96.3	3.7	Forestry and logging products	98.2	1.8
Tubers and legumes	99.1	0.9	Salmon and trout farming	100.0	0.0
Forage and other crops for industrial use	79.1	20.9	Other fish, shellfish, and seaweed	90.7	9.3
Vegetables and mushrooms	97.9	2.1	Copper	10.0	90.0
Wine and Pisco grape	100.0	0.0	Minerals (excluding copper)	72.3	27.7
Table grapes	24.1	75.9	Manufactured products	86.5	13.5
Apples	35.4	64.6	Electricity, gas, water, and waste management	99.7	0.3
Peaches and other stone fruits	52.9	47.1	Construction	100.0	0.0
Avocado	58.2	41.8	Trade, hotel, and restaurant services	98.4	1.6
Kiwis and other tropical fruits	64.6	35.4	Transport, communications, and information services	93.1	6.9
Blueberries and other berries	30.2	69.8	Financial services	97.6	2.4
Other fruits	48.2	51.8	Real estate and housing services	99.7	0.3
Cattle	97.9	2.1	Business services	98.8	1.2
Pigs	99.9	0.1	Personal services	95.3	4.7
Poultry	100.0	0.0	Public administration services	100.0	0.0
Raw milk	100.0	0.0	Other goods and services	93.1	6.9
Eggs	97.2	2.8			

Source: own creation.

2.5 Household expenditure

Households in the lower income quintiles (1-3) spend most of their income on manufactured products, whereas the highest quintiles do so on services (Tables 8 and 9). In fact, households in the fifth quintile spend 40% of their income on services while they spent the lowest proportion among all household quintiles on agricultural and manufactured commodities. Savings are particularly high for households in the fifth income quintile, amounting to 26%. On the other hand, the first three quintiles have negative savings; this means they need to get indebted to keep their level of consumption.

Table 8. Shares of household expenditure by category (%)

Expenditure items	Q1	Q2	Q3	Q4	Q5
Agriculture	7.6	5.7	4.9	3.8	1.8
Manufactured	66.0	59.5	54.3	46.0	25.6
Utilities	4.3	3.4	3.1	2.7	2.1
Services	50.4	45.4	45.4	46.3	40.0
Direct taxes	0.2	0.1	0.1	0.4	4.2
Savings	-28.4	-14.2	-7.8	0.8	26.3
Total	100.0	100.0	100.0	100.0	100.0

Source: own creation.

Table 9. Shares of household expenditure by item (%)

Detailed expenditure items	Q1	Q2	Q3	Q4	Q5
Wheat	0.00	0.00	0.00	0.00	0.00
Corn	0.02	0.01	0.01	0.01	0.00
Other cereals	0.03	0.02	0.02	0.01	0.01
Tubers and legumes	1.39	1.00	0.82	0.47	0.17
Forage and other crops for industrial use	0.27	0.24	0.22	0.18	0.10
Vegetables and mushrooms	2.14	1.56	1.32	0.97	0.46
Wine and Pisco grape	0.00	0.00	0.00	0.00	0.00
Table grapes	0.27	0.22	0.21	0.14	0.07
Apples	0.28	0.22	0.21	0.15	0.07
Peaches and other stone fruits	0.38	0.26	0.20	0.17	0.09
Avocado	0.62	0.45	0.45	0.39	0.18
Kiwis and other tropical fruits	0.30	0.24	0.19	0.17	0.09
Blueberries and other berries	0.10	0.09	0.06	0.07	0.04
Other fruits	0.65	0.51	0.45	0.36	0.19
Cattle	0.01	0.01	0.01	0.00	0.00
Pigs	0.00	0.00	0.00	0.00	0.00
Poultry	0.03	0.02	0.02	0.01	0.01
Raw milk	0.06	0.06	0.05	0.04	0.02
Eggs	0.65	0.47	0.37	0.30	0.12
Other animals and livestock products	0.01	0.01	0.00	0.00	0.00
Support services for agriculture, livestock, and forestry	0.00	0.00	0.00	0.00	0.00
Forestry and logging products	0.26	0.21	0.19	0.17	0.13
Salmon and trout farming	0.00	0.00	0.00	0.00	0.00
Other fish, shellfish, and seaweed	0.16	0.15	0.14	0.11	0.08
Copper	0.00	0.00	0.00	0.00	0.00
Minerals (excluding copper)	0.00	0.00	0.00	0.00	0.00
Manufactured products	65.99	59.53	54.30	45.96	25.56
Electricity, gas, water, and waste management	4.25	3.40	3.08	2.74	2.10
Construction	0.00	0.00	0.00	0.00	0.00
Trade, hotel, and restaurant services	5.39	5.39	6.08	6.39	6.10
Transport, communications, and information services	9.47	9.64	9.61	10.12	8.17
Financial services	5.02	4.55	4.70	5.09	4.68
Real estate and housing services	16.73	13.38	12.14	10.80	8.28
Business services	0.46	0.42	0.43	0.46	0.43
Personal services	0.95	0.86	0.89	0.96	0.88
Public administration services	0.11	0.10	0.10	0.11	0.10
Other goods and services	12.24	11.09	11.44	12.40	11.40
Direct taxes	0.22	0.13	0.14	0.36	4.18
Savings	-28.44	-14.21	-7.84	0.84	26.29
Total	100.00	100.00	100.00	100.00	100.00

Source: own creation.

2.6 Macroeconomic indicators

Macroeconomic data for Chile reflect the relatively open economy since total trade makes up more than half of the GDP (Table 10). The negative current account balance shows that money is coming into the country. This means, Chile is a net borrower from the rest of the world. However, the government is also running a recurring fiscal surplus since government savings are positive, reflecting moderate government spending.

Table 10. Macroeconomic indicators and ratios

Indicators	Value (100 billion CLP)
GDP at factor cost	1600.4
Recurrent fiscal balance	17.5
Current account balance	-42.0
Private savings	124.0
Investment	382.1
Imports	489.2
Exports	511.2
GDP at market prices	1797.6
Ratios	**%**
Trade-to-GDP	55.7
Fiscal balance-to-GDP	1.0
Current account-to-GDP	-2.3
Private savings-to-investment	32.4

Source: own creation.

3 Final remarks

The 2017 Chile SAM presents an overview of the contributions made by each sector to the Chilean economy. The data reveals the openness of the Chilean economy to trade and the importance of exports, specifically copper exports. Since several sources of data were used to build the SAM, the cross-entropy estimation method was used to estimate a balanced matrix. Nonetheless, given that the date obtained from the different sources used to develop the SAM were relatively consistent, the imbalances encountered were minimal, thus providing high confidence in the data. Limitations of the SAM include the difficulty in incorporating additional accounts or further disaggregating them due to data constraints. An example of this is the land factor, for which the Central Bank does not provide data, hence, the SAM does not include a separate account for land. The capital and enterprise income accounts were adjusted to match the income shares by quintiles provided by the World Bank (2021). These adjustments resulted in a very low contribution of the capital/land factor to the income of the first quintile, which may possibly underestimate the income from land derived by smallholder-farmers. Once data on land income to households becomes available, the separation of the capital/land income may

be a valuable improvement to the SAM. In addition, the SAM did not disaggregate households by location into rural and urban, instead a disaggregation by quintile was carried out. Moreover, labor was divided between low skilled and high skilled labor assuming that most rural households are employed in agriculture, have a high share of low skilled labor, and tend to belong the lower quintiles. This left out gender, which could provide better insights on how agricultural labor is structured. Therefore, there is space for potential data improvement that could incorporate these types of accounts and work out these uncertainties, enabling a more detailed analysis on household income distribution and welfare.

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Appendix 1. Mapping between SAM accounts and IOT of the Central Bank of Chile

SAM account	Code	IOT Sector Number
Activities		
Annual crops (cereals and others) and fodder	aacrop	1
Growing of vegetables and nursery products	agvn	2
Grape cultivation	agcult	3
Cultivation of other fruits	acofru	4
Breeding of cattle	abcatt	5
Pig farming	apfarm	6
Poultry breeding	apoulbr	7
Breeding of other animals	abroanim	8
Support activities for agriculture and livestock	asupagrliv	9
Forestry and logging	aforlogg	10
Aquaculture	aaqua	11
Extractive fishing	aexfish	12
Mining (excluding copper mining)	amin	13-14, 16-18
Copper mining	acoppmin	15
Manufacturing industry	amanuind	19-63
Electricity, gas, water and waste management	aegwwm	64-69
Construction	acons	70-73
Commerce, hotels and restaurants	achr	74-78
Transport, communications and information services	atciserv	79-93
Financial intermediation	afinani	94-96
Real estate and housing services	arehserv	97-98
Business services	abusiserv	99-103
Personal services	aperserv	105-111
Public administration	apadm	104

SAM account	Code	IOT Sector Number
Commodities		
Wheat	cwheat	1
Corn	ccorn	2
Other cereals	cothcer	3
Tubers and legumes	ctuberleg	4
Forage and other crops for industrial use	cfociu	5
Vegetables and mushrooms	cvegmush	6
Wine and Pisco grape	cwinpgra	7
Table grapes	ctabgra	8
Apples	capple	9
Peaches and other stone fruits	cpeachosf	10
Avocado	cavocado	11
Kiwis and other tropical fruits	ckiwisotf	12
Blueberries and other berries	cblueberob	13
Other fruits	cothfruits	14
Cattle	ccattle	15
Pigs	cpig	16
Poultry	cpou	17
Raw milk	crawmilk	18
Eggs	cegg	19
Other animals and livestock products	coalp	20
Support services for agriculture, livestock, and forestry	cssalf	21
Conifers	cconif	22
Eucalyptus	ceuca	23
Firewood and other forestry products	cfirewoofp	24
Salmon and trout farming	csalmtf	25
Other fish, shellfish, and seaweed	cothfishshs	26
Minerals (excluding copper)	cminerals	27-29, 31-36
Copper	ccopper	30
Manufactured products	cmanuprod	37-118
Electricity, gas, water, and waste management	cegwwm	119-124
Construction	ccons	125-131
Trade, hotel, and restaurant services	cthrserv	132-138
Transport, communications, and information services	ctciserv	139-156
Financial services	cfinserv	157-161
Real estate and housing services	crehserv	162-163
Business services	cbusiserv	164-168
Personal services	cperserv	169-170
Public administration services	cpadmserv	171
Other goods and services	cothgdserv	172-181

Source: own creation based on data from the Banco Central de Chile (2020b).

Appendix 2. Mapping between SAM activities and activity types of the National Employment Survey (NES)

Activity name SAM	Activity type NES
Annual crops (cereals and others) and fodder Growing of vegetables and nursery products Grape cultivation Cultivation of other fruits Breeding of cattle Pig farming Poultry breeding Breeding of other animals Support activities for agriculture and livestock Forestry and logging Aquaculture Extractive fishing	Agriculture, livestock, forestry, and fishing
Copper mining Mining (excluding copper mining)	Mining and quarrying
Manufacturing industry	Manufacturing industries
Electricity, gas, water, and waste management	Electricity, gas, steam, and air conditioning supply Water supply; sewage disposal, waste management and decontamination
Construction	Construction
Commerce, hotels, and restaurants	Wholesale and retail trade; motor vehicle and motorcycle repair Accommodation and food service activities
Transport, communications, and information services	Transport and storage Information and communications
Financial intermediation	Financial and insurance activities
Real estate and housing services	Real estate activities
Business services	Professional, scientific, and technical activities Administrative and support service activities Activities of households as employers; undifferentiated activities of households as producers of goods and services for their own use
Personal services	Artistic, entertainment and recreational activities Other service activities Education Human health care and social assistance activities Activities of extraterritorial organizations and bodies
Public administration	Public administration and defense; compulsory affiliation social security plans

Source: own creation based on data from the Banco Central de Chile (2020b) and INE (2017a).