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CENTRAL BANK AND DEPOSIT-TAKING CORPORATIONS: NOMINAL REVALUATION OF FINANCIAL ASSETS AND LIABILITIES

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The main purpose of the PICNA Dissemination Notes is to divulge research and technical concepts related to national accounts in an accessible manner, making them understandable to the general public.
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Nominal revaluation of financial assets and liabilities

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Central bank and Deposit-taking corporations: Nominal revaluation of financial assets and liabilities

The System of National Accounts (SNA) records balance sheets, transactions, revaluation, and other changes in the volume of financial assets and liabilities. This report aims to analyse the revaluation of financial instruments, specially focusing on deposits, bank loans and bills.

The value of the asset stocks can change due to transactions and other non – transactional flow such as revaluations and other changes in the volume. Transactions in financial assets result from net acquisitions (gross acquisitions minus disposals), while transactions in liabilities consist of net incurrences (gross incurrences minus repayments).

The formula for calculating the overall change in financial assets and liabilities is:

Closing stocks (CS) =
Opening stocks (OS)
+ Transactions (T)
+ Revaluation (R)
+ Other changes in the volume of assets (OCVA)

CS = OS + T + R + OCVA

The nominal holding gain on a financial asset (or liability) is the increase (or decrease) in its value. A positive revaluation of liabilities equals a nominal holding loss, while a negative revaluation results in a nominal holding gain.

Revaluations are influenced by exchange rate fluctuations (for foreign currency-denominated instruments) and other price changes.

Financial assets and liabilities are classified as follows: a) Monetary gold and Special drawing rights, b) Currency and deposits, c) Debt securities d) Loans, e) Equity and investment fund shares, f) Insurance, pension and standardized guarantee schemes, g) Financial derivatives and employee stock options and h) Other accounts receivable/payable (SNA 2008).

Initially, the focus will be on the revaluing instruments denominated in foreign currency, which applies to both negotiable and non-negotiable assets and liabilities denominated in foreign currency (mainly deposits and loans recorded at nominal value[1]). These financial instruments are valued at nominal units of foreign, reflecting the original funds advanced, less repayments, plus accrued interests.

[1] Nominal values are not adjusted for expected losses (possibilities of not being paid) or for changes in interest rates.

While an exact measurement of the financial flows can be achieved by tracking each instrument´s movement during the period, in practice, an approximation method is often used, starting from balance sheets. Ideally, transactions and other flows should be converted at the exchange rate applicable at the time the flow occurs.

There are four different scenarios outlined in Table Nº1 regarding nominal gains or losses (positive or negative revaluations) involving assets held at the beginning of the period (OS), assets acquired (A) and disposed (D), and assets held at the end of the period (CS), assuming OCVA equals zero. Transactions (T) take place when a financial instrument is acquired or disposed of.

$T = A - D$

$CS = OS + A - D + R + OCVA$

Table Nª1

Nominal gains: Four scenarios

	Opening stock (OS)	Asset acquired (A)	Asset disposed (D)	Closing stock (CS)	Nominal gains / losses (R)
1	X			X	Unrealised
2	X		X		Realised
3		X		X	Unrealised
4		X	X		Realised

Source: own elaboration based on paragraph 12.81, SNA 2008

For example (Table Nº2), in case 1, the opening and closing stocks are the same because no transactions have taken place during the period; therefore, the nominal revaluation in domestic currency is unrealised.

In case 2, the balance sheet at the beginning of the period is USD 150, and USD 50 has seen sold, indicating a USD 100 asset stock at the end of the period. The sale of the asset (transaction) implies realised nominal gains or losses in domestic currency.

In case 3, the opening balance sheet is USD 100, and USD 50 has been bought, resulting in a closing balance sheet of USD 150. The purchase (transaction) indicates unrealised nominal gains or losses in domestic currency.

In case 4, an asset is acquired and disposed of during the period. The sale of this asset (transaction) implies realised nominal gains or losses in domestic currency.

The total value of the revaluation includes both realised and unrealised holding gains or losses. In contrast, the value of the assets and liabilities in the closing stocks only includes unrealised revaluation (as assets have not been sold or liabilities have not been cancelled). When assets are sold or liabilities are repaid, these transactions reflect the realised holding gains or losses (as seen in case 2 and 4).

"When a gain is realised, the sale, use or disposal is recorded in one or other of the flow accounts – the production account, the capital or financial accounts, or the "other" volume change account, as the case may be – depending on the nature of the asset and whether or nor it is disposed of in a transaction" (Chapter 5, OECD 2003).

Table Nª2

Example of nominal gains: Four scenarios

	Opening stock (OS)	Asset acquired (A)	Asset disposed (D)	Closing stock (CS)	Nominal gains / losses (R)
1	USD 100			USD 100	Unrealised
2	USD 150		USD 50	USD 100	Realised
3	USD 100	USD 50		USD 150	Unrealised
4		USD 50	USD 50		Realised

Source: own elaboration based on paragraph 12.81, SNA 2008

Based on Annex - Chapter 12 (SNA 1993), the measurement of nominal holding gains is explained. The variable d_t has two distinct components: a) the acquisition or disposal of an asset (transactions with other institutional units), and b) other changes in the volume of assets. Therefore, the changes in stock quantities ($dt = Q_n – Q_0$) are due solely to these two effects (T or OCVA).

Table Nª3

The measurament of nominal holding gains

Q_n	Quantity in stock at the end of n
P_n	Price at the end of n
Q_0	Quantity in stock at the end of 0
P_0	Price at the end of 0
$P_n \times Q_n$	Value of the stock at the end of n
$P_0 \times Q_0$	Value of the stock at the end of 0
$dt = Q_n - Q_0$	Flow of volume during t (due to transactions or other volume changes in the asset)
$P_t \times dt$	Flow of value during t (due to transactions or other volume changes in the asset)
t	Periods

Source: own elaboration based on Annex - Chapter 12 (SNA 1993)

Nominal holding gains / losses can be expressed as follows:

$R = (P_n - P_0)\, Q_0 - (P_n - P_t)\, d_t$

$R = (P_n \times Q_n - P_0 \times Q_0) - P_t \times d_t$

"It can also be seen that holding gains are the duals of the values of transactions and other quantity changes in the sense that the values of transactions and other quantity changes are obtained by applying prices to changes in quantities whereas the values of holding gains are obtained by applying quantities to changes in prices" (Paragraph 5, Annex Chapter 12, SNA 1993).

If $d_t = 0$ ($Q_n = Q_0$), nominal holding gains will be $R = (P_n - P_0)\, Q_0$.

If d_t is positive: The term $(P_n - P_t)\, d_t$ measures the nominal holding gain due to the increase in the quantity of the asset that occurs between when the time it was acquired and the end of the period.

If d_t is negative: The term $(P_n - P_t)\, d_t$ measures the nominal holding gain due to the disposed quantity of the asset. This value is subtracted from $(P_n - P_0)\, Q_0$.

Based on an IMF method (Annex 5.1, IMF 2016), an example is provided of stocks of deposits in foreign currency (USD) and in domestic currency ($). The exchange rate refers to the number of units of domestic currency per unit of foreign currency ($/USD).

The opening and closing balance sheets in domestic currency are calculated by multiplying the foreign currency stocks by the exchange rates at the beginning and end of the period (Eb and Ee), respectively.

Opening stock in domestic currency: USD 100 x 200 = $ 20.000

Closing stock in domestic currency: USD 150 x 230 = $ 34.500

Table Nº4

Transactions and revaluation estimate

Opening stock in foreign currency	OS	USD 100
Closing stock in foreign currency	CS	USD 150

Opening stock in domestic currency	OS	$ 20.000
Closing stock in domestic currency	CS	$ 34.500

Beginning-of-period exchange rate	Eb	200
End-of-period exchange rate	Ee	230
Average exchange rate	Ea	220

Transactions in domestic currency	T	$ 11.000
Revaluation in domestic currency	R	$ 3.500

Source: own elaboration based on Annex 5.1, IMF (2016)

$CS = $OS + $T + $R[2]

$T = (USD CS – USD OS) x Ea

$R = (Ee – Ea) x USD CS – (Eb – Ea) x USD OS

The estimation of transactions is determined by calculating the difference between closing and opening stocks in foreign currency (USD closing stock and USD opening stock), multiplied by the average exchange rate (Ea)[3]. This can be expressed as follows: (USD 150 – USD 100) x 220 = $ 11.000. The increase in net deposits (USD 50) due these transactions is valued at 220. Ea is intended to represent the average rate at which all transactions occurred during the period. If the amounts and timing of deposits transactions are unknown, this method can serve as an approximation.

The revaluation estimate is calculated as follows: (230 – 220) x USD 150 – (200 – 220) x USD 100 = $ 1.500 + $ 2.000 = $ 3.500.

Another way of expressing this is: [(230 – 220) / 230] x $ 34.500 – [(200 – 220) / 200] x $ 20.000 = $ 1.500 + $ 2.000 .

This is a positive nominal holding gain on deposits denominated in foreign currency from the perspective of the creditor (the owner of the asset). Conversely, for the debtor (issuing bank), it represents a nominal holding loss.

To clarify the revaluation estimates, the opening stock is established as of December 31st, 2021, and the closing stock is as of March 31st, 2022. During the first quarter, the net acquisition amounts to USD

[2] OCVA is zero

[3] Stocks or Balance sheets

50 from the creditor`s perspective. In case 1, the transaction occurred in January, while in case 2, the creditor brought in USD 25 in January and another USD 25 in February.

In both cases (1 and 2), the estimated revaluation is $ 3.500 during 2022. The amount of $ 2.000 reflects the effect of the exchange rate increase (20 = 220 - 200) on the opening stock (USD 100). Additionally, $1.500 results from the increase in exchange rates (10 = 230 – 220) on the closing stock (USD 150).

Table Nº5

Stocks, transactions and revaluation

		Stock in foreign currency	Transactions in foreign currency	Exchange rate	Revaluation in domestic currency
Case 1	December 31st, 2021	USD 100		200	
	January, 2022		USD 50	220	$ 2.000
	February, 2022				$ 1.500
	March 31st, 2022	USD 150		230	
Case 2	December 31st, 2021	USD 100		200	
	January, 2022		USD 25	220	$ 2.000
	February, 2022		USD 25	220	$ 1.500
	March 31st, 2022	USD 150		230	

Source: own elaboration based on Annex 5.1, IMF (2016)

The total flow in domestic currency is $14.500, which can be disaggregated into: financial transactions ($11.000) and revaluation ($3.500).

Table Nº6

Transactions and revaluation in domestic currency estimates

Opening stock in domestic currency	OS	$ 20.000
Transaction flows	T	$ 11.000
Revaluation (other flows)	R	$ 3.500
Closing stock in domestic currency	CS	$ 34.500

Source: own elaboration based on Annex 5.1, IMF (2016)

The stocks and flows of deposits recorded in the System of National Account are as follows (assuming that households and non – financial corporations are creditors):

Table Nº7

System of National Account

		Banking sector		Households and Non-financial corporations	
Stocks	Deposit assets Deposit liabilities Net worth		$ 20.000	$ 20.000	
Transactions	Net lending (+) / net borrowing (–) Increase in deposit assets Increase in deposit liabilities		$ 11.000	$ 11.000	
Revaluation	Asset revaluation Liabilities revaluation Changes in net worth		$ 3.500	$ 3.500	
Stocks	Deposits assets Deposits liabilities Net worth		$ 34.500	$ 34.500	

Source: own elaboration based on SNA (2008)

The stocks and flows of loans recorded in the System of National Account are as follows (assuming that households and non – financial corporations are debtors):

Table Nº 8

System of National Account

Stocks and flows		Banking sector		Households and Non-financial corporations	
Stocks	Loan assets Loan liabilities Net worth	$ 20.000			$ 20.000
Transactions	Net lending (+) / net borrowing (–) Increase in loan assets Increase in loan liabilities	$ 11.000			$ 11.000
Revaluation	Asset revaluation Liabilities revaluation Changes in net worth	$ 3.500			$ 3.500
Stocks	Loan assets Loans Liabilities Net worth	$ 34.500			$ 34.500

Source: own elaboration based on SNA (2008)

Based on statistics regarding the stocks of non – financial private sector deposits (in USD) in Argentina, the value of revaluation in domestic currency during 2022 is estimated. Presented below (Table N°9) are the balance sheets at the end of March, June, October and December, along with the estimated flows (transactions and revaluation) during each quarter of 2022.

Table Nº9

Stocks, transactions and revaluation of private sector deposits (in millions)

	Ending Balance sheet in foreign currency	Average exchange rate	End-of-period exchange rate	Ending Balance sheet in domestic currency	Transactions in domestic currency	Revaluation in domestic currency
December 31st, 2021	**USD 15.732**		**103**	**$ 1.621.025**		
1st Quarter 2022		107			-$ 47.827	$ 122.883
March 31st, 2022	**USD 15.283**		**111**	**$ 1.696.081**		
2nd Quarter, 2022		118			$ 31.095	$ 219.541
June 30th, 2022	**USD 15.547**		**125**	**$ 1.946.718**		
3rd Quarter, 2022		135			-$ 81.938	$ 336.401
September 30th, 2022	**USD 14.942**		**147**	**$ 2.201.181**		
4th Quarter, 2022		162			$ 228.397	$ 466.115
December 31st, 2022	**USD 16.348**		**177**	**$ 2.895.693**		

Source: own elaboration based on the Central Bank of Argentina

During the second and fourth quarter, the net deposits have increased, resulting in positive transactions. Conversely, in the first and third quarters, the net deposits have decreased, leading to negative transactions. In this context, the sale transactions indicated nominal revaluations realised in domestic currency. Throughout the year and in each quarter, the nominal revaluation was positive.

Based on statistics regarding the stocks of non - financial private sector loans (in USD) in Argentina and applying the same method (IMF 2016), the total flow in domestic currency during 2022 is estimated (Table N°10).

Table Nº10

Stocks, transactions and revaluation of private sector loans (in millions)

	Ending Balance sheet in foreign currency	Average exchange rate	End-of-period exchange rate	Ending Balance sheet in domestic currency	Transactions in domestic currency	Revaluation in domestic currency
December 31st, 2021	**USD 3.935**		**103**	**$ 405.462**		
1st Quarter 2022		107			-$ 14.167	$ 30.644
March 31st, 2022	**USD 3.802**		**111**	**$ 421.939**		
2nd Quarter, 2022		118			$ 22.850	$ 55.569
June 30th, 2022	**USD 3.996**		**125**	**$ 500.359**		
3rd Quarter, 2022		135			-$ 44.693	$ 84.391
September 30th, 2022	**USD 3.666**		**147**	**$ 540.057**		
4th Quarter, 2022		162			-$ 22.905	$ 107.225
December 31st, 2022	**USD 3.525**		**177**	**$ 624.377**		

Source: own elaboration based on the Central Bank of Argentina

By 2022, Argentina has experienced the coexistence of several exchange rates. The official dollar (wholesale exchange rate detailed in Communication "A" 3500) refers to the exchange rate in the FX market where foreign traders can access foreign currency.

"The Central Bank will request the ensemble of banks to inform the purchase and sale exchange rates for the US dollar for transactions payable in pesos and in US dollars" (Communication "A" 3500, Central Bank of Argentina).

The official dollar is used almost exclusively in international trade, and transactions are conducted directly between the Central Bank and commercial banks.

On the other hand, the Electronic Payment Market dollar (MEP dollar) is the exchange rate through which savers can access foreign currency in the local market. In this system, agents buy bonds denominated in domestic currency and then sell the same bonds denominated in foreign currency. This operation determines an implicit rate of exchange.

The official exchange rate is used by the Central Bank to convert dollar - denominated financial instruments into domestic currency. The significant point is that the official dollar is lower than the MEP dollar, so savers use the MEP dollar to estimate their revaluation gains / losses (not the official dollar). This results in revaluation gains / losses perceived differently from the perspective of banks (official dollar) compared to savers (MEP dollar).

Below is the MEP exchange rate data (quarterly average and at the end of each quarter, see Table N°11):

Table Nº11

Electronic Payment Market dollar (MEP Exchange rate)

	Average exchange	End-of-period
December 31st, 2021		**198**
1st Quarter 2022	203	
March 31st, 2022		**191**
2nd Quarter, 2022	211	
June 30th, 2022		**250**
3rd Quarter, 2022	287	
September 30th, 2022		**302**
4th Quarter, 2022	308	
December 31st, 2022		**328**

Source: Newspaper Ambito financiero

Shown below is an example based on exercise 6 (Chapter 8, OECD 2006) which estimates the effect of revaluation. In it, the stock of loans in foreign currency (USD) are presented, and starting from the stocks in domestic currency, the transactions and revaluation during the period are calculated.

The exchange rate variation is denoted as follows r = (Ee – Eb) / Eb. The method requires estimating the revaluation effect by using the domestic currency as *numéraire*. Thus, it recalculates the exchange rate as the number of units of foreign currency per unit of domestic currency (USD / $). The re-expressed exchange rates are 0,005 = 1 / 200 and 0,004 = 1 / 230. In this example, the exchange rate has decreased -13%, thus (0,004 – 0,005) / 0,005.

Table Nº12

Balance sheets and exchange rates

Opening stock in foreign currency	OS	USD 100
Closing stock in foreign currency	CS	USD 150

Opening stock in domestic currency	OS	$ 20.000
Closing stock in domestic currency	CS	$ 34.500

Beginning-of-period exchange rate	USD/$	Eb	0,005
End-of-period exchange rate	USD/$	Ee	0,004

Source: own elaboration based on Exercise 6 - Chapter 8, OECD (2006)

$CS = $OS + $T + $R[4]

$CS = $OS + $T + r*$OS + r/2*$T

CS	OS	T	R = r x OS	R = r/2 x T
$ 34.500	$ 20.000	$ T	-$ 2.600	$ -0,065 * T

It is assumed that the transaction occurred at the midpoint of the period (r/2). Thus, the primary objective is to calculate the transaction amount, denoted as T.

$CS - $OS – r x $OS = (1 + r/2) x $T

$T = ($CS - $OS – r x $OS) / (1 + r/2)

$T = ($34.500 - $20.000 - $2.600) / 0,935

$T = $18.289

[4] OCVA is zero

The value of the transactions is $18.289. The revaluation is subdivided into two components. The revaluation of the stock held at the beginning of the period is calculated as r x OS = - 0.13 x $20.000 = - $2.600 = - 0.13 x USD100 x 200 and the revaluation for the transaction is calculated as r/2 x T = - 0.065 x $18.289 = - $1.189. The first component arises from the effect of a 13% decrease in the exchange rate since the beginning of the reporting period. The second component is due to a 6.5% depreciation of the exchange rate at the time the transaction took place. The total nominal losses in domestic currency amount to -$3.789 (calculated as -$2.600 - $1.189).

Table Nº13

Transactions and revaluation estimates

Opening stock in domestic currency	OS	$ 20.000
Transactions in domestic currency	T	$ 18.289
Revaluation of the stock held at the beginning of the period	R	-$ 2.600
Revaluation for the transaction	R	-$ 1.189
Closing stock in domestic currency	CS	$ 34.500

Source: own elaboration based on Exercise 6 - Chapter 8, OECD (2006)

The resulting estimates for transaction and revaluation differ from the methods outlined by the IMF and the OECD in previous analyses. Several key points should be noted. The prior revaluation value was $3.500, while the total flow amounts to $14.500.

In the OECD example, the revaluation effect of holding assets since the beginning of the period (valued at $20.000) is $2.600, reflecting a 13% depreciation in the exchange rate. Consequently, bank issuers experience a positive nominal gain in domestic currency, as their creditors assets have increased by $2.600. Additionally, banks realised nominal gains of $1.189 because, by the time payment was cancelled midway through period ($18.289), the exchange rate had depreciated 6.5%. While the total flow remains $14.500, its disaggregation differs from previous calculations.

Further, the transactions and revaluation of non – financial private sector deposits and loans in Argentina have been recalculated (refer to Table N°14 and Table N°15).

Table Nº 14

Stocks, transactions and revaluation of private sector deposits (in millions)

	Ending Balance sheet in foreign currency	End-of-period exchange rate (USD/$)	Exchange rate depreciation	Ending Balance sheet in domestic currency	Transactions in domestic currency	Revaluation in domestic currency (1)	Revaluation in domestic currency (2)
December 31st, 2021	**USD 15.732**	0,010		$ 1.621.025			
1st Quarter 2022			-0,072		$ 198.093	-$ 115.952	-$ 7.085
March 31st, 2022	**USD 15.283**	0,009		$ 1.696.081			
2nd Quarter, 2022			-0,114		$ 470.208	-$ 192.841	-$ 26.731
June 30th, 2022	**USD 15.547**	0,008		$ 1.946.718			
3rd Quarter, 2022			-0,150		$ 590.824	-$ 292.044	-$ 44.317
September 30th, 2022	**USD 14.942**	0,007		$ 2.201.181			
4th Quarter, 2022			-0,168		$ 1.162.868	-$ 370.491	-$ 97.864
December 31st, 2022	**USD 16.348**	0,006		$ 2.895.693			

(1) Revaluation of the stock held at the beginning of the period, (2) Revaluation for the transaction
Source: own elaboration based on the Central Bank of Argentina

Table Nº 15

Stocks, transactions and revaluation of private sector loans (in millions)

	Ending Balance sheet in foreign currency	End-of-period exchange rate (USD/$)	Exchange rate depreciation	Ending Balance sheet in domestic currency	Transactions in domestic currency	Revaluation in domestic currency (1)	Revaluation in domestic currency (2)
December 31st, 2021	**USD 3.935**	0,010		$ 405.462			
1st Quarter 2022			-0,072		$ 47.167	-$ 29.003	-$ 1.687
March 31st, 2022	**USD 3.802**	0,009		$ 421.939			
2nd Quarter, 2022			-0,114		$ 134.012	-$ 47.974	-$ 7.618
June 30th, 2022	**USD 3.996**	0,008		$ 500.359			
3rd Quarter, 2022			-0,150		$ 124.067	-$ 75.063	-$ 9.306
September 30th, 2022	**USD 3.666**	0,007		$ 540.057			
4th Quarter, 2022			-0,168		$ 191.321	-$ 90.900	-$ 16.101
December 31st, 2022	**USD 3.525**	0,006		$ 624.377			

(1) Revaluation of the stock held at the beginning of the period, (2) Revaluation for the transaction
Source: own elaboration based on the Central Bank of Argentina

Now, we will examine short – term securities. The LELIQs (Liquidity Bills) and NOTALIQs (Liquidity Notes) are instruments issued by the Central Bank of Argentina (BCRA liabilities) in domestic currency. These instruments are primarily acquired by the banking sector, acting as creditors.

Liquidity bills (LELIQ) are discount instruments issued by the Central Bank of Argentina through daily auctions. These securities have maturities of less than one year and do not pay interest prior to their expiration due to the short-term nature of the instruments. They are sold at a discount to their nominal value during these daily auctions. Buyers pay a discounted price (below par value) and receive the full nominal value upon maturity. The holder's income, representing the interest earned, is the difference between the purchase price and the nominal value of the bill. Maturities for these instruments are available in increments of 28, 91, 182 and 364 days (equivalent to 1, 3, 6 and 12 months).

Below we presented the balance sheets, issuance, and repayments of LELIQ and NOTALIQ. These stocks, recorded at the end of each quarter of 2022, along with transactions throughout the year, are assessed at nominal prices.

Table Nº 16

Stocks, Issuance and Repayments of Central Bank`s Bills (LELIQ y NOTALIQ)
Nominal value - In millions of domestic currency

	Balance sheets	Issuance transactions	Repayment transactions	Revaluation
December 31st, 2021	$ 1.782.205			
1st Quarter, 2022		$ 11.250.064	$ 9.020.506	$ 0
March 31st, 2022	$ 4.011.763			
2nd Quarter, 2022		$ 13.246.945	$ 11.939.560	$ 0
June 30th, 2022	$ 5.319.148			
3rd Quarter, 2022		$ 16.961.021	$ 15.550.766	$ 0
September 30th, 2022	$ 6.729.403			
4th Quarter, 2022		$ 20.313.240	$ 19.421.059	$ 0
December 31st, 2022	$ 7.621.584			

Source: own elaboration based on the Central Bank of Argentina

The discounted price (DP) is calculated using the following formula:

DP = NV / (1 + r x n / 364)

NV = nominal value

r = annual interest rate

n = numbers of days from issuance to maturity

d / 364 = factor to annualise the interest rate

For instance, on December 29th, 2022, the Central Bank of Argentina issued LELIQ bills with a nominal value of $1.074.024. These bills were due on January 26th, 2023 (resulting in a maturity period of 28 days) and their interest rate was 75%. Consequently, the purchase price (discounted price) is $1.015.441.

$1.015.441 = $1.074.024 / (1 + 0,75 x 28 / 364)

The LELIQ purchase prices were calculated for the transactions that took place during 2022. Thus, the discounted prices (market prices) are presented in Table Nª17.

Table Nº 17

Issuance, maturity date and interest payment of Central Bank`s Bills (LELIQ)
Market value - In millions of domestic currency

	Issuance transactions	Maturity date	Average interest rate	Interest income
December 31st, 2021				
1st Quarter, 2022 March 31st, 2022	$ 10.796.259	28 / 128 days	42%	$ 453.805
2nd Quarter, 2022 June 30th, 2022	$ 12.842.544	28 / 128 days	49%	$ 404.401
3rd Quarter, 2022 September 30th, 2022	$ 16.126.606	28 / 128 days	64%	$ 834.415
4th Quarter, 2022 December 31st, 2022	$ 20.045.456	28 / 128 days	76%	$ 267.784

Source: own elaboration based on the Central Bank of Argentina

"The market price is equal to the present value of that future payment – i.e., the par value discounted to the present at the current market rate of interest – plus the present value of the remaining stream of cash interest payments, if any. Variations in market rates of interest therefore cause instantaneous reciprocal variations in the market prices of these securities which generate nominal holding gains or losses for both the creditors and the debtors – i.e., the current holders of the securities and the issuers. These price changes must be distinguished from changes in market values due to the accumulation of reinvested interest" (Chapter 5, OECD 2003).

The market price of a bond issued at a discount is below its face value and the difference between these prices represents the interest that the issuer is obligated to pay over the life of the bond. In principle, the accrued interest is treated as being "reinvested" by the bondholder. Thus, the gradual increase in the market price of a bond is essentially a volume increase rather a price increase.

A bill or bond sold at a discount is an example of quality change. The increase in the market price is attributed to the accumulation of accruing interest; therefore, this is not a "price" effect, as the instrument is changing qualitatively. The quality effect arises from the reinvested interests recorded in the financial accounts as supplementary financing. There are no nominal holding gains / losses (Chapter 5, OECD 2003).

"*The increases in value due to the accrual of interest are recorded in the distribution of primary income account and the financial account and not in the revaluation account*", paragraph 12.109 SNA 2008.

The flows recorded in the System of National Account are:

Table Nº 18

System of National Account

		Central bank		Banking sector	
Stocks, Dec 31st 2021	**LELIQ assets** **LELIQ liabilities** **Net worth**		**1.782.205**	**1.782.205**	
Transactions 1st quarter 2022	Accrued interest Net lending (+) / net borrowing (–) Issuance Redemption Interest unpaid		 $ 10.796.259 -$ 9.020.506 $ 453.805	 $ 10.796.259 -$ 9.020.506 $ 453.805	
Stocks, March 31st 2022	**LELIQ assets** **LELIQ liabilities** **Net worth**		**4.011.763**	**4.011.763**	
Transactions 2nd quarter 2022	Accrued interest Net lending (+) / net borrowing (–) Issuance Redemption Interest unpaid		 $ 12.842.544 -$ 11.939.560 $ 404.401	 $ 12.842.544 -$ 11.939.560 $ 404.401	
Stocks, June 30th 2022	**LELIQ assets** **LELIQ liabilities** **Net worth**		**5.319.148**	**5.319.148**	
Transactions 3rd quarter 2022	Accrued interest Net lending (+) / net borrowing (–) Issuance Redemption Interest unpaid		 $ 16.126.606 -$ 15.550.766 $ 834.415	 $ 16.126.606 -$ 15.550.766 $ 834.415	
Stocks, Sep 30th, 2022	**LELIQ assets** **LELIQ liabilities** **Net worth**		**6.729.403**	**6.729.403**	
Transactions 4th quarter 2022	Accrued interest Net lending (+) / net borrowing (–) Issuance Redemption Interest unpaid		 $ 20.045.456 -$ 19.421.059 $ 267.784	 $ 20.045.456 -$ 19.421.059 $ 267.784	
Stocks, Dec 31st 2022	**LELIQ assets** **LELIQ liabilities** **Net worth**		**7.621.584**	**7.621.584**	

Source: own elaboration based on SNA (2008)

The non – transferable Treasury bills have been issued in foreign currency, with a maturity period of 10 years and yield equal to interest rate accrued by the international reserves (a maximum of the Libor rate minus one percentage point). The central bank is the only creditor of these securities, which cannot be transferred to another holder.

This fully amortised security is completely paid off by the end of the maturity period and, accrued interest is paid every 6 months.

Table Nº 19

Stocks of Non – transferable Treasury bills (in millions)

	Interest rate	Maturity date	Original nominal value in foreign currency	Residual nominal value in foreign currency	Inssuance in foreign currency	Payments in foreign currency
December 31st, 2021	Libor-1%	2023 - 2032	**USD 57.509**	**USD 57.509**		
1st Quarter 2022					USD 203	USD 0
March 31st, 2022	Libor-1%	2023 - 2032	**USD 57.712**	**USD 57.712**		
2nd Quarter, 2022					USD 7.758	-USD 7.758
June 30th, 2022	Libor-1%	2023 - 2032	**USD 57.712**	**USD 57.712**		
3rd Quarter, 2022					USD 2.732	USD 0
September 30th, 2022	Libor-1%	2023 - 2032	**USD 60.444**	**USD 60.444**		
4th Quarter, 2022					USD 1.263	USD 0
December 31st, 2022	Libor-1%	2023 - 2032	**USD 61.707**	**USD 61.707**		

Source: own elaboration based on Ministry of Economy

In Table Nª20 the transactions and revaluations are calculated using the IMF method, while in Table Nª21, the same flows are calculated using the OECD example. In both cases (IMF and OECD), the total flow is the same, but the disaggregation of transactions and revaluations differs.

Table Nº 20

Stocks, transactions and revaluation of Non – transferable Treasury bills (in millions)

	Nominal value in foreign currency	Average exchange rate	End-of-period exchange rate	Nominal value in domest currency	Transactions in domestic currency	Revaluation in domestic currency
December 31st, 2021	**USD 57.509**		**103**	**$ 5.925.774**		
1st Quarter 2022		107			$ 21.626	$ 457.433
March 31st, 2022	**USD 57.712**		**111**	**$ 6.404.833**		
2nd Quarter, 2022		118			$ 0	$ 821.635
June 30th, 2022	**USD 57.712**		**125**	**$ 7.226.468**		
3rd Quarter, 2022		135			$ 369.948	$ 1.307.900
September 30th, 2022	**USD 60.444**		**147**	**$ 8.904.316**		
4th Quarter, 2022		162			$ 205.222	$ 1.820.587
December 31st, 2022	**USD 61.707**		**177**	**$ 10.930.124**		

Source: own elaboration based on Ministry of Economy

Table Nº 21

Stocks, transactions and revaluation of Non – transferable Treasury bills (in millions)

	Nominal value in foreign currency	End-of-period exchange rate (USD/$)	Exchange rate depreciation	Nominal value in domest currency	Transactions in domestic currency	Revaluation in domestic currency (1)	Revaluation in domestic currency (2)
December 31st, 2021	**USD 57.509**	0,010		**$ 5.925.774**			
1st Quarter 2022			-0,072		$ 936.422	-$ 423.872	-$ 33.491
March 31st, 2022	**USD 57.712**	0,009		**$ 6.404.833**			
2nd Quarter, 2022			-0,114		$ 1.643.270	-$ 728.217	-$ 93.418
June 30th, 2022	**USD 57.712**	0,008		**$ 7.226.468**			
3rd Quarter, 2022			-0,150		$ 2.985.925	-$ 1.084.105	-$ 223.972
September 30th, 2022	**USD 60.444**	0,007		**$ 8.904.316**			
4th Quarter, 2022			-0,168		$ 3.848.408	-$ 1.498.727	-$ 323.872
December 31st, 2022	**USD 61.707**	0,006		**$ 10.930.124**			

(1) Revaluation of the stock held at the beginning of the period, (2) Revaluation for the transaction
Source: own elaboration based on Ministry of Economy

Below the flows recorded in the System of National Account are presented (Table N°22, IMF method). The interest rate accrued by the non – transferable Treasury bills has not been estimated.

Table № 22

System of National Account

		Central bank		Goverment	
Stocks, Dec 31st 2021	**Non - Transferable Treasury bills** **Non - Transferable Treasury bills** **Net worth**	**$ 5.925.774**			**$ 5.925.774**
Transactions 1st quarter 2022	Accured interest Net lending (+) / net borrowing (–) Issuance	$ 21.626			$ 21.626
Revaluation 1st quarter 2022	Asset revaluation Liabilities revaliation Changes in net worth	$ 457.433			$ 457.433
Stocks, March 31st 2022	**Non - Transferable Treasury bills** **Non - Transferable Treasury bills** **Net worth**	**$ 6.404.833**			**$ 6.404.833**
Transactions 2nd quarter 2022	Accured interest Net lending (+) / net borrowing (–) Issuance				
Revaluation 2nd quarter 2022	Asset revaluation Liabilities revaliation Changes in net worth	$ 821.635			$ 821.635
Stocks, June 30th 2022	**Non - Transferable Treasury bills** **Non - Transferable Treasury bills** **Net worth**	**$ 7.226.468**			**$ 7.226.468**
Transactions 3rd quarter 2022	Accured interest Net lending (+) / net borrowing (–) Issuance	$ 369.948			$ 369.948
Revaluation 3rd quarter 2022	Asset revaluation Liabilities revaliation Changes in net worth	$ 1.307.900			$ 1.307.900
Stocks, Sep 30th, 2022	**Non - Transferable Treasury bills** **Non - Transferable Treasury bills** **Net worth**	**$ 8.904.316**			**$ 8.904.316**
Transactions 4th quarter 2022	Accured interest Net lending (+) / net borrowing (–) Issuance	$ 205.222			$ 205.222
Revaluation 4th quarter 2022	Asset revaluation Liabilities revaliation Changes in net worth	$ 1.820.587			$ 1.820.587
Stocks, Dec 31st 2022	**Non - Transferable Treasury bills** **Non - Transferable Treasury bills** **Net worth**	**$ 10.930.124**			**$ 10.930.124**

Source: own elaboration based on SNA (2008)

The value of the financial stocks can change due to transactions and other flows which are not transactions (mainly nominal revaluations). One aim is to disaggregate the total flows into transactions and changes in the price of financial assets.

The main methods to estimate the nominal revaluation of the central bank and deposit-taking corporations` financial instruments have been analysed. The stocks, transactions and revaluations of deposits and loans (banks' liabilities and assets) denominated in foreign currency have been discussed.

Furthermore, the nominal revaluation of the Central bank bills (banking sector`s assets) and the non – transferable Treasury bills (central bank`s assets) have been estimated. Similarly, the goal was to differentiate transactions and revaluations (total flows) and their consistency with stocks.

The total value of the revaluation includes realised and unrealised gains or losses. Given that the closing stocks only include unrealised revaluations, when an asset is sold or a liability is repaid, these transactions (sale or repayment) contain realised gains or losses.

When the amounts and timing of transactions are unknown, an approximation method can be used. The idea is to estimate the transaction amount based on the time it is assumed to have occurred and the exchange rate at that time (for instruments denominated in foreign currency).

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