Working Party on Financial Statistics

Securities by securities database and the Chilean Financial Accounts

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Securities by securities database and the Chilean Financial Accounts

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ABSTRACT

The main purpose of this document is to show how the securities database is used to compile Chilean Financial Accounts and the Balance sheets of the economy. The database is managed by the Depósito Central de Valores (DCV, Chilean Custody Service), institution that provides most of the services of custody, administration, compensation and liquidation of securities in the Chilean capital market, and the exclusiveness of these services for new securities issued.

The DCV information contains the balances in custody of “securities other than shares”, value to value. Because of this, it is possible to obtain data for bonds, certificates of deposit, commercial papers, debentures, and other instruments in the financial markets, and with these data calculate statistics such as the maturity of the instruments, the holders and the issuers of those, and the relationships between sectors, among others.

1  INTRODUCTION

One of the functions of the Central Bank of Chile is to publish the main national macroeconomic figures, including those of a monetary and foreign exchange nature, and the balance of payments and national accounts, among others.

In this context, the Central Bank of Chile compiles and publishes at quarterly frequency the Institutional National Accounts, which include financial accounts and balance sheets by institutional sectors, along with the flows and the stocks of assets and liabilities of the financial instruments. These statistics are useful for macroeconomic analysis because of the integration between the financial markets and the real economy.

For compiling the financial accounts and balances sheets, the database of the Chilean Custody Service (Depósito Central de Valores, DCV) is used. The DCV is an institution that processes and records, electronically, the transactions made at the stock exchanges and at the over the counter

1 Any errors or omissions are responsibility of the authors. The views and ideas expressed in this paper do not necessarily represent those of the Central Bank of Chile or its authorities.
market. Because of that, this institution possesses weekly records of value-to-value data, which is available from June 2008.

These data also allow us to calculate for each instrument statistics like the holder of securities, the issuer sector, the financial transactions (net purchases), the effect of the UF\(^2\), and changes in prices and in the exchange rate.

In this document, the first section describes the information supplied by the DCV, quantifying and characterizing the different instruments. The second section details the methodology of setting market prices. The third section explains the results when this information is included in the financial accounts and in the balance sheets. Finally, in the last section some conclusions are detailed.

2 BACKGROUNDS

2.1 Concepts

The National Accounts of the Chilean economy are calculated with the guidelines of the System of National Accounts (SNA) 1993. Therefore, the financial account and the balance sheets are measured using these concepts, including the definitions of the institutional sectors and of the financial instruments.

The financial account is the statistics that records transactions of financial assets and liabilities between institutional units, and between institutional units and the rest of the world (SNA, 1993). In the SNA, the opening and the closing balance sheet of the accounting period must be accounted to obtain the stocks and the complete records of the changes of assets and liabilities between periods. Schematically, the difference between these balances is explained in the following manner:

Table 1. Balances, transactions and other adjustments

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5) = (1)+(2)+(3)+(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Balance</td>
<td>Net transactions</td>
<td>Other adjustments</td>
<td>Exchange rate</td>
<td>Outstanding amounts</td>
</tr>
<tr>
<td>sheets</td>
<td></td>
<td></td>
<td>valuation and</td>
<td>at the end of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>price valuation</td>
<td>period (closing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>adjustment</td>
<td>balance sheet)</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration.

The column (2) of table 1 represents the transactions of financial and non financial assets. If it corresponds to a transaction of a non financial asset, the operation is registered in the capital account. Furthermore, the financial account contains transactions related to financial assets that take place between the institutional units or with the rest of the world, whose resulting surplus is the net lending or the net borrowing.

In the financial account, the following categories of assets are distinguished:

\(^2\) Unidad de Fomento (UF) is an index used in Chile, whose ISO code is CLF or UF. It was created on January 20, 1967, in order to value mortgage loans and debt securities according to inflation variations.
The instructions of SNA manual indicate that the transactions of these financial assets must be registered according to the price in which the operation was arranged, excluding the costs of services, fees, commissions and other payments made to carry out these transactions. Regarding the time of the registration, these transactions are recorded at the moment when they take place.

As it was previously stated, the main focus of this paper is to value debt securities. In this category are included: bonds, certificates of deposit, commercial papers, debentures, and other instruments traded in the financial markets.

The capital gains (table 1, column 4) are represented by changes in prices of the assets. They can be of two types: profit by neutral possessions that reflect variations in the general level of prices; and profits by real possessions, that reflect variations in relative prices of assets.

### 2.2 Depósito Central de Valores

Depósito Central de Valores³ S.A., (DCV) is a corporation established in accordance with the Chilean Law in 1993. Its regulations and rules depend on the Superintendence of Securities and Insurance (SVS, Chilean supervisor). DCV’s purpose is to electronically process and register transfer transactions in the stock exchange and in the over-the-counter market, besides coordinate and provide the necessary information for financial settlement of such transactions.

About its ownership, DCV belongs to the main agents of the Chilean capital market; stock exchanges, insurance companies, administrators of pension funds, banks and broker-dealers, and from 2010 onwards, the foreign custody companies have also been incorporated.

In relation to the market share, DCV acts as a monopoly in the custody service of electronic securities for the Chilean financial market, being a product of a gradual process (from 1993 to 2001). The first step was to hold all paper stock certificates in one centralized location, and automate the process by keeping electronic records of all certificates and securities clearing and settlement (changes of ownership and other securities transactions).

These securities include time deposits, stocks, and bonds (both public and private), among others. In general terms, the value of fixed income securities held at the DCV was 115,316 million dollars at the end of 2011 (representing 46.3% of the Chilean GDP). This amount represents 96.5% of the total debt securities issued in the Chilean market. Likewise, in 2011, 99% of total transactions corresponded to clearing and settlement performed by the DCV.

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2.3 Financial accounts in the Chilean statistics context

Figure 1 shows the size of the Chilean market as percentage of the GDP, separated by instruments for periods Q4 2008 (left) and Q1 2012 (right). As can be seen, Securities other than shares represent 51.5% (in Q4 2008) and 63.9% (in Q1 2012) of the Chilean GDP, and 10% and 12% of total instruments on each of these periods. This relative importance of the bond market is maybe explained by some characteristics of the Chilean economy, as its opening to international trade, its liberalization of capital flows, or its private pension funds.

Figure 1. Capitalization by instruments, stocks in Q4 2008 (left) and in Q1 2012 (right) (Percentage of GDP, upper indexes; Percentage of the total, lower indexes)

Besides, Figure 2 shows issuer sectors for securities other than shares in Q1 2012 (left graph). It can be seen that the most important sector corresponds to Non-financial corporations (32% of total), followed by Deposit-taking corporations (24%). Likewise, it emphasizes the role of the General Government and the Central Bank, institutions that issue 41% of the total, representing 25.9% of the GDP.

Furthermore, the transactions by issuer of debt securities (right graph) show that the Central Bank has increased its issuance in recent quarters, while non-financial companies have reduced operations of these instruments during the last periods.
3 METHODOLOGY

3.1 Calculation of market prices

The aim of the methodology is to determine the opening and closing balances at market prices, and transactions and gains by nominal possessions, according to the definitions given in point 2 of this document.

The first step of this methodology is to value -at market prices- the balance, at the start and at the end of each period, of debt securities reported by the DCV. In order to calculate this, the daily listing of prices published by the Chilean Superintendence of Pensions (SP) is utilized, prices that are expressed as percentages of the face value.

Nevertheless, the information of securities of the DCV can be reported at face value or at par value\(^4\). For the instruments informed at face values, market prices are obtained using directly the price\(^5\). For instruments reported at par value, by using complementary information, face values are calculated in order to apply the prices of the SP.

Besides, before calculating balances at market prices, and transactions and variations of prices, the interests paid are calculated by each type of instrument. For this purpose, the weekly balances at par values are multiplied by the weekly rate of issuing of the instrument, and by the corresponding currency index.

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\(^4\) Par value: It is face value plus the interests.

\(^5\) Exception to this rule is the bond of the old security social system.
Furthermore, to compute the previously mentioned values, complementary sources are used. Among others, these sources contain the monthly reports with issuance and settlement of bonds recorded in the registration of the Superintendence of Banks and Financial Institutions (SBIF), and corporate bonds and debentures issues statistics of the SVS. These data sources are detailed in table 2.

<table>
<thead>
<tr>
<th>Information</th>
<th>Frequency</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities database</td>
<td>Weekly</td>
<td>Depósito Central de Valores (DCV)</td>
</tr>
<tr>
<td>Prices of financial instruments</td>
<td>Daily</td>
<td>Superintendence of Pensions (SP)</td>
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<tr>
<td></td>
<td></td>
<td><a href="http://www.spensiones.cl">www.spensiones.cl</a></td>
</tr>
<tr>
<td>Indicators by currency type (UF,</td>
<td>Daily</td>
<td>Central Bank of Chile (BCCH)</td>
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<tr>
<td>exchange rate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash flows schedule</td>
<td></td>
<td>Risk America</td>
</tr>
<tr>
<td>Monthly report of issue of bank</td>
<td>Monthly</td>
<td>Superintendence of Banks and Financial</td>
</tr>
<tr>
<td>debt securities</td>
<td></td>
<td>Institutions (SBIF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.sbif.cl">www.sbif.cl</a></td>
</tr>
<tr>
<td>Statistics of issued debentures</td>
<td>Monthly</td>
<td>Superintendence of Securities and Insurances (SVS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.svs.cl">www.svs.cl</a></td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration.

3.2 Calculation of transactions

After estimating market prices, financial operations are calculated. These operations can be measured as the issuance of new debt minus depreciation, or, as interest payments plus accrued interest in a time span. Likewise, this can be expressed as the remainder of the par value at the end of the period, and the par value at the start of the period.

Nevertheless, the simple subtraction between par values in securities, with nominal values expressed in currencies other than Chilean pesos (CLP), incorporates the fluctuation between the unit of emission and CLP. Due to this, the type of nominal denomination should be distinguished among Chilean pesos, American dollars, UF’s, or others.

Whether you consider a bond issued in UF or dollars, the difference between the par values shows the financial operations of the period in the currency of issue (3), corresponding to the payment of coupons or interest, including the effect of fluctuations with respect to the Chilean peso.

Finally, the result of the financial operation in Chilean pesos for securities not issued in CLP is obtained from the difference between par values (1) and (2) in figure 3, multiplied by the average of the monetary index (4). This converts the unit of issuing into Chilean pesos (value of the UF or the exchange rate between Chilean peso and American dollar) obtaining the financial operation in Chilean pesos (5).
3.3 Calculations of revaluations

Some differences in the valuations of transactions for prices changes are contained in the revaluation account. These adjustments are “currency of issue fluctuation effect” and “marking to market effect”.

On the one hand, the “currency of issue fluctuation effect” is the difference between par values in Chilean pesos, and the financial operation previously mentioned. In the case of debt securities issued in UF this value will be zero.

On the other hand, the “marking to market effect” is the difference between market prices, the calculation of the financial operation, and the “currency of issue fluctuation effect”.

Source: Authors’ elaboration.
4 RESULTS

The product obtained from the DCV base, for the period 2008-2012, is worthy because it contains different glances for the analysis, including information by sector issuers and holders, and by currencies and maturities.

The results detailed by issuers (figure 5, left graph) show that Non-financial corporations are the main issuer sector, with emissions of debt securities achieving 13.1% of the Chilean GDP, representing 25% of the total, at June 2012. This sector is followed by the Deposit-taking corporations, which issue values corresponding to 12.5% of the Chilean GDP. Likewise, the Central Bank and the General Government achieve emissions representing 12.3% and 11.8% of the Chilean GDP, respectively.

The results detailed by holders (figure 5, right graph) show that the Chilean pension funds are the most important debt securities holders of the local market, with a portfolio representing roughly 27% of the Chilean GDP, and achieving 50% of the total market at Q2 2012. On the other hand, Insurance companies and Deposit-taking corporations represent respectively 21% and 12% of the total of debt securities market.

Figure 5. Issuers of debt securities by institutional sector (left), and holders of debt securities by institutional sector (right), Q2 2012. (Percentage of the GDP, upper indexes; percentage of the total, lower indexes)

Source: Authors’ elaboration based on DCV data.

With the information shown above, it is possible to analyze the relationships between institutional sectors (see the network in figure 6). The main issuers are the Non-Financial corporations, the General Government, and the Central Bank. On the other hand, the main holders are the Pension

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6 The supervisor of the Chilean pension funds publishes the portfolio value, so this source helps to validate the obtained results.
Funds and the Insurance companies. Furthermore, the main holder sector corresponds to the Pension funds, which hold the most of debt securities issued by other sectors.

Figure 6: Sector interlinkages in Debt Securities, Q2 2012. (percentage of the GDP)

Source: Authors’ calculations based on DCV data and made using the Pajek software.

Note: Arrows between sectors represent the cross-sector exposure “Who issues debt securities and whom holds these debt securities”. The thickness of each line illustrates the size of the exposure. The size of the circle indicates the net position between holding and issuance; red circles indicate “which sector emits more debt securities than what it holds”; and blue circles represent “which sector holds more debt securities than what it issues”.

Balances variations represent other data obtained from the DCV database that can be useful in the construction of financial accounts (figure 7). As can be seen, during the second half of 2009 and the first three quarters of 2011, net emissions increased; however, during 2010 the emission of debt securities decreased (which can be noticed through the size of the financial transactions).

Figure 7. Components of the change in stocks (percentage of annual GDP)

Source: Central Bank of Chile, based on DCV data.
In addition, the DCV also reports the currency denomination, information that enables other features to be explained. Debt securities are expressed in domestic currency and linked to UF in 84%, in domestic currency and nominal term in 15.5%, and in foreign currency (US$) in 0.5%, as shown in figure 8.

**Figure 8. Breakdown by currencies in Q2 2012 (percentage of the total)**

![Diagram showing currency breakdown](source: Authors’ elaboration based on DCV data.)

Finally, DCV database also enables analyzing the information by maturity. The DCV provides information with respect to the residual term of the outstanding instruments. Figure 9 shows the network of the residual value of debt securities between institutional sectors in Q2 2012, for long term (>365 days) in the left graph, and for short term in the right graph (<365 days).

**Figure 9. Sector interlinkages in residual values of debt securities (long term in the left graph and short term in the right graph), Q2 2012 (percentage of the GDP)**

![Sector interlinkages network](source: Authors’ calculations based on DCV data and made using Pajek software.)
The right graph suggests that the Central Bank possesses a bigger residual value in the short term than all other sectors, and this compromise is held with respect to other sectors. On the other hand, in the long term (right graph) the figure shows, among other features, that Non-financial corporations, the General Government, and the Central Bank have compromises in the long term with the Pensions funds sector, mainly.

5. CONCLUSIONS

The main purpose of this document was to explain the use of the DCV database as one of the sources of information in the compilation of the Chilean financial accounts. This dataset contains information of securities other than shares, providing detailed information about issuers, nominal values of each instrument, maturities, and agents who hold each asset.

This document gives details on the calculation of concepts used in the National Accounts, and shows the main results detailed by issuers, holders, relationships between sectors, currencies and maturities. Furthermore, this information is being used for economic analysis, and also for the control of the financial stability at the Central Bank of Chile.
REFERENCES


