5 Stocks, Flows, and Accounting Rules

I. Introduction

5.1 This chapter discusses financial stocks and flows, and the accounting rules for the compilation of monetary and financial statistics. The stock and flow concepts and accounting rules follow the *System of National Accounts 2008* (*2008 SNA*) and other statistical manuals. The framework used is a consistent system that, in principle, measures each financial flow or stock position identically for the parties involved, using the same accounting rules. The framework is also an integrated system in which changes in stocks of financial assets and liabilities account for all flows in a period. It divides flows into *transactions*, *revaluations (holding gains and losses)*, and *other changes in the volume of assets* (OCVA).

5.2 In addition to the characteristics of stocks and flows and the accounting rules, this chapter presents the principles of aggregation, netting, and consolidation. Four annexes and five boxes focus on special issues and provide numerical examples.

II. Stocks and Flows

5.3 This section deals with recording and valuation of stocks and flows as defined within the framework of the *2008 SNA*, focusing mainly on financial assets and liabilities.

5.4 *Stocks refer to holdings of assets and liabilities at a point in time. Flows refer to economic actions and effects of events within an accounting period.*

5.5 *Economic flows*[1] *reflect the creation, transformation, exchange, transfer or extinction of economic value within a period of time.* They involve changes in the volume, composition, or value of an institutional unit's assets and liabilities during the accounting period, thus constituting the difference between the opening stock position and the closing stock position. Flows consist of transactions between institutional units and *other flows* that in turn consist of revaluations and OCVA during the period of time.

5.6 *A transaction is an interaction between institutional units by mutual agreement or through the operation of the law and involves an exchange of value or transfer, or an action within an institutional unit that is analytically useful to treat like a transaction, often because the unit is operating in two different capacities. Other flows are changes in the volume, value, or classification of assets and liabilities that do not result from transactions.*

5.7 *A revaluation (holding gain/loss or valuation change) of assets and liabilities occurs whenever an asset increases/decreases in monetary value or a liability decreases/increases in monetary value because of a change in their prices and/or the exchange rate.*

5.8 *The OCVA account records the changes in assets and liabilities between opening and closing stocks that are neither due to transactions nor to valuation changes.*

5.9 The terms used in the framework in which changes in stocks account for all flows in a period are as follows:[2]

  a. Opening stock (OS). The value of the outstanding position in, or holdings of, assets or liabilities at the beginning of an accounting period.

  b. Transactions (T). Flows that constitute transactions as defined in paragraph 5.6.

  c. Revaluations or valuation changes (VC). Flows arising from changes in the prices of assets and

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[1] "Flows" is used as a short term for "economic flows" in the rest of this *Manual*.

[2] These terms also apply to nonfinancial assets.

liabilities, including changes in the exchange rates.

d. OCVA. Examples of OCVA are write-offs of claims, reclassification of assets, and monetization or demonetization of gold (see paragraph 5.21).

e. Closing Stock (CS). The value of the position in, or holdings of, assets or liabilities at the end of an accounting period. CS equals the value of the opening stock plus flows arising from transactions, revaluations, and OCVA.

5.10 Table 5.1 provides an example for recording stocks and flows for an asset or liability. The total flow during the period is divided into three components: *transactions, valuation changes,* and *OCVA*.

A. Adding-up Identities

5.11 The stock and flow framework for monetary statistics has both *vertical* and *horizontal adding-up identities,* which can either be used for quality control purposes or to derive data residually (see Table 5.2). The vertical adding-up identities (vertical check) are that total assets should equal total liabilities including equity.

5.12 The horizontal adding-up requirements use the stock/flow identity, where the sum of the opening stock, transactions, revaluations, and OCVA during the reporting period is equal to the closing stock for each category of assets and liabilities (see Table 5.1):

$$(5.1) \quad CS \equiv OS + T + VC + OCVA$$

5.13 Each category of assets and liabilities requires the collection or estimation of separate data for OS, CS, OCVA and, if possible, for at least one of the remaining flows—either T or VC. In this case, the data for either T or VC can be obtained residually, using the horizontal adding-up requirement.

B. Flows

5.14 Flows discussed in the context of monetary and financial statistics mostly constitute the flows in financial assets and/or liabilities. This *Manual* recommends compiling data on stocks and on each of the three separate flow components—transactions, revaluations, and OCVA. Detailed flow data facilitate a more thorough analysis for monetary policy and other macroeconomic policy purposes, and fosters consistency between the monetary and financial statistics on one side and the national accounts, external sector statistics, and government finance statistics on the other side, which also contain detailed flow data.

Transactions

5.15 Every transaction is either a monetary or non-monetary transaction. *A monetary transaction is one in which one institutional unit makes a payment (receives a payment) or incurs a liability (acquires an asset) stated in units of currency. A nonmonetary transaction is one that is not initially stated in units of currency.* Monetary and financial statistics are concerned mostly with monetary transactions, as the focus is on transactions in financial instruments (see Table 5.3).

5.16 *Interest is a form of investment income that is receivable by the owners of certain kinds of financial assets, namely deposits, debt securities, loans, and other accounts receivable for putting the financial assets at the disposal of another institutional unit. Income on Special Drawing Rights (SDR) holdings*

			VC			
	OS	T	Due to exchange rate changes	Due to other price changes	OCVA	CS
Asset/liability	100	+10	+3	−2	−5	106

Table 5.1 Stocks and Flows for a Financial Asset or Liability Category

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

Table 5.2 Stock and Flow Data: Adding-up Requirements						
	OS	**T**	**VC**	**OCVA**	**CS**	**CS – OS = T – VC – OCVA**
Assets						
Asset 1						0
Asset 2						0
. . .						. . .
Asset *m*						0
Total Assets (*TA*)						**0**
Liabilities, including equity						
Liability 1						0
Liability 2						0
. . .						. . .
Liability *n*						0
Total Liabilities (TL)						**0**
Vertical check: *TA – TL*	**0**	**0**	**0**	**0**	**0**	**0**

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

and allocations is also included in interest. Interest may be a predetermined sum of money, or a fixed or variable percentage of the principal outstanding. For financial assets and liabilities, interest can (and usually does) accrue on the principal amount, resulting in an interest cost for the debtor (and a corresponding income for the creditor), which is recorded as a transaction. When this cost is paid periodically, as commonly occurs, it is known as an interest payment. All other payments by the debtor to the creditor that reduce the principal amount outstanding are known as principal payments.

Revaluations

5.17 Revaluations result from price changes and can accrue on almost all economic assets held for any length of time during a reporting period. Revaluations may be unrealized or realized.

5.18 An unrealized revaluation is one accruing on an asset that is still owned or a liability that is still outstanding at the end of the reporting period. The values of the assets and liabilities in the closing balance sheet incorporate the unrealized revaluations.

5.19 A revaluation is realized when an asset is sold, redeemed, used or otherwise disposed of, or a liability incorporating a revaluation is repaid. The value of transactions includes the value of realized revaluations. In other words, unrealized holding gains are realized when transactions take place.

5.20 The asset and liability categories that are subject to revaluation in the methodology of this *Manual* are shown in Table 5.4.

Other changes in the volume of assets

5.21 Separate entries for the financial flows arising from OCVA should be shown for all categories of assets and liabilities included in monetary statistics, as described in Chapter 7, and in the financial statistics as described in Chapter 8. The circumstances that result in entries in the OCVA account are grouped into six categories, most of which have several subcategories.[3] The following are the categories and subcategories that are relevant for the financial corporations (FCs) sector in most countries, and are relevant to the compilation of monetary and financial statistics (see Table 5.5).

   a. Economic appearance and disappearance of assets. The following two subcategories are more relevant for FCs:

[3] For more detailed descriptions of OCVA categories see Chapter 12 and the subheading "Other flows" in Annex 1 (page 553) of the *2008 SNA*.

Table 5.3 Main Transactions by Asset/Liability Category for Financial Corporations	
Asset/Liability	**Transactions**
Monetary gold (central bank asset)	Purchases *less* sales (between monetary authorities and international financial institutions only)
	Plus accrued interest on unallocated gold accounts with nonresidents that give title to claim the delivery of gold
SDR holdings (central bank asset)	New SDR allocation *less* SDR cancellation
	Purchases of SDRs *less* sales of SDRs[1]
	Plus accrued interest on SDR holdings
	Plus remuneration receipts in SDRs from the IMF on the reserve tranche position
	Plus IMF purchases and loan receipts in SDRs
	Plus interest receipts in SDRs on lending to the IMF
	Less IMF repurchases and loan repayments in SDRs
	Less payments of charges in SDRs to the IMF
SDR allocations (central bank liability)	New SDR allocation *less* SDR cancellation
	Plus accrued interest (charges) on SDR allocation
Domestic currency holdings (other than central bank)	Net acquisition of currency
Domestic currency (central bank liability)	Change in currency in circulation (see paragraph 6.22)
Foreign currency holdings	Purchases *less* sales
Deposits—assets or liabilities	Deposit placements/receipts *less* withdrawals
	Plus accrued interest for the period
Debt securities—assets	Purchases *less* sales, redemptions and interest payment[2]
	Plus accrued interest for the period
Debt securities—liabilities	Issuances *less* redemptions, purchases of own debt securities, and interest payments[2]
	Plus accrued interest for the period
Loans—assets	Loan extensions *less* loan principal and interest payments[2]
	Plus accrued interest for the period
Loans—liabilities	Loan receipts *less* loan principal and interest payments[2]
	Plus accrued interest for the period
Equity and investment fund shares—assets	Purchases and new contributions *less* sales and withdrawal of capital
Equity—liabilities	New funds contributed by owners *less* outflow from dividends when shares go ex-dividend and withdrawal of capital
	Plus/minus inflow or outflow of retained earnings for foreign direct investment enterprises only
	Plus/minus profit or loss from corresponding transactions
Investment fund shares—liabilities	Sales *less* redemptions and/or buy-backs
Insurance, pension and standardized guarantee schemes—assets	Prepayments of insurance premiums and net fees for standardized guarantees
	Plus/minus change in claims of pension funds on pension managers for any underfunding/overfunding

Table 5.3 Main Transactions by Asset/Liability Category for Financial Corporations (*Continued*)	
Asset/Liability	**Transactions**
Insurance, pension and standardized guarantee schemes—liabilities	Amounts of estimated obligations to beneficiaries and holders accrued during the period[3] *less* payments to beneficiaries from reserves and provisions
Financial derivatives—assets	Purchases *less* sales and settlements *Minus* receipts of nonrepayable margins
Financial derivatives and employee stock options—liabilities	Sales *less* settlements *Minus* payments of nonrepayable margins
Other accounts receivable/payable	Transactions in trade credit and advances, etc.
Nonfinancial assets	Acquisitions less disposals *Less* consumption of fixed assets

[1] Transactions also include SDRs obtained from a new SDR allocation or disposed of because of SDR cancellation.
[2] Includes redemptions/repayments arising from debt reorganization, including debt cancellation by mutual agreement (debt forgiveness).
[3] For more details see paragraphs 5.185, 5.190, 5.197, and 5.199.
Note: SDR=Special Drawing Rights.

Changes in the value of goodwill and marketing assets. FCs may show assets in the form of *purchased goodwill* on their balance sheets. The value of goodwill and marketing assets is the difference between the value paid for an enterprise as a going concern and the value of its assets less the value of its liabilities (excluding equity). Goodwill that is not evidenced by a sale/purchase is not considered an economic asset and, therefore, does not enter the monetary and financial statistics. The value of purchased goodwill is calculated at the time of sale, entered as a nonfinancial asset in the books of the seller in the OCVA account and then recorded as a transaction in nonfinancial assets (sale of goodwill) with the purchaser. Thereafter, the purchased goodwill is classified as a nonfinancial asset in the books of the purchaser and is written down via entries in the OCVA account (*2008 SNA*, paragraph 12.34).

Appearance and disappearance of financial assets and liabilities. Included in this subcategory are write-offs of bad debts by creditors. **Debt write-off is a unilateral cancellation of debt by the creditor**. Recognition by a creditor that a financial claim can no longer be collected due to bankruptcy or other factors and the consequent removal of the claim from the balance sheet of the creditor should be accounted for here. Write-downs, which are partial write-offs, are also accounted here.

b. Catastrophic losses. The volume changes recorded as catastrophic losses in the OCVA account are the result of large-scale, discrete, and recognizable events that may destroy assets within any asset category. Such events include natural disasters, acts of war, riots, and technological accidents. Catastrophic losses most commonly apply to nonfinancial assets but may also apply to the loss of financial assets and, in particular, the loss of currency (for instance, if currency held by an FC is destroyed) and other bearer-type financial assets, as well as to those cases when the written records evidencing ownership over financial assets are destroyed.

c. Uncompensated seizures. Governments or other institutional units may take possession of (confiscate) assets of other institutional units, including units owned by nonresidents, without full compensation for reasons other than the nonpayment of taxes, fines, or similar levies. If the compensation for such seizures falls substantially

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Asset or Liability	Exchange rate changes	Other price changes
Table 5.4 Revaluations by Asset/Liability Category for Financial Corporations		
Monetary gold (central bank asset)	√	√
SDRs (central bank asset)	√	
Domestic currency		
Foreign currency	√	
Deposits		
In domestic currency		
In foreign currency	√	
Debt securities		
In domestic currency		√
In foreign currency	√	√
Loans		
In domestic currency		√
In foreign currency	√	√
Equity and investment fund shares (assets)		
In domestic currency		√
In foreign currency	√	√
Equity (liabilities)[1]		√
Investment fund shares		
In domestic currency		√
In foreign currency	√	√
Insurance, pension, and standardized guarantee schemes (assets)	√[2]	√
Insurance, pension, and standardized guarantee schemes (liabilities)	√[2]	√
Financial derivatives and employee stock options		
In domestic currency		√
In foreign currency	√	√
Other accounts receivable/payable	√	
Nonfinancial assets		√

[1] Financial statistics only. For financial statistics, liabilities in the form of equity are valued at market or fair value.
[2] Applies to components denominated in foreign currency.
Note: SDR = Special Drawing Rights.

short of the market or fair value of the assets as shown on the balance sheet, the difference should be recorded in the OCVA account as a decrease in the assets of the institutional unit losing the assets. Foreclosures and repossession of goods by creditors are not treated as uncompensated seizures. They should be treated as transactions (i.e., disposals by debtors and acquisitions by creditors) because, by explicit or general understanding, the agreement between the debtor and creditor provided this avenue of recourse.

d. Other changes in volume not elsewhere classified. This category comprises the following items:

Corrections in the calculation of consumption of fixed capital. This subcategory covers entries in the OCVA account arising from the impact of unexpected events (other than catastrophic losses) not anticipated when allowances were specified for the consumption of fixed capital or the assumptions underlying the calculation of consumption of fixed capital were mistaken.

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Table 5.5 Other Changes in the Volume of Assets by Asset/Liability Category

Asset or Liability	Economic appearance of assets, catastrophic losses (assets only), and uncompensated seizures (assets only)	OCVA not elsewhere classified, including provisions[1] and accounting entries	Changes in classification
Monetary gold (central bank asset)	√		√
SDRs (central bank)			
Domestic currency	√		√
Foreign currency	√		√
Deposits	√		√
Debt securities	√		√
Loans	√		√
Equity and investment fund shares (assets)	√		√
Equity and investment fund shares (liabilities)		√	√
Insurance, pension and standardized guarantee schemes (assets)	√	√	
Insurance, pension, and standardized guarantee schemes (liabilities)	√	√	
Financial derivatives and employee stock options	√		
Other accounts receivable/payable	√	√	√
Nonfinancial assets	√	√	√

[1] In monetary statistics, OCVA entries for provisions are shown in *Other accounts payable [MS]* and in *Equity liability [MS]* (as a reduction in *Current year result*). The entry for nonfinancial assets in this category relates to the corrections in the calculation of consumption of fixed capital.
Note: SDR = Special Drawing Rights; OCVA = other changes in the volume of assets.

Life insurance and annuities entitlements. For an annuity, the relationship between premiums and benefits is usually determined when the contract is entered into, taking account of mortality data available. Any subsequent changes in the underlying relationship will affect the liability of the annuity provider towards the beneficiary and the consequences are recorded in OCVA.

Pension entitlements. For defined benefit pension plans, an entry in the OCVA account captures changes in the actuarial-determined liability that results from changes in the benefits structure—for example, changes in the benefits formula and reductions in the pensionable age. Thus changes to pension entitlements as a result of changes in

model assumptions are shown as other changes in volume, whereas changes negotiated between the parties are recorded as transactions.

Provisions for calls under standardized guarantee schemes. When an institutional unit underwrites a standardized guarantee scheme, a provision should be entered in its accounts for the expected excess of calls under the scheme over any fees received, investment income, or recoveries made. Changes to these provisions are recorded as OCVA whenever a new scheme is introduced or a significant change to the expected level of calls is recognized, beyond what will be recovered.[4]

[4] See also *Government Finance Statistics Manual 2014* (*GFSM 2014*), Appendix 4, paragraphs 4.78–4.79.

e. <u>Changes in classifications</u>. This category comprises the following events:

<u>Changes in sector classification and structure</u>. Changes in the activities, legal status, and/or organizational structure of institutional units can result in their sectoral reclassification. Reclassifying an institutional unit from one sector to another transfers its entire balance sheet.[5] Entries in the OCVA account can also arise from changes in structure—for example, when a corporation disappears as an independent legal entity by virtue of its being absorbed by another corporation or when a corporation is split into more than one institutional unit.[6] It is recommended that sectoral reclassifications of FCs be recorded as if these events occurred at the beginning of the reporting period. In particular, the asset prices (or fair values) and exchange rates that prevailed at the beginning of the period should be used to calculate the amounts for the OCVA entries. A special case arises when the institutional coverage in monetary and financial statistics is expanded. Ideally, it is expected that the accounts of all FCs are covered for all periods, but this is not always the case in practice, especially for OFCs. In such cases, changes in a period in assets and liabilities of the FCs subsector arising from the expansion of coverage of the subsector are to be recorded as OCVA and shown separately.

<u>Changes in classification of assets and liabilities</u>. Because of changes in its characteristics or in the purpose for which it is used, an asset or liability may be classified differently in the opening and closing balance sheets. For example, loans may be reclassified as debt securities in accordance with the guidance that loans that become negotiable (i.e., marketable) should be reclassified as debt securities. Deposits can be reclassified as (1) "included in broad money" for deposits that are newly included in broad money, and (2) "excluded from broad money" for deposits of ODCs under liquidation and excluded from broad money. Furthermore, when a central bank purchases gold bullion as a reserve asset from a counterparty that is not a monetary authority or an international financial institution, a transaction in nonmonetary gold—that is, an increase in nonfinancial assets of the central bank and a decrease in nonfinancial assets of the seller—is recorded. Then a reclassification from nonfinancial to financial assets (valuables to monetary gold) is recorded in the OCVA account (monetization) by the central bank. To demonetize gold (in preparation for sale to a counterparty other than a monetary authority or an international financial institution), the central bank would record OCVA entries for a gold reclassification—that is, a negative entry in the monetary gold category and a positive entry in nonfinancial assets of the central bank (see also *2008 SNA*, paragraph 12.36, and the sixth edition of the *Balance of Payments and International Investment Position Manual (BPM6),* paragraph 9.18). In determining the amounts for OCVA entries arising from reclassification of financial assets and liabilities, the asset prices (or fair values) and exchange rates that prevailed on the date of the reclassification should be used.

5.22 In reference to changes in classifications, the OCVA account is used to record changes in the classification of institutional units or assets and liabilities, but not corrections of data that were misclassified in

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[5] For example, if an FC is newly authorized to accept liabilities included in the definition of broad money, it would be reclassified from other financial corporations (OFCs) to other depository corporations (ODCs). Other examples of events that result in changes in sector (or subsector) classification are the privatization of public nonfinancial corporations (from a public nonfinancial corporation to an other nonfinancial corporation); divestitures within an institutional unit, resulting in the creation of two or more units with separate financial accounts and operating in different sectors; and changes in the institutional units within an economy or a currency union arising from changes in economic territory when countries are unified into a single nation, new countries join a currency union, or when one country is divided into two or more countries.

[6] When a corporation is absorbed by one or more other corporations, all claims and liabilities between the acquired corporation and the acquiring corporation disappear at the level of the data reported for macroeconomic statistics. Symmetrically, when a corporation is split into more than one institutional unit, new claims and liabilities between the new corporations may appear. The disappearance and appearance of the claims and liabilities between these institutional units lead to entries in the OCVA account.

earlier periods. It is important to trace the origins of data misclassification and to correct all current and historical data on stocks and flows. If this is not possible, a clear indication of the break in series should be provided.

III. Accounting Rules

5.23 This section discusses the accounting rules for monetary and financial statistics. Time of recording and general valuation principles are first presented. Then the treatment of transactions costs and financial service fees are discussed, followed by the principles of aggregation, netting, and consolidation.

A. Time of Recording

Recording on an accrual basis

5.24 *Accrual accounting records flows and changes in the corresponding stocks at the time economic value is created, transformed, exchanged, transferred, or extinguished.* Accrual recording is used in macroeconomic statistics as a general principle. This means that flows and stocks are recorded when a change of economic ownership (see paragraph 4.9) takes place. The effects of economic events are thus recorded in the period in which they occur, irrespective of whether payment was made. In principle, the two parties to a transaction should record it at the same time. However, in practice adjustments may be needed so that the same transaction date is applied to the data for both parties.

5.25 The change of economic ownership is central in determining the time of recording on an accrual basis for transactions in financial assets. A change in economic ownership means that the majority of risks, rewards, and rights and responsibilities of ownership in practice are transferred.

5.26 In practice, it is not always possible to determine the exact time when the economic ownership has changed, leading the parties to record the same transaction at different times. In particular, differences may arise from delays in mail delivery or differences in the time zones where the parties operate, as well as from differences in the time-of-recording conventions (see also the next subsection). It is important to make timing adjustments in cases in which major divergences occur from the required basis. In choosing among source data, compilers are encouraged to use those

sources that most closely match the needs of accrual accounting. For example, records of drawings on loans are preferable to sources that quote authorization dates or program dates that may not be realized. Information on interest from either the payments records or debt service schedule may not be appropriate for accrual recording. For deriving accrued interest, the data on positions and contractual interest rates can be used.

5.27 For some financial instruments, the debtor does not make any payments to the creditor until the financial instrument matures, at which time a single payment discharges the debtor's liability; the payment covers the amount of funds originally provided by the creditor and the interest accumulated over the entire life of the financial instrument. The interest accruing in each period prior to maturity should be recorded as a financial transaction representing a further acquisition of the financial asset by the creditor and an equal incurrence of a liability by the debtor.

Trade date and settlement date accounting

5.28 A transaction in financial assets is recorded on the trade date (i.e., the time of change in ownership of a financial asset) rather than on the settlement date (i.e., the time of delivery of the financial asset). If settlement of a financial transaction occurs after the ownership has changed, this gives rise to accounts receivable/payable.

5.29 When the transaction date is in one reporting period and the settlement date is in the next reporting period, the recording entries for an asset purchase are:

a. First reporting period. The asset purchase is included in transactions (T), and any revaluation of the asset from the transactions date to the end of the first reporting period is included in valuation changes (VC). An accounts payable is recorded due to the time lag between the trade and settlement dates.

b. Second reporting period. When settled, the accounts payable is extinguished and currency and deposits are reduced.

5.30 Adjustment to a transaction-date basis should be made for transactions that are recorded on a settlement-date basis, but for which settlement

does not take place until the next reporting period. Data adjustment relies on data availability and the reporting system. Restatement of asset transactions—from settlement date accounting to transaction date accounting—is illustrated with numerical examples in Annex 5.4. In general, a successful adjustment for time of recording and valuation depends on granular data availability and a good information technology (IT) system.

B. Transaction Costs and Financial Service Fees

General principles

5.31 Transactions in financial assets and liabilities should be recorded at the prices at which they were bought and sold (see paragraph 5.39) excluding any transaction costs: that is, service charges, fees, commissions, taxes, etc. should be recorded separately from the transaction in the financial asset and liability. The latter is because both debtors and creditors should record the same amount for the same transaction in a financial asset/liability. Transaction costs include service charges, fees, commissions, taxes, and similar payments whether charged explicitly, included in the purchaser's price, or deducted from the seller's proceeds.

5.32 Transaction costs can be divided into two types—explicit and implicit transactions costs:

a. Examples of explicit type of transaction costs are service charges, fees, commissions, such as a brokerage commission, and domestic taxes expressed as a fixed amount per transaction or as a percentage of the value of an asset purchase or sale.

b. Examples of the implicit type are transaction costs that are built into the bid-ask price spreads for financial assets. A market specialist stands ready to buy a financial asset at the quoted bid price and, at the same time, is prepared to sell the same financial asset at an asked price (that is, offer price) that is above the bid price. The spread between the bid and ask price—the profit margin of the market specialist—is a measure of transaction costs incurred by the buyer and seller combined. Paragraphs 5.35–5.36 provide guidance on the treatment of the transaction costs embedded in the bid-ask spreads.

5.33 Explicit commissions, service charges, and fees that buyers and sellers pay as transaction costs are treated as payments for services.[7] Taxes and similar compulsory payments are transfers. Transaction costs are excluded from the valuation of financial transactions, and end-period stocks. Transaction costs reduce/increase *Equity liability [MS]* through current-year results for payers/payees, for the period in which the financial asset is acquired/provided.

5.34 When source data include some or all types of transaction costs in the amounts of asset purchases or sales, the explicit and implicit charges would need to be excluded.

Bid and ask prices

5.35 Transactions are to be recorded at the prices at which financial assets are bought and sold excluding transaction costs. Transaction data should, therefore, be adjusted to take account of the transaction costs embedded in the buying bid and selling ask prices. In acquiring securities in the secondary market, a FC usually pays the ask (or offer) price in the secondary market and records the securities transaction in the full amount paid—that is, ask price per security times number of securities acquired. The transaction should be valued at the mid-price between the bid-offer prices, with the difference with the offer price recorded as a transaction cost. Subsequent revaluation of the securities position should also be based on the mid-price.

5.36 Flows and stocks in foreign–currency-denominated financial instruments are also recorded at the relevant midpoint exchange rate.

C. Valuation of Stocks and Flows

5.37 This subsection discusses the general principles for the valuation of flows and stocks of financial assets and liabilities. A detailed discussion on the valuation of stocks and flows for each type of financial asset and liability is presented in Section IV in this chapter. Annexes to this chapter provide numerical examples.

5.38 The main valuation principle in this *Manual* is that flows and stocks should be measured at market prices. ***Market prices refer to current exchange value,***

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[7] IFRSs recognize some fees, which are an integral part of the effective interest rate of a financial instrument, as an adjustment to the interest rate.

that is, the value at which nonfinancial and financial assets are exchanged or else could be exchanged for cash (currency or transferable deposits).

5.39 *Market prices for transactions are defined as amounts of money that willing buyers pay to acquire something from willing sellers; the exchanges are made between independent parties and on the basis of commercial considerations only, sometimes called "at arm's length."* According to this definition, a market price refers only to the price for one specific exchange under the stated conditions.

5.40 *Stocks should be valued at market prices, that is, as if they were acquired in market transactions on the balance sheet reporting date.* Many financial assets are traded in markets on a regular basis and can be valued by using the price quotations from these markets. If the financial markets are closed on the balance sheet date, the market prices that should be used in the valuation are those that prevailed on the closest preceding date when the markets were open.

5.41 Nominal values are used for recording deposits, loans, and other accounts receivable/payable, given all these financial instruments are not tradable by definition. Nominal valuation requires that accrued interest be included in the outstanding amount of the underlying instrument, and not as part of miscellaneous assets/liabilities.

5.42 All these general valuation principles are consistent with the *2008 SNA* and other statistical manuals. However, the valuation of *Equity liability [MS]* at book value[8] is a feature of monetary statistics and, although it is not the preferred valuation method in the *2008 SNA*, it can be reconciled with the SNA concepts (see Figure 2.2) and is consistent with one of the alternative valuation methods (to approximate the market value of unlisted shares) called *own funds at book value* (see paragraph 5.160e and *2008 SNA*, paragraphs 13.71 and 13.88).

5.43 In the source data, the valuation of stocks may be based on commercial, supervisory, tax, or other accounting standards that do not fully reflect the market values. In such cases, the data should be adjusted

to reflect, as closely as possible, the market value of the financial assets and liabilities, except when they are to be recorded at nominal or book values. The difference in valuation between the source data and the market value recorded in the monetary statistics is reflected in *Equity liability [MS]* as a valuation adjustment.

Fair values

5.44 *The fair value of a financial asset or liability is a market-equivalent value defined as the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.* It thus represents an estimate of what could be obtained if the creditor had sold the financial claim.

5.45 Two general methods for establishing fair values involve use of either:

a. Relative valuation: Market prices of financial assets and liabilities that are market-traded, but otherwise similar to the nontraded or infrequently traded financial assets and liabilities that are being valued; or

b. Absolute valuation: Discounted present values of future cash flows.

5.46 Relative valuation involves estimating the fair value of nontraded or infrequently traded financial assets and liabilities using the market price of a similar but market-traded financial instrument. For example, the fair-value price of an infrequently traded bond with five-year remaining maturity might be given by the market price of a publicly traded five-year bond having a comparable risk. In other cases, it may be appropriate to use the market price of a similar financial instrument, but with some adjustment in the fair value to account for differences in liquidity and/or risk level between the traded and nontraded instruments. For example, the fair value of unlisted equity shares held by an FC may be based on the market price of equity shares of another similar corporation that has traded shares. Furthermore, the fair value may need to be adjusted for differences in the scale of operations, number of outstanding shares, and other factors that are perceived as differentiating the values of the nontraded and traded shares.

5.47 In some cases, the financial asset or liability may possess some characteristics of each of several other

[8]For cases where adjustments by compilers are made to reflect market values of some assets and liabilities (other than liability equity), the associated contra-entry adjustments are reflected in *Equity liability [MS]*. See paragraph 5.43.

financial instruments, even though its characteristics are not generally similar to any one of these instruments. In such cases, information on the market prices and other characteristics (e.g., type of instrument, issuing sector, maturity, credit rating) of the traded instruments should be considered in estimating the fair value of the nontraded instrument.

5.48 Absolute valuation involves valuing financial assets and liabilities based on the present or time-discounted value of future cash flows. This is a well-established approach to valuation, in both theory and practice (see Box 5.1).

Other valuations

5.49 It is important to clearly distinguish between various valuation terms. *Market values*, *fair values* (explained previously), *nominal values,* and *book values* should be distinguished from such notions as *amortized values*, *face values*, and *historic cost*, explained as follows.

    a. Nominal value refers to the outstanding amount at any moment in time the debtor owes to the creditor. It reflects the sum of funds originally advanced, plus any subsequent advances, plus

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Box 5.1 Fair Valuation Using the Present Value of Future Cash Flows

The fair value of a financial asset or liability is calculated as the sum of the present value of all future cash flows, as shown in the following equation:

$$\text{Fair value} = \sum_{t=1}^{n} \frac{(\text{cash flow})_t}{(1+i)^t}$$

where (cash flow)$_t$ denotes the cash flow in a future period (t), n denotes the number of future periods for which cash flows are expected, and i denotes the discount rate that is applied to discount the future cash flow in period t. A single discount rate, i, is used in this approach to discount the cash flow in all future periods.

The method is relatively easy to apply in valuing any financial asset or liability if (1) the future cash flows are known with certainty or can be estimated and (2) a discount rate can be estimated for the life of the financial asset. Market interest rates, current or expected, are often used as the discount rates, based on the assumption that these market interest rates are most representative of the cost of acquiring funds in the financial markets.

The recommended discount rate is the pre-tax effective yield (i.e., yield to maturity) on actively traded securities for which the risk is approximately the same as those of the securities for which the future cash flows will be discounted. The range of securities issued in some countries may be so narrow that the discount rate may need to be represented by

the yield on government securities or other actively traded securities that have similar duration,[1] but lower risk (such as credit, liquidity, or other risks) than the securities to be valued. The yield (relevant market interest rates) on the actively traded securities should be used as the discount rate, without adding a risk premium, unless evidence is available to substantiate the estimate of a risk premium.

A more complex approach to estimate the present value (that is, fair value) of a financial instrument (a bond) is, instead of applying a single discount rate, to apply time-variant discount rates to the future cash flows—that is, by using:

$$\text{Fair value} = \sum_{t=1}^{n} \frac{(\text{cash flow})_t}{(1+i_t)^t}$$

where i_t denotes the discount rate in period t, which in general may differ from the discount rate in other time periods. Forward rates could be used as the discount rates, i_t ($t = 1, 2,. . ., n$), which are the rates at various maturities along a *zero-coupon yield curve* (or simply *zero curve*) for which bond yields on a zero-coupon basis have been estimated from the yields of bonds with coupons.

This approach is more difficult to implement than the single discount-rate approach described herein because of the data requirements—that is, yields on short-, medium-, and long-term securities in the same risk class as the securities that are to be fair valued— are required.

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[1] Duration is the weighted average term to maturity of a debt security. It can be used to measure the impact on the value of a debt security that will result from a one percentage point change in interest rates. Duration takes into account the schedule of interest and principal payments that occur throughout the life of the debt security.

any interest that has accrued, less any repayments (which includes any payments covering accrued interest). For debt instruments indexed to a "narrow" index (such as a commodity price, stock price, or gold price), the nominal value can also include holding gains and losses arising from movements in the index (see also paragraph 5.58). Nominal value of a financial asset or liability denominated in foreign currency also includes holding gains or losses arising from exchange rate changes. At any specific point in time, the nominal value of traded financial assets may deviate from their market values due to revaluations arising from market price changes. For financial instruments such as deposits, loans, and other accounts receivable/payable, the lack of generally available market values means that these instruments are recorded using their nominal value.

b. Amortized value reflects the amount at which the financial asset or liability was measured at initial recognition minus the principal repayments and excluding accrued interest.[9] On the date of each scheduled payment (after the scheduled payment is made), amortized value is the same as nominal value, but it may differ from the nominal value on other dates because nominal value includes interest that has accrued and not been paid.

c. Face value is the undiscounted amount to be paid to the holder of a debt security at or before maturity. It is also known as "par value" or simply "par." Before maturity, the market value of a debt security may be greater or lower than face value, depending on the interest rate payable and the perceived risk of default. As debt securities approach maturity, market value approaches face value. At maturity, the market value is equal to the face value.

d. Book value generally refers to the value recorded in the entity's records. Book values may have different meanings because their values are influenced by the timing of acquisition, company takeovers, frequency of revaluations, and tax and other regulations. Book value is used in this *Manual* to value *Equity liability [MS]*.

e. Historic cost reflects the cost at the time of acquisition and sometimes it also may reflect occasional revaluations.

Instruments denominated in foreign currency

5.50 The standard unit of account for monetary and financial statistics is the domestic currency unit. Thus it is necessary to convert all foreign-currency-denominated stocks and flows into domestic currency amounts using market exchange rates. Flows in foreign-currency-denominated instruments are converted into the domestic currency unit using the market exchange rate prevailing at the time the flow takes place. Stocks denominated in foreign currency should be converted into domestic currency values at the market exchange rate prevailing at the balance sheet date. The midpoint between the buying and selling rate of exchange should be used for both flows and stocks so that any service charge is excluded (see paragraph 5.36).

5.51 Market exchange rate quotations in major world markets such as the foreign exchange market in London or New York should be used for convertible currencies.[10] For nonconvertible currencies, it may be necessary to use exchange rate quotations from regional or other specialized foreign exchange markets. If the exchange rate for the last day of the reporting period is unavailable, the rate quotation for an earlier date (as near to the end of the reporting period as possible) should be used for converting stock data to domestic currency units.

5.52 Institutional units sometimes apply exchange rates that differ from market rates in converting stocks and flows into domestic currency units. If the conversion to domestic currency units is based on a single *official exchange rate* or on an exchange rate from an *official multiple exchange rate system*,[11] the data should be adjusted to a market-rate basis, to the

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[9] Amortized value described here is different from the concept of valuation at amortized cost described in IFRSs in that the IFRSs takes into account the accrued interest, premiums or discounts, and the impairment and noncollectability of an asset.

[10] Rate quotations for weekend days and holidays should be the exchange rates that prevailed at the close of the preceding business day.

[11] Official multiple exchange rate systems are schedules of official exchanges rates used to apply separate exchange rates to various categories of transactions and/or transactors.

extent possible. The market exchange rate is defined as an exchange rate determined by market forces; an *official exchange rate* is an exchange rate determined on an administered basis by the national authorities. Official exchange rates may be administered to keep them closely aligned with market exchange rates or, at the other extreme, may differ substantially from market exchange rates for extended periods of time.

Indexed financial instruments[12]

5.53 Indexed financial instruments are those for which the amounts of the interest payments (interest) or the principal outstanding or both are linked to an index. The indexation links the amount of the outstanding principal and/or interest to changes in a general price index, a specific price index, the price of a commodity, or an exchange rate index. The recording (separating out) of transactions and valuation changes depends on the type of index used to adjust the level of principal to which the interest is linked and on the currency in which the interest and principal are denominated.

5.54 The values of the price indicators are not known in advance. For financial instruments with indexation of the amount to be paid at maturity, they may be known only at the time of repayment. As a result, interest flows are uncertain before repayment and cannot be determined up front. For estimating interest accruals before the values of the reference indicators are known, some proxy measures will have to be used. In this regard, it is useful to distinguish the following three arrangements:

    a. Indexation of interest payments only with no indexation of amount to be paid at maturity.

    b. Indexation of the amount to be paid at maturity with no indexation of interest payments.

    c. Indexation of both the amount to be paid at maturity and interest payments.

5.55 When only interest payments are indexed, the full amount resulting from indexation is treated as interest accruing during the period covered by the coupon. It is most likely that by the time data are compiled for a reporting period, the date for the interest payment would have been passed and hence the value

of index is known. When the date for the interest payment has not been passed, the movement in the index during that part of the reporting period can be used to calculate the interest accrual.

5.56 When the amount to be paid at maturity is index-linked, the calculation of interest accruals becomes uncertain because the redemption value is unknown. In some cases, the maturity time may be several years in the future.

5.57 When the amount to be paid at maturity is linked to a general or broad price index, the change in the value of the principal outstanding between the opening and closing stocks due to the movement in the relevant index is treated as interest accruing (transaction) in that period, in addition to any interest accruing from the coupon. In this case, interest accruing in an accounting period due to the indexation of the amount to be paid at maturity may be calculated as the change in the value of the amount outstanding between the end and beginning of the accounting period due to the movement in the relevant index.

5.58 When the amount to be paid at maturity is indexed to a specific, narrowly defined price index that includes a holding gain motive, the preferred approach is for interest accrual to be determined by fixing the rate of accrual at the time of issue. Accordingly, interest is the difference between the issue price and the market expectation, at inception, of all payments that the debtor will have to make, which is recorded as accruing over the life of the instrument. This approach records as income the yield-to-maturity at issuance, which incorporates the results of the indexation that are foreseen at the moment the instrument was created. Any deviation of the underlying index from the originally expected path is treated as holding gains or losses (valuation changes) that will not usually cancel out over the life of the instrument.

5.59 Financial instruments with both the amount to be paid at maturity and interest payments indexed to a foreign currency are treated as though they are denominated in that foreign currency. Thus, interest, other flows, and stock levels for these instruments should be calculated using the same principles

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[12] See also *2008 SNA* (paragraphs 17.274–17.282), *BPM6* (paragraphs 11.59–11.65), and *GFSM 2014* (paragraphs 6.75–6.77).

that apply to foreign-currency-denominated instruments.[13] Interest should accrue throughout the period using the foreign currency as the currency of denomination, with the flows converted to the domestic currency using midpoint market exchange rates. Similarly, the amount outstanding should be valued using the foreign currency as the unit of account, with the end-of-period exchange rate used to determine the domestic currency value of the instrument (including any accrued interest).

D. Aggregation, Netting, and Consolidation

Aggregation

5.60 *Aggregation is the summation of stocks or flows across institutional units.* For example, for sectors and subsectors, financial assets and liabilities are aggregated into major categories—loans classified by debtor sectors and deposits classified by creditor sectors. Similarly, monetary and credit aggregates are the sum of major financial assets or liabilities across various sectors. Sectoral balance sheets—the underlying data sets for the monetary statistics described in Chapter 7—should be compiled as aggregated data of institutional units in the same subsector of the FCs sector.

Gross and net recording

5.61 Individual units may have the same kind of financial instrument both as an asset and as a liability—for example, a claim and a liability in the form of a debt security. *Aggregation in which assets and liabilities are shown for their full values is referred to as gross recording.*

5.62 This *Manual,* consistent with the *2008 SNA* and other statistical manuals, follows gross recording for stocks. Specifically, claims on a particular institutional unit or group of units should not be netted against the liabilities to that unit or group. For example, a DC might have an outstanding loan to a customer who is also one of its depositors. The DC's asset (i.e., the loan claim) should not be netted against the liability (i.e., the deposit of the borrower). Compilation on a

net basis may be necessary due to the unavailability of source data on a gross basis. The need to resort to such netting is expected to be relatively rare for most categories of assets and liabilities in the FCs' sector.

5.63 On the other hand, recording transactions on a purchases-*less*-sales basis (i.e., net acquisition of a specific category of financial assets or liabilities) should be used. For example, the amount of a particular category of debt securities purchased should be netted from the amount redeemed or sold during the period.

5.64 Further, some derived analytical measures in the analytical surveys described in Chapter 7 are presented on a net basis. The general principle for such presentation is that assets and liabilities are shown separately on a gross basis and net values are shown for analytical purposes. For example, the depository corporations survey (DCS) in Chapter 7 shows *net foreign assets* and *net claims on central government*. It also shows separately the stock and flow data for the asset and liability components that are being netted. The DCS shows *claims on nonresidents* and *liabilities to nonresidents* as the separate components of net foreign assets.

Debt defeasance

5.65 *Debt defeasance* allows a debtor (whose debts are in the form generally of debt securities and loans) to remove certain liabilities from the balance sheet by pairing irrevocably assets of equal value to the liabilities. This may be carried out either by placing the paired assets and liabilities in a trust account within the institutional unit concerned, or by transferring the paired assets and liabilities to another institutional unit. In the former case, no entry is recorded for defeasance and the assets and liabilities will not be excluded from the balance sheet of the unit. In the latter case, the assets and liabilities in question are moved to the balance sheet of the second unit as long as this unit is recognized as a separate institutional unit.

Consolidation

5.66 *Consolidation is a method of presenting statistics for a set of units as if they constituted a single unit. Consolidation eliminates stocks and flows between institutional units, which are grouped into the same sector or subsector.* Consolidation entails

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[13] Specific examples of such instruments are the IMF-related accounts in the balance sheet of a central bank that are denominated in domestic currency but are linked to SDR (*IMF quota subscription, IMF No. 1 Account, No. 2 Account,* and *Securities Account*).

the "canceling out" of stocks and flows that arise from financial claims and corresponding liabilities between the institutional units within the financial sector or subsector covered by a particular survey.

5.67 An institutional unit consisting of a headquarters office and branch offices within the same economy should report stocks and flow data consolidated across all resident entities of the institutional unit. Financial flows and positions between institutional units should be reported on a gross basis for monetary and financial statistics. For sectors and subsectors, flows and stocks between constituent units should not be consolidated, as a matter of principle, at the level of data compilation and reporting. The sectoral balance sheets for the FCs subsectors and the FCs sector as a whole, in Chapter 7, are based on aggregated rather than consolidated data.

5.68 For analytical purposes, the survey data of the FCs subsectors and the financial corporations survey (FCS), as shown in Chapter 7, consolidate the data in the sectoral balance sheets. Intra-sectoral positions are consolidated in the respective surveys of FCs subsectors, while positions between FCs subsectors are consolidated in the FCS. The DCS in Chapter 7 is thus obtained by canceling out all financial flows and outstanding claims and liabilities between all DCs. The data presented are thus all stocks and flows of DCs that are claims on and liabilities to: (1) FCs subsectors other than the DCs subsector, (2) other domestic sectors, and (3) nonresidents. The DCS is compiled from the data in the central bank survey (CBS) and the other depository corporations survey (ODCS), which are compiled from the sectoral balance sheets for the central bank and the ODCs, respectively. To facilitate data consolidation at the survey level, the sectoral balance sheets and surveys underlying the DCS must contain comprehensive data on financial flows between DCs and the financial assets and liabilities that are outstanding among them.

IV. Compilation of Stocks and Flows
A. Estimating Flows

5.69 An important issue when compiling flows in monetary and financial statistics is the distinction between transactions, revaluations (valuation changes), and OCVA. The recommendation is that, to the extent possible, data on flows for each category

of financial assets and liabilities should be obtained directly from the accounting or other recording systems of the FC. Derivation or estimation of data should be limited to those categories of financial assets or liabilities for which the appropriate data cannot be obtained from the FC's recording system.

5.70 This *Manual* recommends, in order of preference, the following alternatives for obtaining data on flows, given that the opening and closing stocks are available for each category of financial assets and liabilities:

a. Collect the data for all three flow components directly from the accounting or other recording systems of the FC.

b. When the accounting records of the FC provide the needed data only for two of the flow components, derive the third component on the basis of equation 5.1.

c. When the accounting records of the FC provide the needed data only for one of the flow components, estimate the data for the other two components on the basis of equation 5.1 with appropriate assumptions for each category of assets and liabilities.

5.71 Availability of data on the flow components will depend on the national financial reporting standards that are applicable to an FC and the extent to which the accounting system can be expanded, if necessary, to provide data for monetary and financial statistics.

Transactions

5.72 The transactions for each category of assets and liabilities can be derived residually, if data are available for OS, CS, VC, and OCVA. Transactions for the asset or liability category are then given by:

$$(5.2) \quad T = CS - OS - VC - OCVA.$$

5.73 OCVA entries are unlikely for most financial asset and liability categories. Additionally, some financial assets and liabilities are not affected by revaluations. For these cases where $OCVA = 0$ and $VC = 0$, transactions are the only source of period-to-period change in the stocks; that is, $T = CS - OS$.

Revaluations

5.74 Assets and liabilities valued at market prices (or fair values) and/or denominated in foreign currency

(Table 5.4) are expected to have non-zero values for revaluations. Market price changes affect negotiable instruments such as securities. Revaluations for each category of assets and liabilities can be derived residually based on equation 5.1, if data are available for OS, CS, T, and OCVA:

$$(5.3) \quad VC = CS - OS - T - OCVA.$$

5.75 When using equation 5.3 to estimate revaluations for specific categories of securities, compilers need to be aware that the final results will depend on the valuation and other reporting practices. For example, the estimated revaluations may vary depending on the specific parameters used for calculating fair values.

5.76 The estimation method recommended in this *Manual* for foreign-currency-denominated financial assets and liabilities is a practical approach for approximating the revaluations that arise exclusively from exchange rate movements—specifically, for foreign-currency-denominated financial assets and liabilities that are measured at nominal value when expressed in the foreign currency units. Transactions and revaluations must be estimated whenever data are available for the sum of T and VC, but not for T and VC separately.

5.77 In the absence of direct data sources, foreign-currency-denominated transactions and valuation changes can be estimated on a currency-by-currency basis using the daily average exchange rate between the domestic currency and each foreign currency.[14] If daily exchange rates are not available for all days in the period, the exchange rate or exchange rate average that is thought to most closely approximate the daily average for the period should be used.

5.78 Opening and closing stocks in domestic currency for a specific financial instrument are first converted into each foreign currency using market exchange rates on the balance sheet dates. Transactions are then calculated in foreign currency units as a difference between opening and closing stocks less any OCVA. The resulting transactions in foreign currency units are then converted into domestic currency units using the daily average market exchange rates for the period.

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[14] The daily average should be the average of exchange rates for all days of the period.

Revaluations are estimated as a residual on the basis of equation 5.1.

5.79 Annex 5.1 provides detailed guidance and numerical examples on the estimation of transactions and revaluations from exchange rate movements. Two cases are discussed: (1) estimation in the absence of OCVA, and (2) estimation in the presence of OCVA.

Other changes in the volume of assets

5.80 Data for some OCVA entries should be available from an FC's accounting records. The OCVA entries for an individual FC can be separated into those arising from extraordinary or infrequent events and those that are usually recorded on a regularly recurring basis. Many FCs are likely to experience few, if any, extraordinary events that give rise to asset losses that are to be posted to OCVA. In addition, an FC would be expected to have relatively infrequent OCVA entries that result from financial assets or liabilities being reclassified across financial instrument categories.

5.81 Concerning a change in a subsector classification of an FC, several sets of OCVA entries are needed (see also paragraph 5.21e). If an OFC is reclassified to the ODC subsector because it begins to issue liabilities that are included in the definition of broad money, OCVA entries arise in the accounts of the reclassified FC, as well as in the accounts of all FCs that have claims on (or liabilities to) the reclassified FC. These financial positions need to be reclassified as due from (or due to) an ODC, rather than an OFC. Reclassification from an OFC to an ODC is likely to occur relatively infrequently in most countries. When such reclassification occurs, the data for the OCVA entries should be directly available from the accounting records of the reclassified FC (see also paragraphs 7.38–7.39).

5.82 OCVA entries would also arise through the transfer of the reclassified FC's data from the sectoral balance sheet of OFCs to the sectoral balance sheet of ODCs. These OCVA entries are made when the data reported by the individual FCs are aggregated into the sectoral balance sheets as part of the monetary statistics compilation that is described in Chapter 7 and, therefore, do not appear in the compilation of the data for the individual FC.

5.83 A special case of changes in sector classification of FCs and changes in classification of assets and liabilities

arises in the context of currency union statistics when new countries join the union. For monetary statistics at the union level, the inclusion of data for entire FCs subsectors of a new member is recorded as OCVA. In addition, OCVA entries arise in the accounts of all the FCs of the monetary union countries that have claims on (or liabilities to) the residents of the new member country. All these financial positions need to be reclassified as due from (or due to) the appropriate sector of the union residents, rather than nonresidents.[15]

5.84 The main types of OCVA entries that FCs record on a regularly recurring basis are:

   a. Transfer of profit or loss from current year result to retained earnings within the liability account for equity and investment fund shares.

   b. Transfer (that is, appropriation) of retained earnings to general and special reserves within the liability account for equity and investment fund shares.

   c. Provisions (also referred to as allowances) for losses on financial assets (see paragraph 5.231).

   d. Write-offs of loans, securities, or other types of impaired financial assets.

5.85 It should be noted that although the treatment of the recurring types of OCVA in general is consistent with the *2008 SNA*, OCVA entries discussed in the first three items of the preceding paragraph are specific to FCs and monetary statistics because of the different measurement of equity on the liability side of the balance sheet, and are not discussed in the *2008 SNA* (see paragraph 5.167).

B. Stocks and Flows by Financial Assets and Liability Categories

5.86 This subsection covers specific compilation issues for asset and liability categories to which these issues pertain. The asset and liability categories and the FCs that hold the assets or issue the liabilities are shown in Table 5.6.

Monetary gold (central bank asset)

5.87 Holdings of both monetary and nonmonetary gold (nonfinancial assets) should be valued on the basis of the market price of gold prevailing on the balance sheet date, and revaluations should reflect changes in the value of monetary and nonmonetary gold. Monetary gold is to be valued at the price established in organized gold markets. In the world market, gold is priced by troy ounce. It is recommended that the midpoint between the bid-offer prices[16] in the London gold market be used to value the closing stocks of gold. Gold prices quoted in U.S. dollars or another major currency should be translated into domestic currency units using the midpoint of the bid–offer spread for the market exchange rate. As the price of monetary gold is usually quoted in U.S. dollars or another major currency, the value of monetary gold is subject to holding gains and losses through changes in the exchange rate as well as the price of the gold.

5.88 Valuation of monetary gold at prices other than market prices or revaluation at longer than monthly frequency may be the practice used in source data. Supplementary data on the physical quantity of monetary gold should be provided to the compilers of monetary statistics so they can determine the gold prices used in the national valuation and can adjust the valuation, if necessary, to a market-price basis.[17] Further, if for any reason monetary gold is not valued at market prices in monetary statistics, supplementary data should be disseminated on the physical quantity of monetary gold, including gold held in allocated gold accounts and unallocated gold accounts with nonresidents that give title to claim the delivery of gold.

5.89 Transactions in monetary gold should be valued at the actual prices at which the gold is bought or sold. A central bank sale (purchase) of monetary gold to (from) another central bank (or international financial institution such as the IMF) is recorded by both parties as a transaction in monetary gold. Transactions in gold bullion, excluding those among monetary authorities and international financial institutions, are treated as transactions in nonfinancial assets (nonmonetary gold). Transactions in nonmonetary gold are treated as acquisitions less disposals of nonfinancial assets.

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[15] For the case of the euro area, see European Central Bank (2012), Box 1.1.

[16] World gold price quotations are widely available in U.S. dollars, British pound sterling, and euros. The valuation can be based on the morning or afternoon price quotation for the London gold "fix"—a price that is established through competitive interactions among the five members of The London Gold Market Fixing Ltd.

[17] The *International Reserves and Foreign Currency Liquidity: Guidelines for a Data Template* (2013) (see Appendix 2) requires the dissemination of the volume of gold held in fine troy ounces.

Table 5.6 Assets and Liabilities of Financial Corporations		
	Balance sheet	
Asset and Liability categories	**Assets**	**Liabilities**

Monetary gold and SDRs
  Monetary gold
  SDR holdings
  SDR allocations
	
	Central bank
	Central bank
	
		Central bank

Currency
  Domestic currency
  Foreign currency
	
	FCs other than the central bank
	FCs
		
		Central bank

Deposits
  Transferable deposits
  Other deposits
	
	FCs
	FCs
		
		DCs
		DCs and other financial intermediaries except ICPF[1]

Debt securities	FCs	FCs
Loans	DCs, other financial intermediaries except ICPF; and captive financial institutions and money lenders[2]	FCs
Equity and investment fund shares	FCs	FCs

Insurance, pension, and standardized guarantee schemes
  Nonlife insurance technical
    reserves
  Life insurance and annuities
    entitlements
  Pension entitlements
  Claims of pension funds on pension
    manager
  Provisions for calls under
    standardized guarantees
	
	FCs
	
	FCs
	
	FCs
		
		Nonlife insurance corporations
		
		Life insurance corporations and pension funds[3]
		Pension funds[4]
		FCs
		
		FCs

Financial derivatives and employee stock options
  Financial derivatives
  Employee stock options
	
	FCs
	
		FCs
		FCs

Other accounts receivable/payable	FCs	FCs
Nonfinancial assets	FCs	Not applicable

[1] Captive financial institutions and money lenders, insurance corporations, pension funds, or financial auxiliaries may accept relatively small amounts of deposits that are incidental to their operations, rather than for financial intermediation.
[2] In addition, life insurance corporations often extend policy loans. Other insurance corporations, pension funds, and financial auxiliaries may also extend relatively small amounts of loans that are incidental to their operations.
[3] Some ODCs may also provide life insurance and annuity services, in addition to their core business.
[4] When an FC administrates a nonautonomous pension fund for its employees, it will have pension entitlements as a liability.
Note: SDR = Special Drawing Rights; FC = financial corporation; DC = depository corporation; ICPF = insurance corporations and pension funds.

5.90 When a monetary authority purchases gold bullion from institutional units other than monetary authorities or international financial institutions for inclusion in reserve assets the gold is *monetized*, resulting in a reclassification (OCVA) of gold bullion from a nonfinancial to a financial asset (monetary gold). If the monetary authority sells gold bullion that is part of reserve assets to institutional units other than monetary authorities or international financial institutions, the gold is *demonetized*, resulting in a reclassification of gold bullion from a financial asset to a nonfinancial asset before the transaction in nonfinancial assets is recorded (see also paragraph 5.21e).

SDR holdings (central bank asset) and SDR allocations (central bank liability)

5.91 SDR holdings of a central bank and SDR allocations received are denominated in SDRs, a unit of account created in 1969 by the IMF. The SDR exchange rate (usually referred to as the SDR rate)—the exchange rate between the SDR unit and the U.S. dollar—is determined daily by the IMF (and posted daily on the Internet at www. imf.org/external/data.htm#exchange) by summing the U.S. dollar value, based on market exchange rates, of a basket of five currencies (the Chinese renminbi, euro, Japanese yen, pound sterling, and U.S. dollar).[18]

5.92 SDRs are considered to be foreign currency in all cases, including for the economies that issue the currencies in the SDR basket. Any other currency units issued by an international organization, except in the context of a currency union, are considered foreign currency (see *BPM6*, paragraph 3.97).

5.93 The domestic currency value of stocks and flows for the SDR holdings/allocations are determined by converting the SDR amounts into U.S. dollar equivalents, using the SDR rate, followed by conversion of the U.S. dollar equivalents into domestic currency units, using the market exchange rate that prevailed between the domestic currency and the U.S. dollar at the end of the reporting period and on the date of the transaction.[19]

5.94 Main transactions in SDR (holdings and/or allocations) arise from (1) SDR purchases and sales between qualified SDR holders; (2) a new allocation or cancellation of SDRs by the IMF—a very infrequent event; (3) accrued interest receivable/payable on SDR holdings/allocations;[20] (4) member country payments of charges in SDRs to the IMF; (5) remuneration receipts in SDRs from the IMF on the reserve tranche position; (6) IMF purchases/repurchases and loan receipts/repayments in SDRs; and (7) interest receipts in SDRs on lending to the IMF.[21] Stock and transaction data for SDR holdings/allocations should be available from the accounting department of the central bank (if the central bank is the designated fiscal agency) and need to be converted into the unit of account (see also Annex 4.2).

5.95 Valuation changes for SDR holdings/allocations can be derived residually from the data for opening and closing stocks and transactions. The holdings and allocations should be shown gross, rather than netted.

Currency

5.96 Domestic currency notes and coins are held by all FCs. The stock of domestic currency holdings of FCs is valued in nominal amount; therefore, revaluations are not applicable. OCVA for domestic currency holdings of an FC are rare, arising in exceptional circumstances such as when currency is destroyed during events such as wars, riots, or confiscation of an FC's assets. Given $VC = 0$ and $OCVA = 0$, transactions are equal to the period-to-period changes in the stock of currency in circulation—that is, $T = CS - OS$.

5.97 Domestic currency appears as a liability, currency in circulation, in the sectoral balance sheet of the central bank. The central bank holds currency that, subsequent to issuance, has returned to the central bank by way of transactions with ODCs and possibly other institutional units. For monetary and financial statistics, the central bank accounts show only the liability, currency in circulation, which is defined as the

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[18] The renminbi was included in the SDR basket starting on October 1, 2016.

[19] In particular, the valuation of stocks or flows should *not* be based on the representative rate—an exchange rate between the domestic currency and the SDR that is used in the IMF's accounting for its financial relationship with a member country—as that rate is realigned with market exchange rates on an infrequent basis.

[20] A member country receives interest on its SDR holdings and pays "charges" on its SDR allocation. A single rate, the *SDR interest rate*, applies to both interest on SDR holdings and charges on SDR allocations. The SDR interest rate is determined weekly (and posted on the Internet at www.imf.org/external/np/fin/data/sdr_ir.aspx).

[21] For the IMF's currency purchase, creditor members receive remuneration in SDRs, and debtor members pay charges in SDRs.

currency outside the central bank.[22] A related concept is currency outside DCs, defined as currency in circulation *less* ODCs' holdings of domestic currency (cash in vaults).

5.98 Foreign currency holdings of FCs should be recorded at nominal value when expressed in foreign currency units and should be converted to domestic currency units on the basis of the market exchange rate prevailing on the balance sheet date.

5.99 Transactions in foreign currency are recorded at the exchange rate prevailing on transaction dates. For estimating revaluations, the approach explained in paragraph 5.78 should be applied. Transactions data on foreign currency holdings should be available from the foreign exchange records in the recording systems of FCs.

Deposits

5.100 Deposits (assets and liabilities) denominated in domestic currency are recorded at nominal value—that is, the amount of the outstanding deposit balance *plus* any accrued interest. The use of nominal values rather than market values is influenced by pragmatic concerns about data availability and the need to maintain symmetry between debtors and creditors. Another factor is because deposits are not intended for negotiability: without an active market, estimating a market price can be somewhat subjective. Nominal value is also analytically useful because it shows actual legal liability.

5.101 Transactions in deposits are recorded in the amount of net deposits (deposit placements *less* withdrawals) *plus* the accrued interest for the reporting period. Given that valuation changes do not apply to domestic-currency-denominated deposits, the amount of transactions in domestic currency equals the period-to-period change in deposits *less* any OCVA.

5.102 Stocks and flows of foreign-currency-denominated deposits are converted into domestic currency units as described in paragraph 5.50. If data are unavailable for both transactions and valuation changes, the daily average market exchange rate for the period can be used to estimate valuation changes,

and provided there is no OCVA, transactions are the residual.

Debt securities

5.103 Stocks in debt securities are valued at market prices on the balance sheet date. Transactions in debt securities on the asset side of the balance sheet consist of: (1) securities purchases, *less* (2) securities sales, redemptions and interest payment receipts, *plus* (3) accrued interest earned in the period. Transactions in debt securities on the liability side consist of: (1) new securities issuances, *less* (2) securities redemptions (including partial redemptions) and interest paid,[23] *plus* (3) accrued interest incurred in the period. Stocks and transactions in foreign-currency-denominated securities follow the same valuation principles as explained in paragraph 5.50.

5.104 In source data, some debt securities may be valued at nominal rather than at market value. In the International Financial Reporting Standards (IFRSs), for example, all debt securities holdings are valued at market or fair values except for securities classified as held-to-maturity investments, which are valued at amortized cost using the effective interest method.[24] Liabilities in the form of debt securities are also valued at amortized cost, except for those designated as financial liabilities at fair value (including at market value) through profit or loss (see International Accounting Standard [IAS] 39.47 and IFRS 9, paragraph 4.2.1).

5.105 For monetary and financial statistics, assets and liabilities in debt securities (other than short-term) not valued at market price, need to be restated at market price. The difference in valuation between the source data and the market value recorded in monetary statistics is reflected in *Equity liability [MS]* as a valuation adjustment (see paragraph 5.43). Fair values need to be applied to the valuation of those debt securities that are traded infrequently, or are traded only in over-the-counter (OTC) markets for which market price quotations are not available on a regular basis. Fair value methods are discussed in paragraphs

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[22] Central bank holdings of unissued currency are classified as nonfinancial assets in its balance sheet.

[23] Redemption usually occurs through settlement at maturity, but it can occur through issuers' purchase of their own securities prior to maturity.

[24] Effective interest rates used for different approaches to measure interest for debt securities are discussed in the subsection *Accrued interest calculations for debt securities* in this section.

5.44–5.48 and Box 5.1. Determination of fair value using the present value method should be possible for nearly all types of debt securities. However, contractual terms of some securities may be so complex (for example, with respect to multiple embedded derivatives features) that reasonable estimation of future cash flows and/or selection of a representative discount rate is impossible. It is recommended that these securities should be valued at acquisition price or amortized cost (if calculable). If market values for short-term securities are not available, nominal value could be considered an approximation of fair value, provided the market interest rates on these or similar securities have not changed significantly since their issuance.

5.106 Nominal value is recommended as a memorandum item for debt security liabilities to support consistency with debt measures.[25]

Impaired debt securities

5.107 Under IAS 39, debt securities are deemed to be impaired if the creditor has reliable information that the debtor may default on the obligation to pay the interest and principal in accordance with the schedule of future cash flows for the securities.[26] IFRS 9 introduces a material revision of reporting impairment for financial instruments from an incurred loss to an expected loss model. This requires entities to estimate future losses of financial instruments thus creating prospective buffers for losses.

5.108 The statistical treatment for impaired debt securities depends on whether market-price data are available for such securities. If available, the impaired security should be recorded using its market price. If a market price is not available because the impaired security is not traded or is traded infrequently, a fair value should be estimated.

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[25] See *Public Sector Debt Statistics: Guide for Compilers and Users* (2013), paragraph 2.116, and *External Debt Statistics: Guide for Compilers and Users* (2013), paragraph 2.33.

[26] Disappearance of an active market for securities, or lowering of the credit rating of the issuer, does not necessarily imply impairment. As indicated in IAS 39.60, "The disappearance of an active market because an entity's financial instruments are no longer publicly traded is not evidence of impairment. A downgrade of an entity's credit rating is not, of itself, evidence of impairment, although it may be evidence of impairment when considered with other available information."

5.109 Valuation of impaired securities by the present value method is complicated because of uncertainties involved. In some cases, OTC price quotations may be available at prices that are heavily discounted from their pre-impairment prices, if impaired securities are traded in the market. The future cash flow(s) must be estimated, even though the cash flows are highly uncertain with respect to both amount and timing. The present value method should be applied in such a way as to avoid creditor overstatement of fair value. The difference between the pre- and post-impairment values represents a holding loss on the securities (revaluation).

Accrued interest calculations for debt securities

5.110 It should be noted that for debt securities, the value of purchase, sale, and redemption and valuation of positions in the balance sheets do not depend on the method used for the calculation and recording of accrued interest. This is because purchases and sales of debt securities are recorded at transaction prices, and the positions are recorded at market prices or fair values. The treatment of accrued interest only affects the extent to which financial flows are allocated to transactions in accrued interest rather than to holding gains or losses.

5.111 Bonds and similar instruments (such as large-denomination negotiable certificates of deposit and preferred stock) pay a fixed or variable coupon. At the time of issuance, bonds may be priced at par (at face value), below par (at a discount), or above par (at a premium). A bond usually sells at a discount or premium in the secondary market, depending on whether the market interest rates (and, therefore, yields on newly issued bonds) have risen or declined since the bonds were issued. So the accrued interest on a bond is calculated using the effective yield at the time of issuance, purchase, or the beginning of the period, and can be split into two components: the amortization of the discount or premium vis-à-vis the value to be paid at maturity, and the coupon that is earned but not yet paid.

5.112 While debtors have obligations to settle according to the terms and conditions set at the inception of the debt instruments, holders of securities acquired in the secondary markets may not know the interest rate at issuance (which is directly linked to the original

issue price). There are three approaches for defining and measuring interest for debt securities:[27]

   a. <u>Debtor approach</u>. The debtor approach is the perspective of the unit issuing the security. Interest is equal to the amounts the debtors will have to pay to their creditors over and above the repayment of the amounts advanced by the original creditors. Interest accrual on a debt instrument is determined for the entire life by the conditions set at inception of the instrument. The effective yield, established at the time of security issuance, is used to calculate the amount of accrued interest in each period to maturity.

   b. <u>Creditor approach</u>. The creditor approach is the perspective of the unit holding the security. Under this approach, the effective yield used to compute accrued interest on the securities is updated (that is, recalculated) in each period to reflect current market rates.

   c. <u>Acquisition approach</u>. Interest is the income that follows from applying the discount rate implicit in the cost at which the instrument was acquired. The accrual of interest under this approach reflects market conditions and expectations at the time of acquisition. Interest is determined using the remaining yield-to-maturity at the time the debt instrument is acquired. The effective interest rate will change only if the security is resold.

5.113 *The debtor approach is the approach to record interest accrual on debt securities in this* **Manual***, in accordance with the* **2008 SNA** *methodology.*[28]

5.114 The secondary-market purchasers' lack of information on the amounts of funds provided to the debtors is an obstacle to the application of the debtor approach by such purchasers. It should be emphasized, however, that the debtor and creditor approaches converge when the changes in market price during the life of a security are not large.

5.115 In applying the acquisition approach, the interest accrues from the time that ownership changes hands in the same manner as was described for securities

acquired at the time of issue. For the creditor approach as well, the interest accrues from the time that ownership changes hands, but the effective yield is continuously updated to reflect current market rates. The amortization of the discount (or premium) by the acquisition or creditor approach may differ significantly from the amortization by the debtor approach if market interest rates have changed appreciably since the time of issuance.

5.116 In the secondary market, a bond has two prices: the so-called *dirty price* and the *clean price.* The dirty price of a debt security is its market price, which includes the accrued but not yet paid coupon. To separate out the effect of coupon payment, the accrued interest between coupon dates is subtracted from the dirty price to arrive at the clean price. The creditor (that is, secondary market purchaser) records the dirty price as the acquisition cost of the bond. When the coupon is paid, the accrued interest that was included in the dirty price (that is, acquisition cost) is recorded in the creditor's accounts as a reduction in principal.

5.117 Box 5.2 presents examples of accrued interest calculations for different types of debt securities.

5.118 Many countries' accounting standards for accrued interest on debt securities contain a combination of the debtor and acquisition approaches.[29] In IAS 39, accrued interest on securities holdings is based, in effect, on either the debtor approach or the acquisition approach, depending on whether the securities were acquired when issued or later in the secondary market. In IAS 39 and the national financial reporting standards in many countries, accrued interest on securities issued (liabilities) is based, in effect, on the debtor approach, which is consistent with the recommendation in this *Manual* (see paragraph 5.113).

5.119 Where the accounting data have been compiled in accordance with either the creditor or the acquisition approach and reported to the compiler by the FC, supplementary data should be reported for debt securities purchased in the secondary market to allow the compiler to adjust the accrued interest data to the debtor approach, if feasible. Ideally, supplementary data would be reported to the compilers of monetary and financial statistics on a security-by-security (s-b-s) basis[30]

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[27] See also *2008 SNA*, paragraphs 17.261–17.262, and *BPM6*, paragraphs 11.52–1153.
[28] See *2008 SNA*, paragraph 17.263.

[29] *Debtor approach* and *acquisition approach* are terms that are not used in the IFRSs or national financial reporting standards.
[30] See Annex 4 of the *Handbook on Securities Statistics*.

Box 5.2 Accrued Interest for Different Types of Debt Securities

For a coupon-based debt security issued at par (that is, the issue price is equal to the face value), the accrued interest (under the debtor approach) is the accrued coupon.

For a fixed-coupon bond issued at a discount from its face value, the yield is set at a constant rate on the issue price (face value less discount). This rate is the discount rate that equalizes the present value of the future cash flows of the bond with its issue price. The discount bond accrues interest at the set constant rate on its nominal value (principal plus accrued and not paid interest), part of which is paid in the form of the coupon, with the difference increasing the nominal value of the bond. At the end of the life of the bond, its face value is repaid together with the last coupon. The paid-at-maturity discount is recorded as interest.

For a fixed-coupon bond issued at a premium over its face value, the yield is set at a constant rate in the same way as for a discount bond. Interest accrues at the set constant rate on the nominal value of the bond (including the premium paid) during its lifetime. Because the coupon payments are higher than the interest accrued on the nominal value, they should be considered a prepayment of principal and should be discounted from the nominal value.

For a variable-rate bond or similar security issued at face value, the accrued coupon can be calculated by taking into account that the coupon rate, though variable between coupon periods, is reset at the beginning of each coupon period and remains unchanged throughout the coupon period.[1] Suppose an entire reporting period were within a particular coupon period. The accrued coupon earnings for the reporting period would be a prorated share of the coupon. Alternatively, suppose the first coupon period ended after n_1 days of the reporting period, and a different coupon rate applied for the second coupon period, extending through the remaining n_2 days of reporting period (and into subsequent reporting periods). The accrued coupon for the reporting period is an n_1-day share of the first coupon plus an n_2-day share[2] of the second coupon minus the first coupon payment.

For a variable-rate bond issued at a discount (or premium), accrued interest can be calculated as the accrued coupon *plus* the amortization of the discount (or *minus* the amortization of the premium). The amortization of the discount (or premium) for variable-rate securities is the same as for fixed-coupon securities.

For securities with indexed interest and/or principal, the accounting for accrued interest follows the same principles as those for accrued interest on variable-coupon securities. However, different treatments for the recording of accrued interest are recommended depending on the type of index used to adjust the level of principal to which the interest is linked and on the currency in which the interest and principal are denominated. (See paragraphs 5.53–5.59 on the treatment of indexed financial instruments.)

For securities with embedded derivatives such as call, put, or equity conversion options, the accounting for accrued interest is the same as for securities that do not have such features. For all periods leading up to the exercise of the option, the interest accrual is unaffected by the presence of the option. When the embedded option is exercised, the securities are redeemed, and accrual of interest—both coupon flow and amortization of discount or premium—ceases.

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[1] The resetting of the coupon may be affected by an embedded derivative such as a rate cap, collar, or floor. If so, the amount of the new coupon rate, though affected by the embedded derivative, is still known at the beginning of the coupon period when the rate is reset, and accrued interest calculations are not further complicated.

[2] The shares are based on time proportions of n_1/p_1 for the first coupon period and n_2/p_2 for the second coupon period, where n_1 and n_2 are the number of calendar days in the first and second segments of the reporting period, and p_1 and p_2 are the total number of calendar days in the first and second coupon periods.

for all securities for which the acquisition or creditor approach had been applied in the accounting data (see Box 5.3). This approach could be implemented for an FC that held only a few securities purchased in the secondary market. However, large FCs' portfolios may contain hundreds of securities that were acquired in the secondary market. It is recommended that supplementary data be provided for only those securities for which the accrued-interest adjustment arising from recalculation by the debtor approach would be material—such as securities whose price has changed significantly since issuance.

Security-by-security databases

5.120 For the purpose of monetary statistics, data on securities held and issued have been traditionally collected on an aggregated basis from reporting FCs. In practice, compilers receive total figures (possibly broken down by sector, maturity, and currency), which are calculated by reporting FCs based on individual holdings/issues. Recently, compilers in some economies have introduced the possibility (or, in some cases, the obligation) for FCs to report statistical data on securities on an s-b-s basis, which can be used to support the compilation of monetary and financial statistics. Box 5.3 presents the details of s-b-s systems.

Box 5.3 Security-by-Security Data Collection

Security-by-security (s-b-s) reporting entails the collection by statistical compilers of information on each individual security issued and/or held by the reporting FC. The basic principle of s-b-s reporting is that reporting FCs provide statistical data on securities on a granular basis and compilers calculate the balance sheet totals and breakdowns as required, using the reported data.

The metadata collected for each security generally include basic information such as security identifier (e.g., ISIN code),[1] issuer name/code, nominal amount held/issued, acquisition date and price. Additional details that may be collected on the individual securities include original/remaining maturity, sector of the issuer/holder, original denomination, etc.

Some s-b-s collection systems are set alongside a reference database containing information on all traded securities and related attributes (outstanding nominal amount, maturity, issuer, issuer sector, etc.), some of which may be obtained from commercial data providers while others are filled in by data reporter and/or compilers of statistics (e.g., the institutional sector of the issuer). An example of such a database is the Centralized Securities Database (CSDB) of the European Central Bank (ECB), which contains all securities with an ISIN code and relevant attributes. Reporting institutions using the s-b-s system need to provide to compilers only the ISIN code and the quantity of each security held, whereas all the remaining information can be derived by the compiler from the CSDB. (A non-technical description of the CSDB can be found in the publication *The Centralised Securities Database in Brief*, available on the ECB's website at www.ecb.europa.eu.)

The development of an s-b-s collection system carries significant benefits for monetary statistics. Centralizing the aggregation process performed on individual holdings/issues ensures that statistical classifications are carried out using a common methodology across the reporting population. In this context, harmonizing the calculation of valuation adjustments and transactions represents one of the main improvements.

Furthermore, shifting the aggregation process to compilers usually implies more flexibility in terms of aggregating the data along different dimensions (e.g., counterparty sector, maturity brackets). These different aggregations can be performed for the full s-b-s database by defining common rules that apply throughout, without a need for additional effort on the part of reporting FCs. This benefit is particularly relevant in an environment where data users often require new data breakdowns or aggregations, which can be provided using the s-b-s system with a much shorter delay and at a lower cost, as compared to the traditional collection system in which reporting FCs would have to implement the amended requirements.

Finally, the availability of a database containing individual positions in the FCs' security portfolios carries an added benefit from the financial stability analysis perspective, as an obvious source for assessing risk exposures.

The major challenge in setting up an s-b-s collection system lies in the initial investment, mainly to be borne by the compilers. This relates to the need to set up and maintain a very large database containing the data on individual securities. Moreover, the statistical compiler needs to set up the appropriate IT infrastructure for aggregating the individual data as required. In particular, a significant part of this initial investment is attributable to the setting up of the reference database containing the relevant attributes for each security.

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[1] ISIN code is an International Securities Identification Number (ISIN) that uniquely identifies a security.

Memorandum items for debt securities

5.121 This *Manual* recommends including the following debt security-related data in memorandum items: (1) total accrued interest on debt securities for both assets and liabilities; (2) debt securities with maturity of one year or less by currency and by counterpart sector for both assets and liabilities; (3) debt securities assets issued by nonresident FCs and debt securities liabilities held by nonresident FCs; and (4) total amount of debt securities at nominal value for liabilities. Whereas the valuation method for debt securities is the market value, the nominal value of debt securities is an analytically useful measure of the legal liability from the viewpoint of the debtor, because at any moment, it is the amount that the debtor owes to the creditors.

Loans

5.122 Loans are outstanding from the time when funds are disbursed from the creditor to the debtor until the time when they mature or are liquidated prior to maturity—for example, because of early repayment or default by the debtor. Stock data for domestic-currency-denominated loans (assets or liabilities) are recorded at nominal value—that is, the creditor's outstanding claim (equal to the debtor's obligation), which comprises the outstanding principal amount including any accrued but not yet paid interest.

5.123 Like deposits, the use of nominal values is influenced by pragmatic concerns about the need to maintain symmetry between debtors and creditors. Loans also are by definition not traded and therefore estimating a market price can be subjective. Further, the nominal value of the loan is analytically useful because it represents the legal liability of the debtor. However, it is recognized that nominal value provides an incomplete view of the financial position, particularly when some loans are nonperforming. It is recommended that data on expected loan losses (disaggregated by debtor sector) be included as memorandum items accompanying the sectoral balance sheets described in Chapter 7. The expected realizable value of loans may be calculated based on the reported gross amounts of loans and expected loan losses (see also paragraph 5.142).

5.124 Loan transactions comprise the amount of new loans extended or received *plus* accrued interest on loans *less* loan principal and interest payments.

Transactions in loans denominated in domestic currency are equal to the period-to-period change in loans outstanding (that is, *CS – OS*) *less* OCVA (such as arising from loan write-offs). The case of loan repayment after the loan has been written-off is discussed in paragraph 5.231c.

5.125 Stocks and transactions of foreign-currency-denominated loans are converted to domestic currency units as described in paragraph 5.50. Using the data for opening and closing stocks and OCVA, data for the sum of transactions and valuation changes (arising from exchange rate changes) can be derived residually (see Annex 5.1).

5.126 The entire loan portfolio is to be valued at nominal value when presenting the loan data in the sectoral balance sheets described in Chapter 7. In particular, outstanding loans should not be adjusted for provisions for loan losses. A loan portfolio is adjusted downward only when: (1) loans are written off as uncollectible (OCVA), or (2) when the outstanding amount of a loan has been reduced through formal debt reorganization (revaluation or a transaction if it is debt forgiveness, as explained in the next paragraph).

5.127 For domestic-currency-denominated loans, valuation changes arise in the exceptional cases of debt refinancing or debt swaps (e.g., for debt for equity swaps), or when a loan is sold at below (or above) its nominal value.[31] Revaluation is recorded for the debt being replaced prior to its replacement by a new instrument such as: (1) a new loan to the original debtor (loan refinancing); or (2) securities issued by the original debtor (loan swap for securities) or by a new debtor (combination of a loan assumption and swap). In other words, debt refinancing and debt swaps transactions are recorded at the value of the new instrument, with revaluation recorded for the original instrument equal to the difference between the value of the new instrument and the value of the instrument being replaced. An exception arises for nonmarketable debt owed to official creditors when the difference in value is intended to convey a benefit to the debtor—the difference in value is then recorded as a debt forgiveness transaction (see subsection *Recording of Debt Reorganizations* in this section and *BPM6*, Appendix 2).

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[31] See *2008 SNA*, paragraph 22.115, and *BPM6*, paragraphs 9.33 and A2.29–A2.30.

5.128 When a loan is sold at below (above) nominal value, the transaction is recorded at the transaction value and the position is recorded at nominal value. To account for the inconsistency between the market valuation of transactions and nominal valuation of positions, the seller records a revaluation during the period in which the sale occurs, equal to the difference between the nominal and the transaction value, while the buyer records an opposite amount as a revaluation.[32] Such revaluations directly impact *Equity liability [MS]* through valuation adjustment.

5.129 The transaction date (trade date) for a loan is the date on which the funds are disbursed from the creditor to the debtor, even though the loan agreement may be signed on an earlier date. The trade date and settlement date are the same in this case.[33]

5.130 For loans to finance specific projects, loan disbursements can take the form of:

   a. Advances to the borrowing entity—to be recorded when the lender advances funds to the borrower.

   b. Direct payment by the lender to suppliers of goods and services—to be recorded when the lender pays the supplier.

   c. On a reimbursement basis after the borrower has already paid the suppliers—to be recorded when the lender makes reimbursements to the borrower.

5.131 Loans that have become negotiable (i.e., marketable) in secondary markets should be reclassified as debt securities (see paragraph 4.59) and should be valued on the basis of market prices in the same way as other types of debt securities.

5.132 For loan participations, transactions comprise the principal amount of new participations *less* principal and interest payments *plus* accrued interest. For mortgage loans, transactions are recorded in the amount of new loans *less* principal and interest payments *plus* accrued interest. Principal payments for mortgage loans include the principal components of the scheduled payments during the term of the loan, as well as prepayments—repayment of loans prior to maturity.[34]

5.133 Financial lease payments are treated as interest and principal payments on a loan by the lessee to the lessor. Financial leases are often structured similar to the interest and principal payment schedules for a loan that calls for periodic payments in equal amounts over the term of the loan. The rate of interest equates the present value of the total amount payable in install-ments over the life of the lease (including any value to be repaid at maturity) with the market value of the asset at the time the lease is initiated.

5.134 Unlike a mortgage or installment loan, a finan-cial lease may stipulate that (1) the first lease payment is to be made at the inception of the lease, (2) the periodic payments are not all of equal amount, and/or (3) a lump sum payment is required at the termination of the lease, if the lessee is to acquire the asset. If the lessee acquires the legal ownership of the leased asset, the payment for the residual value is included in the last lease payment. If the lessee returns the asset to the lessor at the end of the lease, this is recorded as a transaction in the amount of the residual value of the asset (the final payment under the lease arrangement) and an acqui-sition (lessor)/disposal (lessee) of a nonfinancial asset. Most financial leases are *net leases* in which the les-see pays any operating expenses and property tax and agrees to maintain and insure the asset.

5.135 For those loans (or deposits) for which the con-tract requires the accrual of interest during the grace period (i.e., the relevant interest rate that applies to the grace period is greater than zero), the accrual of interest should be recorded as increasing the value of the principal. On the other hand, if the debtor can repay the same amount of principal at the end of the grace period as at the beginning (i.e., the relevant interest rate that applies to the grace period is zero), no interest costs accrue during the grace period. This treatment applies to loans and deposits but not to debt securities.[35]

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[32] The same principles apply for deposits and other accounts receivable that are sold at below (above) nominal value.

[33] A loan agreement may stipulate that an N-period loan has a principal amount, A $(= A_1 + A_2 + . . . + A_{N-1})$, that is to be disbursed in tranches (that is, installments). The borrower receives A_1 at *time 1*, when the loan goes into effect, and A_2. . ., A_{N-1} at periodic intervals (at *time 2, time 3,. . ., time N-1*) during the life of the loan. The loan agreement legally or effectively represents a *master agreement* for a *series of loans* that should be recorded on separate trade dates—*time 1, time 2, time 3, . . ., time N-1*.

[34] Homeowners may be entitled to repay mortgage loans without incurring prepayment penalties.

[35] See also *External Debt Statistics: Guide for Compilers and Users* (2013), paragraphs 2.97–2.98 and Box 2.4.

5.136 Box 5.4 further elaborates on statistical treatment of different types of loans.

Nonperforming loans and interest arrears

5.137 <u>Nonperforming loans</u> (NPLs; defined in paragraph 4.100) indicate potential losses and may result in actual losses for the FC. The recommendation is that NPLs should continue to be recorded at nominal value and entries in the amount of the provisions for loan losses be included in *Other accounts payable–other [MS]* (see paragraph 5.231).

Box 5.4 Statistical Treatment of Different Types of Loans

Commercial loans are loans to business enterprises contracted on a fixed- or variable-rate basis. Payment of all interest at maturity is standard for many short-term loans, whereas periodic interest payments are common for long-term loans. Accrued interest is included within the transactions and closing stock for the loan. The recommendation is to calculate the accrued interest on a compound basis for long-term loans for which all interest is paid at maturity or at intervals that exceed one year.[1]

A *loan participation* (described in Chapter 4) should be recorded at the nominal value of the financial corporation's participation in the loan. The nominal value is equal to the acquisition cost for the loan participation (excluding fees or commissions) *plus* accrued interest.

Mortgage loans (residential or commercial), *home equity loans*, and *consumer installment loans* for purchases of automobiles or other durable goods call for interest and principal payments at regular intervals (usually monthly) over the life of the loan. The periodic payments for a fixed-rate loan are equal in amount (called a *fully amortized* loan), but the share of interest payment and principal repayment in each payment varies over the life of the loan. As the loan matures, a progressively larger share of each payment is principal repayment, and a declining share represents interest payment. For adjustable-rate mortgage loans, the interest rate is adjusted up or down at specified intervals over the life of the loan, in response to upward or downward movements in a market interest rate to which the loan rate is indexed. When the loan rate is adjusted, the interest and principal repayment schedule is revised to account for the new loan rate and the remaining principal. Accrued interest can be calculated on a time proportion basis—that is, the total amount of the next interest payment *divided* by the number of days between payments *times* the number of days since the start of the most recent recording period.

The statistical treatment of *financial leases* is designed to move away from the legal arrangements to capture the economic reality of such arrangements, by treating assets under a financial lease as if they were purchased and owned by the user. Financial leases should be valued at nominal value. The financial lease payments are treated as interest payments and principal repayments (see paragraph 5.133).

At inception, the lessor and lessee should record a loan transaction in the amount of the lessor's net investment in the lease, which should equal the market or fair value of the leased property. The residual value of the leased property must be taken into account in calculating the cash flows and recording the lease. Financial leases often stipulate that, at the end of the lease term, the lessee has the right to acquire the legal ownership of the leased property upon the fulfillment of agreed conditions (sometimes called hire purchase contracts). It is recommended that the present value of the lessee payment for the residual value of the asset should be included in the valuation of the lease, whether or not the lessee is expected to acquire the asset at the termination of the lease.

For the lessee's accounts, the contra-entry to recording the loan is a nonfinancial asset, recorded as if title to the leased property had been conveyed to the lessee—that is a change of economic ownership of the property from the lessor to the lessee. For the lessor's account, the contra-entry depends on the way in which the leased asset has been acquired:

- *Asset previously recorded in lessor's accounts*. A decrease in nonfinancial assets is recorded, taking into account the residual value of the leased property.

- *Asset acquired expressly for the lease*. The leased asset is acquired directly from the manufacturer or some other seller and is conveyed to the lessee. The lessor records the acquisition and the disposal of a nonfinancial asset, an increase in liabilities/reduction in assets (to pay for the acquisition of the nonfinancial asset), and an increase in loan assets (claim on the lessee). If the acquisition and disposal of the nonfinancial assets occur in the same period, only the financial transactions are recorded.

Box 5.4 Statistical Treatment of Different Types of Loans (*Continued*)

- *Sale and lease back*. The lessee sells the asset to the lessor and then leases the asset from its new owner. The lessor records a cash outflow in the amount of the asset purchase. The lessee records a corresponding increase in cash from the asset sale.[2]

Financial leases that become nonperforming are treated in the same way as nonperforming loans (see paragraphs 5.137–5.140). As with foreclosure for a secured loan, the lessor can repossess the asset if the lessee fails to make the lease payments. The present value of the proceeds expected from the repossession of the asset should be deducted in calculating the expected loss on an uncollectible lease.

A *securities repurchase agreement* (or a securities lending or gold swap arrangement that has cash collateral) should be valued at the nominal amount of the funds supplied by the cash provider to the cash taker (that is, securities or gold provider). The market quotation for a repurchase agreement is an interest rate rather than a purchase and repurchase price, and represents the annualized yield that the cash provider earns from the agreement.

For a securities repurchase agreement the amount of the "loan" at inception is generally less than the market value of the securities (or gold) that are to be sold and repurchased, because the cash provider requires a *haircut* (also called *initial margin*). Accrued interest, which should be included in the stock and transactions data for the securities repurchase agreements, will be relevant for only a subset of the agreements.

The securities repurchase (or a securities lending) agreement may stipulate that, if the market value of the securities falls by a specified amount, the securities provider (that is, cash taker) is required to provide additional margin by supplying more securities as collateral. The provision of additional margin in the form of securities (as in the case of the original margin in the form of securities) is not reflected in the stock and flow data recorded by either the cash provider or cash taker, but rather is recorded off balance sheet by both parties to the agreement.

In some atypical securities repurchase (or securities lending) agreements, the cash provider may be required to provide additional cash during the term of the agreement, particularly if the market price of the contracted securities has increased appreciably. The additional cash is provided in the form of a repayable margin deposit[3] rather than as an augmentation to the cash collateral that was conveyed at the inception of the agreement. The valuation and interest accrual of the repurchase agreement (within loans) is, therefore, unaffected by the depositing of repayable margin. Posting of repayable margin is a separate deposit transaction. If the margin deposit is interest-bearing, any accrued interest is reflected in the deposit account, rather than in the loan account for the securities repurchase (or securities lending) agreement.

For securities repurchase (or securities lending) agreements denominated in foreign currency, the valuation approach is the same as for foreign-currency-denominated loans.

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[1] Explanation and examples can be found in the *External Debt Statistics: Guide for Compilers and Users* (2013)*,* Chapter 2.

[2] Sale and lease-back are motivated by a lessee's desire to obtain funds at a lower borrowing rate than would be obtainable in the loan or securities markets.

[3] This mechanism is the same as the provision of repayable margin for financial derivative contracts.

5.138 Interest should be shown accruing until a nonperforming loan is repaid or the principal is written off, even if underlined interest arrears are being accumulated. An interest arrear—that is, interest overdue for payment—is included in the value of the outstanding asset/liability. The same approach is taken for principal arrears. Interest and principal arrears data should be reported in the memorandum items that accompany the sectoral balance sheets. If there is recognition that the interest and/or principal may not be received in the future, an additional provision for expected loss should be made by the creditor as an OCVA flow (provision for expected loss) and reported in *Other accounts payable-other [MS]*, with a contra-entry in *Equity liability [MS]* through *Current year result*.

5.139 In the source data for FCs, interest arrears may be recorded on balance sheet or off balance sheet. The recording approach underlying the source data needs to be taken into account for proper application of the recommended recording of interest arrears.

5.140 Arrears in interest and principal payments on loan liabilities of FCs typically arise when FCs are experiencing financial difficulties. For a central bank, interest and principal arrears on loan liabilities may arise from its inability to make payments for loans that require payment in foreign exchange that is not readily available.

Impaired loan trading

5.141 This *Manual* recommends that a nonperforming or otherwise impaired loan that has been purchased at a fraction of its nominal value should continue to be recorded as a loan if the purchase is a one-off transaction (see also paragraph 5.126). Additionally, it is advantageous to retain the loan classification for these assets to facilitate the future posting of provisions for loan losses, when necessary (see paragraph 4.101).

Memorandum items for loans

5.142 This *Manual* recommends including the following loan-related data in memorandum items in sectoral balance sheets to allow calculating the aggregate amount of loans based on different valuations: (1) total accrued interest on loans for both assets and liabilities; (2) total amount of interest and principal arrears on loan assets and liabilities; and (3) expected loan losses disaggregated by economic sector of debtor. Furthermore, this *Manual* recommends including the following loan-related data in memorandum items: (1) loans with maturity of one year or less by currency and by counterpart sector for both assets and liabilities; and (2) loans extended to nonresident FCs and loans received from them.

5.143 Data on interest and principal arrears should include all overdue payments that are past due. For some FCs, interest and principal arrears are likely to arise mainly from their loans to nonfinancial corporations (NFCs) and/or to households. It is recommended that FCs report interest and principal arrears on loan assets disaggregated by borrowing sector.

5.144 Expected loan losses should be disaggregated by economic sector of debtor. The accounting data on provisions for loan losses can be directly used in estimating the expected loan losses, if these data reflect, to a reasonable degree, the total expected losses on nonperforming loans. *Specific provisions* are provisions against expected and identifiable losses on loans. *General provisions* are provisions against the possibility of unidentifiable losses that may arise within a portfolio of loans,[36] even though the individual loans that may become uncollectible cannot be identified. To be directly useful in estimating expected loan losses, the data for general, as well as for specific, provisions for loan losses must be disaggregated by economic sector of the debtor.

5.145 In cases where source data on provisions do not reasonably reflect the total expected losses on NPLs, compilers of monetary statistics might attempt to report in memorandum items a more accurate measure of expected losses, as discussed below.

5.146 Expected loan losses include three categories that are based on the secured or unsecured nature of the loan and the prospects for full or only partial loss of the nominal value of the loan:

  a. Full loss on unsecured (that is, uncollateralized) loans. The expected loss on an unsecured loan is the entire nominal value of the loan, if the creditor expects no future cash flows from the loan.

  b. Partial loss on unsecured loans. The expected loss on an unsecured loan is less than the nominal value of the loan, because the lending institution expects some future cash flow through recourse to its creditor claim on the assets of an enterprise that will be liquidated.

  c. Partial loss on secured (that is, collateralized) loans. The expected loss on a secured loan is the nominal value of the loan *less* any recovery that results from possession and subsequent sale of the assets that were collateral for the loan.

5.147 The expected loan loss is the difference between the nominal amount and the recoverable amount—that is, the present value of the expected cash flows to be obtained from the borrower or through liquidation of collateral. The principles for the measurement of

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[36] The calculation of general provisions is based on national practices, as established by the lenders or as imposed within the national accounting or supervisory standards. General provisions can be calculated in various ways—for example, as a percentage of (1) total assets (to provision both loan and non-loan assets), (2) total loans, or (3) loans other than those covered by specific provisions.

the recoverable amount for impaired assets are consistent with IAS 39.63–65:

a. The discount rate to be used in calculating the present value of expected cash flow is the *original yield to maturity* on the loan.[37]

b. If the loan has a variable interest rate, the discount rate for measuring the recoverable amount should be the *current yield to maturity*.[38]

c. The estimated cash flows from secured loans should be based on the expected net proceeds from the sale of the assets used as collateral;[39] costs incurred in acquiring, storing, or maintaining the collateral should be netted from the proceeds of the asset liquidation, or should be treated as negative cash flows, in calculating the present value of the expected cash flows.

5.148 The data for both outstanding loans and expected loan losses are disaggregated by economic sector so that the realizable value of loans to each sector can be derived by deducting expected loans losses from the nominal value of loans.

Equity and investment fund shares

5.149 In the financial statistics, equity and investment fund shares—whether held as assets or issued as liabilities[40]—are recorded at market or fair values. The total value of the shares of a corporation is equal to the market price (or fair value) per share *times* the number of shares issued and currently outstanding.

5.150 In monetary statistics, equity and investment fund shares held as assets are recorded at market value, as are investment fund shares issued as liabilities. Equity liabilities of FCs other than investment funds are recorded at their book value, which corresponds to the difference between total assets and total liabilities. This treatment ensures the balance sheet identity between assets and liabilities in the data reported by FCs.

5.151 Equity and investment fund shares held as assets denominated in foreign currency are recorded at the market or fair value expressed in foreign currency and are converted to domestic currency units as described in paragraph 5.50.[41]

5.152 Transactions in shares (equity securities) assets are reported on a purchases-less-sales basis. Transactions in shares on the liability side of an FC's balance sheet consist of the proceeds from owners' contributions, including issuance of new shares,[42] *less* any outflow of dividends when shares go ex-dividend.

5.153 Transactions in other equity (defined in paragraph 4.126) are principally in the form of owners' net additions to the equity of quasi-corporations—that is, funds or other resources (including fixed or other assets) that the owners provide for capital investment by quasi-corporations *less* withdrawals, where the withdrawals are proceeds from the sale of fixed or other assets, transfers of fixed or other assets, and funds taken from accumulated savings and reserves for the consumption of fixed capital. For quasi-corporations, all equity (including retained earnings and reserves) is assumed to be held by the owners.[43] Equity withdrawals exclude current withdrawals from the income of quasi-corporations.

5.154 For their foreign branches, FCs may inject significant financial support in certain circumstances. Such financial support may take various forms and its economic substance may also vary. These payments should be recorded as transactions in financial instruments used to provide financial support. In

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[37] The original yield to maturity is *original effective interest rate* in IAS terminology.

[38] The current yield to maturity is *current effective interest rate* in IAS terminology—the discount rate that equates the current nominal value of the loan to the present value of the future principal and interest payments that would be received if the loan were not impaired.

[39] See IAS 39, AG84 for more information on estimating cash flows for collateralized loans.

[40] *Equity and investment fund shares* are designated as a liability in the methodology of this *Manual*, consistent with the *2008 SNA* (paragraphs 11.81–11.102) and other major statistical manuals. In accounting and finance literature (including the IFRSs), *equity and investment fund shares* is designated as *equity* and is treated as separate from liabilities.

[41] With few exceptions, shares are denominated in the domestic currency of the issuer.

[42] Including shares from the exercise of stock options or bond conversions into shares, but excluding shares arising from stock splits or stock dividends. A stock split or a stock dividend does not affect the corporation's cash flow or the proportion of these cash flows attributed to each shareholder.

[43] Owners sometimes may provide quasi-corporation financing through the extension of loans, placement of deposits, or purchase of debt securities issued by the quasi-corporation, or other accounts payable. The owners and the quasi-corporations should record such transactions as loans, deposits, etc., rather than as equity.

cases where there is no clarity on the type of financial instrument used, the payments could be recorded as transactions in loans.

5.155 Transactions in shares are valued at the price agreed between the institutional units involved in the transaction. New shares are recorded at issue value. Transactions in foreign-currency-denominated shares and other equity are converted to domestic currency units at the market exchange rates prevailing at the time of the transaction.

5.156 Current and capital transfers[44] received and provided by FCs are treated as transactions affecting *Equity liability [MS]*.[45] The receipt of a current or capital transfer is recorded as a transaction: an increase in currency or deposits (or nonfinancial assets) on the asset side of the FC's balance sheet, or as a reduction in a liability (in case of debt forgiveness). The contra entry is an increase in *Equity liability [MS]* of the FC in *Current year result*. The provision of a current or capital transfer is also recorded as a transaction: a decrease in currency or deposits (or nonfinancial assets) on the asset side of the FC's balance sheet, with a contra-entry in *Equity liability [MS]* in *Current year result*.

Purchase of own shares

5.157 Corporations sometimes purchase or buy back their own shares. In financial statistics, the total value of an FC's equity shares is equal to the market price per share *times* the number of outstanding shares other than those reacquired and held by the FC. In monetary statistics, reacquired shares (called *treasury shares*) should be recorded as a transaction in *Equity liability [MS]* at the market value, with contra-entries recorded as a reduction in currency or deposit holdings, as shown in Table 5.7.[46]

Listed shares, unlisted shares, and other equity

5.158 Listed shares are regularly traded on stock exchanges or other organized financial markets and should be valued in the balance sheets at their current market prices. For monetary statistics, however, shares on the liability side are recorded at book value.

5.159 Market price quotations are usually available on a daily basis for listed shares and, in some cases, on a daily or less frequent basis for OTC shares.[47] For listed shares valued at market price, a representative mid-market price observed on the stock exchange or other organized financial markets should be used for valuation.

5.160 Fair values need to be estimated for nontraded or infrequently traded shares, which collectively are referred to as unlisted or unquoted shares (see *2008 SNA*, paragraph 13.71 and *BPM6*, paragraph 7.16). Consistent with the *2008 SNA* and other statistical manuals, a flexible approach is recommended for the valuation of unlisted shares in the absence of a quotation or a recent transaction price. The following six alternative methods for approximating the market value of unlisted shares are distinguished:

a. Recent transaction price. Recent (e.g., within the past year) transaction prices of unlisted shares may be used to the extent that market conditions have not changed substantially. This method can be used as long as there has been no material change in the corporation's position since the transaction date. As time passes and conditions change, old transaction prices become increasingly misleading.

b. Net asset value (NAV).[48] Appraisals of untraded equity may be conducted by knowledgeable management or directors of the corporation, or provided by independent auditors to obtain total assets at current/market value less total liabilities (excluding equity) at market value. Valuations should be recent.

c. Present-value approach (PVA)/price to earnings ratios. The present value of unlisted equity can be estimated by discounting the forecast

Table 5.7 Recording of Reacquired Shares in Monetary Statistics: An Example					
(In domestic currency units)	OS	T	VC	OCVA	CS
Assets					
Transferable deposits	1,500.0	−225.2[2]			1,274.8
Liabilities					
Equity liability [MS]					
Funds contributed by owners[1]	750.0	−60.0[3]			690.0
Retained earnings	400.0	−165.2[4]			234.8

[1] Funds contributed by owners represent the book value of 500 shares at 1.5 per share.
[2] Buy-back of 40 shares at a market price of 5.63 (5.63*40 = 225.2).
[3] Buy-back of 40 shares at book value of 1.5 (1.5*40 = 60.0).
[4] The difference between the market and book values of the reacquired shares (225.2 − 60.0 = 165.2).
Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

future profits. At its simplest, this method can be approximated by applying a market or industry price-to-earnings ratio to the (smoothed) recent past earnings of the unlisted corporation to calculate a price. This method is most appropriate where there is a paucity of balance sheet information but earnings data are more readily available.[49]

d. <u>Market capitalization method (MCM)</u>. Book values reported by corporations can be adjusted at an aggregate level by monetary statistics compilers using ratios based on suitable price indicators, such as the ratio of market capitalization to book value for listed corporations in the same economy with similar operations.[50] Alternatively, assets that enterprises carry at cost (such as land, plant, equipment, and inventories) can be revalued to current period prices using suitable asset price indices.

e. <u>Own funds at book value</u>. This method for valuing equity uses the value of the enterprise recorded in the books of the enterprise, as the sum of all the components of equity. The more frequent the revaluation of assets and liabilities, the closer the approximation to market values. This method is used to value *Equity liability [MS]* in monetary statistics (see paragraphs 5.167–5.168).

f. <u>Apportioning global value</u>. The current market value of a global enterprise group can be based on the market price of its shares on the exchange on which its equity is traded, if it is a listed company. Where an appropriate indicator may be identified (e.g., sales, net income, assets, or employment), the global value may be apportioned to each economy in which it has direct investment enterprises, on the basis of that indicator, by making the assumption that the ratio of net market value to sales, net income, assets, or employment is a constant throughout the transnational enterprise group. (Each indicator could yield significantly different results from the others.)

5.161 In cases where none of the preceding methods or a combination of MCM and PVA[51] is feasible, less

[49] The dividend discount model approach to the estimation of the fair value of a corporation's shares discounts the stream of future dividend payments by the corporation. Derivation of the formulas can be found in corporate finance textbooks. For example, see Bodie, Kane, and Marcus (2002), pp. 565–576.
[50] An equivalent statement of the market capitalization formula (unadjusted for relative liquidity of the shares) is:

$$\text{Fair value of Corporation } A = \frac{(MV \text{ of Corporation } B) * (BV \text{ of Corporation } A)}{(BV \text{ of Corporation } B)}$$

where *MV* represents market value, calculated as the quoted price per share times the total number of outstanding shares, and *BV* denotes the total book values of the equity of each corporation, respectively.

[51] Use of both methods may be feasible on an infrequent basis for unlisted shares that are held for relatively long periods. Comparing the two valuations, the most conservative estimate of the fair values may be chosen. It is also recommended that the estimates be analyzed periodically to compare the (1) fair-value estimate, (2) book value of the shares, and (3) original or recent (if any) transaction price of the unlisted shares.

suitable source data may need to be used as inputs. For example, cumulated flows or a previous balance sheet adjusted by subsequent flows may be the only sources available. Because these sources use the prices of previous periods, they should be adjusted for subsequent price developments, for example, by using aggregate share price or asset price indexes and by taking into account exchange rate movements, where relevant. The use of unadjusted summing of past transactions is not recommended.

5.162 The means through which equity can be generated may take various forms, such as share issues, equity injections without any commensurate issue of shares (sometimes called "contributed surplus" or "share premiums"),[52] capital contributions, accumulated retained earnings and general and special reserves, or revaluation. These categories should be taken into account when cumulated flows are used to measure the value of equity and no method of estimating market value is available.

5.163 If the current market price is not directly observable, the decision about the methods to adopt should take into account the availability of information as well as judgments as to which available method best approximates market values. Different methods may be suitable for different circumstances and a standard ranking of the alternative methods is not proposed. Compilers should be transparent and should state clearly the method(s) used.

5.164 *Other equity* covers equity in any corporation or quasi-corporation that is not in the form of securities (see paragraphs 4.126–4.128). Other equity should be valued using the NAV method.

Depository receipts

5.165 The basic tenets of accounting for depository receipts (DRs) are (1) avoidance of double counting of ownership of the underlying instruments, debt securities and equity shares; and (2) revaluation that reflects the market price or fair value of the DRs which, in turn, reflects the market value of the underlying shares. The owner of DRs records the DRs as if these were the underlying equity shares or debt securities of the corporate issuer. If issued by a nonresident, the DRs are included in the *Nonresident* subcategory

within the asset category of *Equity and investment fund shares* or *Debt securities* in the accounts of the DR holder (ultimate investor or dealer). The underlying equity shares or debt securities *do not* appear in the balance sheet accounts of the FCs involved in the creation of the DRs. An exceptional balance sheet entry arises if DRs are issued before the FC arranging the issue has acquired the underlying instruments in the custodial account. To avoid double counting, the FC would record a negative holding of the underlying shares, given that the purchaser of the DRs would have reflected the equity ownership through the DR recording in the purchaser's account.

5.166 The DRs traded in active markets should be revalued on the basis of the market price quotations for the DRs. Those for which market price quotes are unavailable can be revalued on the basis of the market price at which the underlying shares are traded in the country of issuance, converted into domestic currency units at the market exchange rate.[53]

Equity liability [MS]

5.167 As discussed in Chapter 4 (paragraphs 4.131–4.132) this *Manual* recommends that equity (except MMF and non-MMF investment fund shares) is valued on the liability side at book value. This measure—*Equity liability [MS]*—is closer to accounting standards (capital and reserves), the basis of the data sources commonly used for monetary statistics, but can be reconciled with other national accounts-based methodologies as follows. For quasi-corporations, the measure of *Equity liability [MS]* is consistent with the valuation method *own funds at book value* in the *2008 SNA*; for FCs with quoted shares, *Equity liability [MS]* plus *Provisions for losses on financial assets* is consistent with the market value of equity plus net worth (see Figure 2.2 in Chapter 2). The addition of provisions to *Equity liability [MS]* is needed for the reconciliation with the national accounts concepts

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[52] When shares are sold at higher than par value, the excess amount received is considered as "contributed surplus" or "share premiums."

[53] Differences between the selling prices of DRs and the underlying shares can induce a brokerage house to buy more shares in the domestic market of the issuer for use as shares to back the issuance of additional DRs in the foreign market, thereby causing the market prices of the DRs and the shares to move toward parity. The process can also work in reverse through "cross-border trading" of the DRs in the country of the issuer of the shares. DRs are canceled by the FC in the foreign market, and the shares are released from the custodian bank and delivered back to the brokerage house in the country of issuance.

because provisions for losses on assets, while recorded as liabilities in monetary statistics, are not recognized as liabilities in the *2008 SNA*.

5.168 Flows for *Equity liability [MS]* of FCs (except MMF and non-MMF investment fund shares) in the monetary statistics framework include:

a. Funds contributed by owners are transactions valued based on the amount of proceeds from the issuance of new corporate shares (less own shares purchased and retired); and for quasi-corporations, the inflow and outflow of other equity.

b. As a principle, retained earnings inflow or outflow is recorded as an OCVA. However, transactions in retained earnings are recorded for foreign direct investors' equity in their direct investment enterprises. In these cases, retained earnings are imputed as being payable to the owners and reinvested as an increase in their equity.[54] Transactions are also recorded for dividends when shares go ex-dividend (outflows).[55,56] The valuation is based on the amount of retained earnings inflow or outflow.

c. Current year result represents the accumulation of the current profit or loss, recorded as transactions, valuation changes, or OCVA depending on whether the flows originating the expense/income are transactions, valuation changes, or OCVA.

d. General and special reserves should be valued based on the nominal amount appropriated from retained earnings. This appropriation is recorded as an OCVA. Transactions are not recorded.

e. Valuation adjustment is the net amount of asset and liability (other than equity liabilities) revaluations for the period, excluding the gains and losses posted to current year result.

5.169 Adjustments to the commercial accounting data source may be needed to meet the valuation requirements of this *Manual.* Any valuation adjustments to the source accounting data are reflected both in the relevant asset or liability and in *Equity liability [MS]*, through *Valuation adjustment.*

Memorandum items for equity liability [MS]

5.170 This *Manual* recommends including the market value of a FC's shares (liability side) in memorandum items classified by holding sector, if possible. Reporting the market valuation of shares on the liability side as a memorandum item allows harmonizing the monetary statistics data with the financial statistics, with the *2008 SNA,* and with the International Investment Position data on external liabilities. It is further recommended to include in memorandum items data on equity assets issued by nonresident FCs and equity liabilities held by nonresident financial corporation.

Investment fund shares or units

5.171 Traditionally, MMF shares maintained a constant share price (equal to the invested amount), irrespective of the market value of their underlying portfolio. The rule was changed in 2014, requiring a floating NAV for institutional prime MMFs, with the daily share prices of these MMFs fluctuating along with changes in the market value of their portfolio, and establishing liquidity fees and redemption gates.[57]

5.172 Changes in value of an investor's equity holding in an MMF are usually reflected by variation in the number of shares held, rather than through changes in the price per share. These changes in value are recorded as revaluation flows within a period. Most MMFs have their share values fixed at one unit of currency. Capital gains or losses and changes in the interest returns on the asset portfolio of the MMF are taken into account by increasing or decreasing the number of fixed-value (one currency unit) shares owned by the investor. The manager of the MMF is responsible for monthly statements that show the investor's current share holdings.

5.173 Holdings of listed shares of non-MMF investment funds should be valued using the market price of the share, and unlisted shares should be valued according to one of the preceding methods for unlisted equity.

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[54] See *BPM6*, paragraph 9.32.

[55] Depending on national financial reporting standards, this transaction could be attributed to the current year result.

[56] For corporations with only one shareholder and with shares that are not traded publicly, the dividends are recorded at the time they are payable. (See *BPM6*, paragraph 3.48, and *GFSM 2014*, paragraphs 5.111–5.112.)

[57] These changes do not affect the intrinsic nature of MMF shares or units, but are intended to bring more transparency to the underlying value of the assets backing MMFs.

5.174 Closed-end investment fund shares usually are traded in OTC markets, and market price quotation are obtainable from current sources. If so, the current value of an investor's holding in a closed-end pool is equal to the market price per share (as of the reference date) *times* the number of shares held; while the value of the total equity of the investment fund is equal to the market price per share *times* the fixed number of shares outstanding. In circumstances in which market price quotations are unavailable, it is recommended that the fair value of the shares be determined on the basis of the NAV of the shares, the valuation method used for open-end investment pools. The NAV-based valuation should be adjusted upward or downward if it is known that, if available, market price quotations would indicate that value of the shares would reflect a substantial premium above, or discount below, the NAV.

5.175 Shares in an open-end investment fund are purchased directly from, or sold directly back to, the investment fund, which stands ready to redeem outstanding shares or sell additional shares at the current value of shares. Through issuance and redemption of shares, the total number of shares in the investment fund is open-ended. Given the absence of exchange or OTC trading outside the fund, the share price quotation of the investment fund is based on the NAV of a share.

5.176 For a mutual fund that has no liabilities (other than its equity), the NAV of each share is equal to the market value of the investment fund's asset portfolio divided by the number of shares outstanding. Investment funds' asset portfolios usually are revalued to the current market value on a daily basis. To obtain the NAV per share of an investment fund that has liabilities in the form of securities or other debt instruments, the value of its liabilities is deducted from the market value of its asset portfolio before dividing by the number of shares outstanding. The fund (or its agent that manages the fund) is responsible for the calculation of the NAV on a daily basis. For valuing their shares, investors can obtain the NAV quotations from the account statements provided by the investment fund and, for many investment funds, from price quotations in the financial press.

5.177 Investment funds are designated as *load funds* and *no-load funds*, where a *load* refers to an up-front commission or other sales charge attached to the purchase of fund shares. The load should be recorded separately as an expense, rather than included in the shareholding—in accordance with the general principle that transaction costs are to be excluded from the outstanding amount of the financial asset.

Insurance, pension, and standardized guarantee schemes

5.178 The liabilities of insurance, pension, and standardized guarantee schemes (IPSGS) and their counterpart assets should be valued in principle at market value. The specific methods of valuing these liabilities are described below. Reinsurance should be treated in the same way as direct insurance. Although under the IFRSs and national financial reporting standards data adjustment may be required for the valuation of some types of pension plan assets, compilers of monetary statistics need to adjust the data to reflect market or fair values of all respective financial assets that should be market-valued.

5.179 Liabilities in the form of life insurance, and annuities and pension entitlements are measured as the present value of amounts expected to be paid out (based on actuarial assumptions for defined benefit arrangements). Measurement of life insurance and pension plan benefits both involve assumptions of an actuarial nature. Most insurance corporations and pension funds have in-house actuarial capabilities for the estimation of life insurance entitlements and post-employment benefits.

5.180 In some countries, expected post-employment (pension) obligations are revalued on a relatively infrequent basis (e.g., every three years or even less frequently). This *Manual* recommends that revaluation should occur at least annually, including for life insurance entitlements.

Nonlife insurance technical reserves

5.181 The amount of nonlife insurance technical reserves recorded in the balance sheet covers the prepayments of net nonlife insurance premiums (paid but not earned as of the balance sheet date) and reserves to meet outstanding nonlife insurance claims. Prepayments of insurance premiums should be recorded on a nominal basis, using straight-line prorating of the premium payment over the period

covered by the prepayment. Most insurance premiums for short-term insurance coverage are often paid on a semi-annual basis but sometimes monthly, quarterly, or annually.

5.182 When the reserves for nonlife insurance and standardized guarantee schemes are denominated in domestic currency, there are generally no holding gains and losses. Exceptionally, if a value for a claim outstanding has been agreed and indexed pending payment, there may be a nominal holding gain or loss recorded due to indexation.

5.183 The insurance premium prepayment may include a deposit component. If unbundled from the insurance contract, the deposit component is classified within the deposit accounts (on a non-prorated basis), and only the remainder—prepayment *minus* the deposit component—is included in prepayment of insurance premiums (on a prorated accrual basis).

5.184 Reserves to meet outstanding nonlife insurance claims should be recorded at the present value of the amounts expected to be paid out in settlement of claims, including disputed claims and an allowance for claims to cover incidents that have occurred but not yet been reported. The discount rate used in calculating the present value should be a market interest rate of a maturity that reflects the average period over which the claims are expected to remain outstanding.

5.185 The recorded transactions for nonlife insurance technical reserves are the amounts of estimated obligations to beneficiaries and holders accrued during the period (that are not due to changes in model assumptions) less those obligations from previous periods that have been paid. For reinsurance, the transactions between the direct insurer and the reinsurer are recorded as an entirely separate set of transactions and no consolidation takes place between the transactions of the direct insurer as the issuer of policies to its clients on the one hand and the holder of a policy with the reinsurer on the other (see also Chapter 4). This non-consolidation is referred to as gross recording on the part of the direct insurer. (See subsection D of *Accounting Rules* in this chapter for descriptions of consolidation and gross recording.)

Life insurance and annuities entitlements

5.186 Life insurance and annuities entitlements represent the financial claims policyholders have against a corporation offering life insurance or providing annuities.[58] The amount to be recorded in the balance sheet for life insurance and annuities entitlement consists of reserves of life insurance companies and annuity providers for prepaid premiums and accrued liabilities to life insurance policyholders and beneficiaries of annuities.

5.187 Life insurance and annuities entitlements should be recorded in the amount of the present value of all expected future benefits of holders of life insurance (excluding term life insurance, which is treated similar to nonlife insurance) policies and annuities, based on actuarial techniques that are standard for life insurance corporations. Adjustment of data to a present-value basis is likely to be required, given that many national financial reporting standards still embody the measurement of insurance corporations' liabilities on an undiscounted basis.

5.188 The discount rate to be used should be determined by reference to market yields (at the balance sheet date) on high-quality long-term corporate bonds or, if corporate bond yields are unavailable, by reference to market yields on government bonds, consistent with the currency denomination of the liabilities.

5.189 For an annuity, the relationship between premiums and benefits is usually determined when the contract is entered into, taking account of mortality data available at that time. Any subsequent changes in life expectancy will affect the liability of the annuity provider towards the beneficiary and the resulting change is recorded as an OCVA.[59]

5.190 Transactions for life insurance and annuity entitlements to be recorded are the amounts of estimated obligations to beneficiaries and holders accrued during the period.

Pension entitlements

5.191 The amounts recorded for pension entitlements depend on the type of pension scheme—one where the formula determining the amount of the pension is agreed in advance (as under a defined benefit scheme) and one where the amount of the pension depends on the performance of financial assets acquired with the future pensioner's contributions (a defined contribution

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[58] See also *2008 SNA*, Part 1 of Chapter 17, for the recording of annuities.
[59] See, *2008 SNA*, paragraph 12.59.

scheme). For both types of schemes, pension entitlements of the participants are recorded as they build up.

5.192 For a defined benefit scheme, an actuarial estimation of the liabilities of the pension provider is used. Pension entitlements of households are calculated in two steps: using actuarial techniques to reliably estimate the amount of post-employment benefits that employees have earned in return for their service in current and prior periods, and discounting those benefits to determine the present value of the defined benefit obligations. Implementation of these steps requires a number of assumptions and projections, such as mortality rates; rates of employee turnover, disability, and early retirement; the proportion of plan members who will select each form of payment option available under the plan terms; the discount rate for calculating the present value; and benefit levels and future salary.

5.193 Regarding the choice of the discount rate, the recommendation is the same as for life insurance and annuities entitlements—market yields on high-quality long-term corporate or government bonds. The currency and maturity should be consistent with the currency denomination and estimated term of the pension entitlements.

5.194 For a defined contribution scheme, the recorded liability of the pension provider is the current market value of the financial assets held by the pension fund on behalf of the beneficiaries.

5.195 This *Manual* recommends that, if feasible, pension entitlements should be recorded for the full amount of the present value of estimated pension obligations. Employment-related pension entitlements are contractual engagements that are expected to be enforceable. Therefore, they should be recognized as liabilities towards households, irrespective of whether the necessary assets exist in segregated schemes or not. Actuarial-based estimates of the present values of liabilities for future payments from fully funded, partially funded, and unfunded defined benefit pension funds are recorded on the balance sheets of employers. Further, when an obligation to pay pensions passes from one unit to another, this should be recorded as a transaction in pension liabilities.

5.196 Special consideration is given to corporations for whom additions to pension entitlements would result in negative book values for total equity in the corporations. The reporting of a zero or negative book value of equity (which constitutes technical insolvency of a corporation) may not be permitted by law or national regulatory/supervisory standards. In such circumstances, it is recommended that ongoing additions should be made to pension entitlements in accordance with national regulatory/supervisory policy with the objective of transitioning to full accounting for obligations arising from pension funds.

5.197 The changes in the volume of reserves for pension entitlements apply to defined benefit schemes. No such adjustments are needed for defined contribution schemes where the benefits are determined solely in terms of the investment earnings on contributions fed into the scheme. As a general rule, changes in pension entitlements negotiated between the parties are transactions, whereas changes in model assumptions give rise to OCVA for insurance reserves, pension entitlements, and provisions for standardized guarantee schemes.[60] Any change in the value of the pension entitlements because of a change in the interest rate used to discount the future benefits should be recorded as a revaluation.

Claims of pension funds on the pension manager

5.198 When the pension manager is a unit different from the administrator (see paragraphs 4.150–4.151), the pension fund has a claim on the manager if the assets of the pension fund do not cover the pension entitlements. Conversely, the value of the claim of the defined benefit pension fund on the pension manager is negative if the pension fund has investments of greater value than pension entitlements, in which case the difference is a claim of the manager of the pension scheme on the pension fund.

Provisions for calls under standardized guarantees

5.199 Provisions for calls under standardized guarantees consist of prepayments of net fees and provisions to meet outstanding calls under standardized guarantees. The transactions for provisions for calls under

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[60] See also the *2008 SNA*, part 2 of Chapter 17, and *BMP6*, paragraph 9.24.

standardized guarantee schemes are the same as for nonlife insurance. The value to be entered in the balance sheet for provisions for calls under standardized guarantees is the expected value of claims under current guarantees less any expected recoveries.

Financial derivatives and employee stock options

5.200 This section contains the principles and approaches for the valuation of the most common types of financial derivatives. Financial derivative contracts with more complex features—including those often called *exotic*—can be valued through modification or extension of the derivative pricing approaches described in this section.

5.201 For a more detailed discussion of the recording of financial derivatives, including different pricing models, see Annex 5.3. In practice, compilers are constrained to values as reported by the respondents based on their own accounts, who in calculating fair values of financial derivatives often use model-based valuation methods.

5.202 The following principles should be followed in the recording and valuation of financial derivatives in monetary and financial statistics:

a. Recognize the exchange of claims and obligations at the inception of a derivative contract as a financial transaction creating asset and liability positions that usually have, at inception, zero value if the instrument is a forward and a value equal to the premium if the instrument is an option.

b. Treat any changes in the market or fair values of derivatives as valuation changes (holding gains or losses).

c. Record secondary market transactions in traded derivatives, such as options, as transactions.

d. Record any payments made at settlement as transactions in financial derivative assets or liabilities.

e. Record, in the sectoral balance sheets, stock positions in financial derivatives at market or fair values.

5.203 Based on the preceding principles, financial derivatives (both exchange-traded and OTC) and employee stock options (ESOs) are valued at market prices prevailing on balance sheet recording dates, whenever a price quotation in a liquid market is available for the reference date. Fair value methods (such as present values or option models) need to be applied whenever market price quotations for the financial derivatives are unavailable or unrepresentative of a liquid market.[61]

5.204 Positions of the same type of financial derivative held as both a financial asset and a liability are presented gross on the asset and liability sides, respectively, of the FCs' balance sheet. Gross asset and gross liability data should be compiled by summing, respectively, the values of all individual contracts in asset positions and the values of all individual contracts in liability positions. This should not be understood as recording the notional amounts of the underlying assets.

5.205 Some options and forwards operate with margin payments, such as futures, where gains or losses are settled daily. In these cases there will not be any entries for financial derivatives at the end of each day in the balance sheets, as the value of financial derivatives will be zero. However, transactions to settle the daily gain/loss will be recorded.

5.206 Commissions and fees paid—at inception or during the lives of derivatives—to banks, brokers, and dealers are classified as payments for services. These payments are for services provided within current periods and are independent of asset and liability relationships created by the derivatives.[62]

5.207 A key characteristic of many derivative contracts is that the counterparties make commitments to transact, in the future and at agreed prices, in underlying items. The present value (or market price) of a financial derivative is derived from the difference between the agreed contract price of an underlying item and the prevailing market price (or the market price expected to prevail), appropriately discounted, for that item. Different recording and valuation principles of the two broad types of financial derivatives—*forward-type contracts* and *options*—stem from their basic characteristics.

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[61] Some OTC derivatives, though not exchange-traded, may have price quotations provided by financial derivatives dealers who specialize in the contracts and that can be used in place of fair value estimates.

[62] This treatment does not apply to periodic fees swapped under credit default swap (CDS) contracts, as these fees are part of the derivative.

5.208 The exchange of claims and obligations at the inception of a derivative contract, as well as secondary market transactions in financial derivatives are recorded as transactions, including any payments made at settlement (see also paragraph 5.202) and receipts/payments of nonrepayable margins. For transactions in foreign-currency-denominated financial derivatives the same principles as explained in paragraph 5.49 apply.

Forward-type contracts

5.209 A forward-type contract usually has zero value at inception, because the parties exchange risk exposures of equal market value.[63] As the price of the underlying item changes during the life of the forward contract, the market value of each party's risk exposure will differ from zero and, therefore, a debtor/creditor relationship will be established. Even without changes in the value of the underlying assets and interest rates, the value of the contract will change as time elapses and the cash flows are discounted for a shorter period. When a change in the price of the underlying item occurs, an asset (creditor) position is created for one party, and a liability (debtor) position is created for the other. The market value of a forward-type contract can switch from an asset position to a liability position (and vice versa) for the same party between reporting dates. When a switch in position occurs (and there are no settlement payments), the market value of the gross asset (or liability) position is revalued to zero, and the gross liability (or asset) position is revalued from zero to the market value.

5.210 The value of a swap contract is derived from the difference, appropriately discounted, between expected gross receipts and gross payments. When a contract requires ongoing servicing (such as an interest rate swap, where each party meets the servicing obligations that were originally held by the other) and a cash payment is received, there is a decrease (increase) in a financial derivative asset (liability) if, at the time of the payment, the contract is in an asset (liability) position. If compilers are unable to

implement this approach because of market practice, all cash receipts should be recorded as reductions in financial assets, and all cash payments should be recorded as decreases in liabilities.

5.211 The recording of a futures contract involves the recording of flows—transactions and valuation changes—in the category of financial derivatives and any associated transactions in margin deposit accounts. For the reporting period in which the contract is settled (on the delivery date or earlier), the settlement is recorded as a transaction. Changes in value over time are recorded as valuation changes.

Options

5.212 For options, the writer of the option is considered to have incurred a counterpart liability representing the cost of buying out the rights of the option holder. The market value for an option (including warrants) is recorded at the current value of the option—that is, the prevailing market price. In the absence of a prevailing market price, the estimated cost of buying out the rights of the option holder should be used. For a warrant, the counterpart liability of the issuer is the current outlay required to buy out the exercise rights of the holder.

5.213 The recorded market or fair value at inception of the call or put option equals the premium paid (option purchase) by the purchaser or premium received (option written) by the seller. The buyer records the full price of the premium as the acquisition of a financial asset, and the seller records it as the incurrence of a liability. Sometimes, a premium is paid after the inception of a derivative contract. In such cases, the option purchaser records the value of the premium payment as an asset that was financed by a trade credit within accounts payable from the option writer at the time the derivative was purchased. The trade credit is extinguished when the premium is paid. After the initial recording, the asset or liability position should be valued at the current market price or fair value at the end of each reporting period.

5.214 The value of the option depends on the potential price volatility of the underlying instrument, the time to maturity, interest rates, and the difference between the strike price and the market price of the underlying item.

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[63] The treatment of forward-type contracts that have a nonzero value at inception as a result of having forward prices calculated differently from current market values (off-market swaps), is described in paragraphs 4.174. The loan component of the off-market swap is valued at nominal value and the derivative component at market or fair value.

5.215 The value of an option has two components: an *intrinsic value* and a *time value*. The intrinsic value of an option is the value of the option if exercised immediately. The time value of an option is the value that derives from the potential for favorable movements in the price of the underlying asset during the remaining life of the option. For a call option, the intrinsic value is the maximum of the market value of the underlying asset (S) *minus* the strike price (K) at which the option holder can exercise an in-the-money option; or zero, if the current market value of the underlying asset is below the strike price (i.e., $S - K < 0$). For a put option, the intrinsic value is the maximum of K *minus* S, or zero if the option is currently out of the money (i.e., $K - S < 0$). As expiration approaches, the time value of an option declines due to shrinkage of the time remaining for favorable movements in the market value of the underlying asset. At expiration, only the intrinsic value—either an in-the-money payoff or a zero value—remains.

5.216 The recording entries for options begin when a call or put option is purchased (an asset) or sold (a liability). When options are traded, a transaction is recorded in the financial derivatives account with a contra-entry for the cash (currency or deposit) received. The asset or liability position in the option is removed from the asset and liability accounts when the option is sold (asset transaction only), exercised (transaction), or expires on an out-of-the-money (unexercised)[64] basis (revaluation).

5.217 Most option contracts, if exercised, are settled by a cash payment, rather than by delivery of the underlying assets or commodities to which the contract relates. *Net settlement payments* for financial derivatives are financial transactions that are similar to the transactions recorded when other financial instruments mature:

a. When a financial derivative is settled in cash, a transaction equal to the cash value of the settlement is recorded for the derivative. No transaction in the underlying item is recorded. When a cash settlement payment is received, a reduction in a financial derivative asset is recorded with a counterpart increase in cash and deposits. When a cash settlement payment is made, a reduction of a financial derivative liability is recorded with a counterpart decrease in cash and deposits.

b. When an underlying instrument is delivered, two transactions occur, and both are recorded. The transaction in the underlying item is recorded at the market price prevailing on the day of the transaction. The transaction in the derivative is recorded as the difference, multiplied by the quantity, between the prevailing market price for the underlying item and the strike price specified in the derivative contract.

c. When more than one contract is settled—in cash, at the same time, and with the same counterparty—some of the contracts being settled may be in asset positions and some may be in liability positions. It is recommended that the transactions are recorded on a gross basis (i.e., the transactions in assets are recorded separately from those in liabilities). Recording the transactions on a gross basis is preferred to recording them on a net basis—that is, after the sum of the liability flows is subtracted from the sum of the asset flows, the result is recorded as a single amount.[65]

5.218 The recording of flows for credit derivatives is similar to those for forward-type and option-type contracts. As noted in paragraph 4.180, credit derivatives take the form of both forward-type (total return swaps) and option-type contracts (CDSs). Under a total return swap there is a swap of payments (see paragraph 4.181) that are to be recorded similarly to other swap contracts. Under a CDS, premiums are paid in return for a cash payment in the event of a default by the debtor of the underlying instrument (see paragraph 4.182). Periodic fee (similar to the premium for options) and other payments under CDSs and secondary market purchases/sales of CDSs are recorded as transactions in credit derivatives. The settlement and exercising of contracts are also recorded as transactions.

Fair values for nontraded or infrequently traded financial derivatives

5.219 For fair valuing nontraded or infrequently traded financial derivatives, interest rates used in

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[64] See Table 4.3.

[65] The net basis is, however, recommended for transactions in financial derivatives classified as reserve assets. (See *BPM6*, paragraph 6.91.)

Box 5.5 Compounding and Discounting at Continuously Compounded Rates

Definitions	**Examples**

Definitions

The *future value (FV)* of an amount C invested today (T = 0) for N years, at a continuously compounded rate R, at time T = N is:

$$FV = Ce^{RN},$$

where e^{RN} is the *compounding factor and N =* (days until the cash flow)/(days in a year). For example, N = 0.25, N = 0.37, N = 1, N = 2.31.

The *present value (PV)* today (T = 0) of a cash flow C at time T = N discounted at a continuously compounded rate R is:

$$PV = Ce^{-RN},$$

where e^{-RN} (or expressed as $1/e^{RN}$) is the *discounting factor*.

Conversions between a continuously compounded rate (R_c) and an m-times-per-year-compounded rate (R_m) and vice versa are made using:

$$R_m = m(e^{R_c/m} - 1) \quad \text{and} \quad R_c = m \ln[1 + (R_m/m)].$$

Examples

Combining forward rates in successive periods

Using continuously compounded rates, the average interest rate for a period (e.g., annual) is the arithmetic average of the successive forward rates within the period. Suppose one- and two-year forward rates of 10.5 percent are followed by a third-year forward rate of 11.4 percent. Then, the three-year forward rate, R, is 0.108 = (0.105 + 0.105 + 0.114)/3. The three-year (N = 3) compounding factor is $e^{RN} = e^{(0.108)(3)} = 1.383$ and the corresponding discounting factors is $e^{-RN} = 0.723$.

Present value formulations

- A three-year zero-coupon bond with a face value of 1,000

$$PV = Ce^{-RN} = 1,000 * 0.723 = 723$$

- A three-year 10 percent coupon bond with a face value of 1,000 using time-variant discount rates

$$PV = C_1 e^{-R_1 t_1} + C_2 e^{-R_2 t_2} + \ldots + C_N e^{-R_N t_N}$$
$$= 100 e^{-(0.105)(1)} + 100 e^{-(0.105)(2)} + 1,100 e^{-(0.114)(3)}$$
$$= 965.91$$

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compounding or discounting cash flows are on a continuously compounded basis, as used in valuation models for financial derivatives. Compounding and discounting at continuously compounded rates are described in Box 5.5.

5.220 Conversion to domestic currency values of all foreign-currency-denominated financial derivatives is the same as for other financial instruments. The market or fair values of financial derivatives positions are calculated in foreign currency units and then converted to domestic currency as explained in paragraph 5.50.

Employee stock options

5.221 ESOs are usually nontradable and must be fair-valued by reference to the price (or fair value) of the underlying shares. Fair values of ESOs can be measured from a market value of equivalent options or according to an options-pricing model, such as the binomial-tree or the Black-Scholes model (see Annex 5.3).

5.222 ESOs should be recognized on the balance sheet. Before the option is exercised, the arrangement between the employer and employee has the nature of a financial derivative and is shown in the accounts of both parties (see *2008 SNA*, paragraphs 17.388–17.394). The entry appears in the liability category of financial derivatives in the accounts of the FC that has written the option. There is no entry for ESO in asset categories of FCs accounts, because ESOs are generally assets only of households.[66] The estimate of the value of the ESO should be made at the "grant date." If this is not possible, the value of the option should be recorded at the "vesting date." In principle, any change in value between the grant date and the vesting date should be treated as part of the compensation of employees; any change in value between vesting date and exercise date is treated as a holding gain or

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[66] In some cases, stock options may be provided to suppliers of goods and services to the enterprise.

loss. For pragmatic reasons, the whole of the increase between "grant date" and "exercise date" is treated as a holding gain or loss. An increase in the value of the share price above the strike price is a holding gain for the employee and a holding loss for the employer and vice versa.

5.223 At the time of granting an ESO, the employer records a liability in ESO, with the contra-entry a decrease in *Equity liability [MS]* reflecting an expense for compensation of employees (reducing *Current year result*).

5.224 After the initial recording, the liability position in the ESO in the FCs balance sheet should be valued at fair value at the end of each reporting period with a contra-entry in *Equity liability [MS]* through valuation adjustment. When the option is exercised and is settled in cash, a redemption transaction in the ESO liability (reduction) is recorded at the fair value of the ESO (a value that reflects the difference between the market price of the equity and the price that the buyer would have paid for the equity), along with a transaction in currency and deposits assets (reduction). When the option is exercised and the underlying shares are delivered, a redemption transaction in the ESO liability (reduction) is recorded at the fair value of the ESO, along with a transaction in currency and deposits assets (increase) in the amount paid by the employee (at the strike price), and a transaction in *Equity liability [MS]* (increase) in the amount of the difference. The entry in *Equity liability [MS]* is recorded in *Funds contributed by owners* at the book value of shares and in one of the other (than *Funds contributed by owners*) components of equity in the amount of the difference between the market and book values of the issued shares.

5.225 When an employee of a subsidiary is issued a stock option in the parent company, the subsidiary is shown as acquiring an option from the parent with a corresponding ESO liability to the employee because the parent is not the employer. Such instances might arise when the subsidiary is resident in a different economy than the parent (see *BPM6*, paragraph 8.41).

Other accounts receivable/payable
Trade credit and advances

5.226 Trade credit and advances should be valued at nominal value for both creditors and debtors, which is the outstanding amount that debtors are contractually obliged to pay the creditors when the obligation is extinguished (see also *2008 SNA*, paragraphs 11.13–11.15).

5.227 When a discount is offered to the debtor for early payment, this is reflected in the value of the goods and services. If payment is not made within the discount period, the discount is recorded as interest.

5.228 Special treatment arises in the exceptional cases of long-term trade credits. For trade credits of longer maturity, the treatment in the *2008 SNA* (paragraph 3.144) is to be applied, as follows. When the time gap (billing period) becomes "unusually long"[67] and the amount of trade credit extended is very large, the conclusion may be that interest has been implicitly charged. In such cases, the value of the trade credit should be adjusted (valuation change), so interest can accrue at the appropriate discount rate over the period to the final payment date.[68]

Other accounts receivable/payable—other

5.229 Nominal value is used to value most subcategories, including settlement accounts, items in the process of collection, and most categories of miscellaneous asset and liability items. The *IMF quota subscription* (applicable to the central bank only) should be valued on the basis of market exchange rates at the balance sheet dates, and for monetary statistics revaluations should be recorded in *Equity liability [MS]* (valuation adjustment). *Provisions for losses on assets* included in *Other accounts payable[MS]–other* are valued at book value.

5.230 Interest due on other accounts receivable or payable, if any, is included here. Interest accrued on financial assets and liabilities other than *Other accounts receivable/payable* should not be included

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[67] What constitutes an unusually long time in this context will depend on the circumstances. For instance, for any given time period, the higher the level of interest rates, the greater is the opportunity cost of delayed payment (see the *External Debt Statistics: Guide for Compilers and Users* (2013), paragraph 2.39).

[68] See also *GFSM 2014*, paragraph 3.118.

here but should be included in the outstanding amount of the financial asset or liability.

Provisions for losses on assets and write-offs

5.231 The *2008 SNA* framework does not contain accounts for provisions for losses on loans and other financial assets because changes in the value of a financial asset that are imposed solely to meet regulatory, supervisory, or accounting requirements are not recorded in the SNA. Provisions for losses on assets are treated as bookkeeping entries that are internal to the corporation and do not appear in the *2008 SNA*, except in the case of expected losses on NPLs that appear as memorandum items in the balance sheets. In the monetary statistics, on the other hand, such a provision is classified under *Other accounts payable[MS]—other* and is treated as the precursor of a loan (or other asset) write-off and, like loan write-offs, is treated as an OCVA flow. OCVA entries and contra-entries for these categories are:

a. Provisions for losses on financial assets. An OCVA entry in the amount of the provision created during the reference period is posted to *Provisions for loan losses* (a subcategory of *Other accounts payable [MS]—other*). The OCVA contra-entry is a reduction in *Equity liability [MS]* (*Current year result*).[69]

b. Financial asset (loan) write-offs. An asset (loan) write-off is shown as an OCVA reduction in the outstanding amount of the financial asset (loan). The OCVA contra-entry is a reduction in *Provisions for loan losses* within *Other accounts payable [MS]—other*. If the full amount of the financial asset (loan) write-off has been provisioned, the negative OCVA entry for the reduction in the amount of the financial asset (loan) is matched with the OCVA entry for a reduction in *Provisions for loan losses* (a liability account), and the adding-up condition is maintained for the OCVA column shown in Table 5.2. No provision for loss may have been made for the financial asset (loan), or the provision for loss may have been insufficient to cover the entire

amount of the financial asset (loan) loss that is written off. In such instances, all or part of the OCVA contra-entry is posted as a reduction in *Equity liability [MS]* (*Current year result* or *General and special reserves*).[70]

c. Reversal of provisions for financial asset (loan) losses. Financial asset (loan) recoveries—that is, unexpected repayment of impaired financial assets (loans)—sometimes occur prior to write-off. Whereas the repayment is recorded as a transaction (an increase in currency or other financial asset and a reduction in financial assets), an OCVA entry in the amount of the financial asset (loan) recovery is also made to reverse the earlier provisioning for financial asset (loan) loss, and an OCVA contra-entry is posted as an increase in *Equity liability [MS]* (*Current year result*) to reverse the previous entry that was posted when the provision for loss was made. The recovery may be the full amount or only part of the principal and interest of the financial asset (loan). In exceptional cases, financial asset (loan) repayment may occur after the write-off. If this is the case, an OCVA increase in the respective financial asset (loan) is first recorded with a contra-entry increase in *Equity liability [MS]* (*Current year result*), thereby reversing the earlier entries in the amount of the loan write-off. The repayment is then recorded as a transaction reducing the financial asset (loan), and a contra-entry is made for the cash or other form of payment from the defaulted borrower.

Nonfinancial assets

5.232 Stock positions and flows of financial assets and liabilities of FCs are the primary focus of monetary and financial statistics. Nonetheless, accurate data on nonfinancial assets (as defined in Annex 8.1, paragraphs 8.102–8.104) are required for completing the stock and

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[69] The positive entry in *Provisions for loan losses* and negative entry in *Equity liability [MS]* preserve the adding-up requirement for the OCVA column (see the stock and flow illustration in Table 5.2).

[70] The permissibility of using special and general reserves to absorb all or part of the loan write-off would depend on the national accounting standards, the supervisory regulations for the maintenance and use of special and general reserves, and the financial circumstances of the FC. As part of a major clean-up of its loan portfolio, an FC may have loan write-offs that exceed its retained earnings. The corporation may be permitted to charge part of the loan write-offs against special and general reserves, in conjunction with a workout plan for rebuilding such reserves in the future.

flow data in the balance sheet framework of monetary statistics. The recommendation is that the valuation of produced and nonproduced nonfinancial assets should be at market value on the balance sheet date consistent with SNA principles.

5.233 In practice, source data as compiled in accordance with national financial reporting standards often use other methods of valuation. In the national financial reporting standards of many countries, depreciation allowances are not representative of the consumption of fixed capital, which is the economically meaningful concept that the *2008 SNA* specifies for the estimated opportunity costs of using fixed assets. Depreciation allowances for fixed assets may be based primarily on tax and economic policy considerations, rather than on the useful lives of the nonfinancial assets and their replacement costs.

5.234 Accurate data on the production, acquisition, disposal, and consumption of nonfinancial assets are needed for analysis of the linkages between the financial account and the other accounts (in particular, the capital account) of the *2008 SNA*. In addition, stock data for nonfinancial assets are needed for the *2008 SNA* sectoral balance sheets that contain accounts for both financial and nonfinancial assets (see Chapter 8). Nonfinancial assets should be valued in monetary and financial statistics consistent with the needs of the national accounts, which may be difficult in practice given that in the source data for monetary and financial statistics, nonfinancial assets are usually recorded at acquisition cost rather than at market or fair value.

C. Recording of Debt Reorganization

5.235 *Debt reorganization (also referred to as debt restructuring) is defined as arrangements involving both the creditor and the debtor (and sometimes third parties) that alter the terms established for servicing an existing debt.* There are four main types of debt reorganization described in the *2008 SNA*: (1) debt forgiveness, (2) debt rescheduling or refinancing, (3) debt conversion, and (4) debt assumption.[71]

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[71]See *2008 SNA*, paragraphs 22.104–22.130. See also *BPM6*, Appendix 2 *Debt Reorganization and Related Transactions; Public Sector Debt Statistics: Guide for Compilers and Users* (2013), Chapter 4, subsection *Debt Reorganization*; and *External Debt Statistics: Guide for Compilers and Users* (2013), Chapter 8.

5.236 Debt forgiveness refers to a reduction in the amount of, or the extinguishing of, a debt obligation by the creditor via a contractual arrangement with the debtor. Debt forgiveness is distinguished from debt write-off by the agreement between the parties and the intention to convey a benefit, rather than unilateral recognition by the creditor that the amount is unlikely to be collected. Debt forgiveness is a voluntary cancellation of a creditor's claim and a debtor's obligation by mutual agreement, which is recorded as a transaction in the form of a capital transfer from the creditor to the debtor. In the balance sheet, the debtor's liability and creditor's asset are reduced by the amount of debt that is forgiven, with a counterpart increase in equity of the debtor and reduction in equity of the creditor. Valuation of the amount of the debt forgiven is at market prices for flows and stocks, except for loans where the nominal value is used.

5.237 Debt rescheduling or refinancing is an agreement to alter the terms and conditions for servicing an existing debt, usually on more favorable terms for the debtor. Debt rescheduling involves rearrangements on the same type of instrument, with the same principal value and the same creditor as with the old debt. Refinancing refers to the conversion of a debt obligation—a loan or a debt—into a new debt instrument, generally at a different value and may be with a creditor different than that from the old debt.

5.238 The treatment for debt rescheduling in monetary statistics is that the existing contract is extinguished and a new contract created. Typically, debt rescheduling should not affect the valuation of a loan because the outstanding amount of the loan is the same before and after rescheduling; only the schedule for future interest and principal payments has been affected. The market value or fair value of a debt security would usually be affected by rescheduling, because lengthening of maturity and postponement of debt servicing would be expected to reduce the discounted present value of the security. Transactions are valued at the value of the new debt with any difference recorded as a revaluation.

5.239 The treatment of debt refinancing is similar to debt rescheduling to the extent that the debt being refinanced is extinguished and replaced with a new financial instrument or instruments, with transactions valued at the value of the new debt. The balance

sheet reflects the transactions extinguishing the old debt instrument and the creation of the new debt instrument along with any revaluation for the old debt recorded in the valuation adjustment. The exception is non-marketable debt owed to official creditors, where the old debt is extinguished at its original value and the difference in value with the new instrument is recorded as debt forgiveness.

5.240 Debt conversion (swap) and prepayments. Debt conversion is an exchange of debt—typically at a discount—for a non-debt claim such as equity, or for counterpart funds that can be used to finance a particular project or policy. This includes *debt-for-equity swaps* among other arrangements. Debt swaps often call for writing down, or discounting, the value of the original debt instrument before the conversion to equity. Any holding loss from writing down the value of the original debt is recorded in the revaluation account.

5.241 Debt prepayments consist of a repurchase, or early payment, of debt at conditions that are agreed upon between the debtor and the creditor (i.e., debt is extinguished in return for a cash payment agreed upon between the debtor and the creditor). When a discount is involved relative to the nominal value of the debt, prepayments are referred to as "buybacks," and any difference in value is recorded as a valuation change.

5.242 Debt assumption occurs when one unit assumes responsibility for another unit's outstanding liability to a creditor. It involves three parties—the creditor, the original debtor, and a new debtor who assumes the debt obligation. The recording depends on the assumptions under which the debt-assuming party acquires or does not acquire a claim on the original debtor. In all cases, the debt-assuming party records the creation of a new liability to the creditor (financial account entry).[72]

5.243 Different is the case of debt repudiation. Debt repudiation refers to a unilateral cancellation of a financial claim by a debtor and is therefore not recognized in macroeconomic statistics.

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[72] For a fuller discussion of the recording of debt assumption, see *BPM6*, paragraph 8.45, and *Public Sector Debt Statistics: Guide for Compilers and Users* (2013), paragraphs 4.56–4.57.

5.1 Estimation of Transactions and Valuation Changes from Exchange Rate Movements

5.244 Equations for estimating transactions (T) and valuation changes (VC) are presented for two cases: a category of foreign-currency-denominated deposits that has no other changes in the volume of assets (OCVA) entry for the period, and a category of foreign-currency-denominated loans that has an OCVA entry arising from a provision for loan losses. The derivation of the estimation equations and numerical examples of the calculations for T and VC in each case are presented in the next sections of this annex.

5.245 Suppose that T and VC are to be estimated for a single category of deposits of an other depository corporation (ODC)—namely, those denominated in a single foreign currency and constituting liabilities to NFCs. In the methodology of this *Manual*, each transaction should be valued at the exchange rate that applied to the transaction—that is, the exchange rate that prevailed at the time of the transaction. If data on the amount and timing of the transactions are unknown, it is necessary to choose a single exchange rate as representative of all transactions, even though the transactions actually occurred at various exchange rates during the reporting period.

5.246 The recommendation in this *Manual* is that *the daily average exchange rate (the midpoint between the buying and selling rate) for the period—denoted as e_m—should be used to represent the single exchange rate for all transactions during the period.*[73] e_m is viewed as the most representative exchange rate for a category of financial assets or liabilities for which transactions are conducted on a day-to-day basis throughout the reporting period.

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[73]The exchange rates refer to the number of units of domestic currency per unit of foreign currency.

Estimation in the Absence of OCVA

5.247 T and VC for the deposit category can be estimated by using the data on exchange rates, the *opening stock denominated in foreign currency (S_0)*, and the *closing stock denominated in foreign currency (S_1)*. *Foreign-currency-denominated transactions* constitute the total flow in foreign currency units at nominal value—that is, the difference between S_1 and S_0, or $S_1 - S_0$. Transactions expressed in domestic currency units are estimated by applying the daily average exchange rate (e_m) to the *foreign-currency-denominated flow* for the period:

$$T = e_m(S_1 - S_0). \qquad (5.4)$$

5.248 The VC expressed in domestic currency units can be calculated from the exchange rates (e_0 and e_1) and opening and closing stocks in foreign currency units:

$$VC = e_1 S_1 - e_0 S_0 - e_m(S_1 - S_0)$$
$$= (e_1 - e_m)S_1 - (e_0 - e_m)S_0. \qquad (5.5)$$

5.249 Equivalently, estimates for T and VC can be calculated from the data for stocks translated into domestic currency units: $OS = e_0 S_0$ and $CS = e_1 S_1$. Substituting for S_0 and S_1 in equations (5.4) and (5.5), the T and VC estimates are:

$$T = (e_m/e_1)CS - (e_m/e_0)OS \qquad (5.6)$$

and

$$VC = [1 - (e_m/e_1)]CS - [1 - (e_m/e_0)]OS. \qquad (5.7)$$

5.250 T and VC can be estimated from equations (5.4) and (5.6) and the stock data in foreign currency units, or from equations (5.5) and (5.7) and the stock data in domestic currency units. Alternatively, the VC can be derived—that is, can be obtained—from

$VC = CS - OS - T$, where T is the transaction estimate from equation (5.4) or (5.6).

Numerical Example

5.251 Suppose transactions and valuation changes are to be estimated for deposits denominated in a single foreign currency, the euro (€). The exchange rate is expressed as domestic currency units, N, per euro. For example, $N2/€$ is an exchange rate of two units of domestic currency per euro.

Opening stock in foreign currency, S_0: €112
Closing stock in foreign currency, S_1: €122

Beginning-of-period exchange rate, e_0: $N2.10/€$
End-of-period exchange rate, e_1: $N2.20/€$

Opening stock in domestic currency, OS: $N235.20$
[$= (N2.10/€)(€112)$]
Closing stock in domestic currency, CS: $N268.40$
[$= (N2.20/€)(€122)$]

Daily average exchange rate, e_m: $N2.18/€$

$OCVA = 0$

Transactions estimate

$T = (2.18) (€122 - €112)$
    $= N21.80$ (see equation (5.4))

$T = (2.18/2.20) (N268.40) - (2.18/2.10) (N235.20)$
    $= N21.80$ (see equation (5.6))

Valuation-change estimate

$VC = (2.20 - 2.18) (€122) - (2.10 - 2.18) (€112)$
    $= N11.40$ (see equation (5.5))

$VC = [1 - (2.18/2.20)](N268.40)$
    $- [1 - (2.18/2.10)](N235.20)$
    $= N11.40$ (see equation (5.7))

$VC = N268.40 - N235.20 - N21.80$
    $= N11.40$ (derived)

Estimation in the Presence of OCVA

5.252 T and VC for the loan category for which an OCVA entry for a provision for loan losses is applicable can also be estimated from the stock data denominated in foreign currency (S_0 and S_1) or, equivalently, from the stock data translated into domestic currency units (OS and CS). Each equation includes OCVA denominated in foreign currency. The equations for

estimating T and VC from the data for the foreign-currency-denominated stocks are:

$$T = e_m(S_1 - S_0 - OCVA), \qquad (5.8)$$

and

$$VC = e_1S_1 - e_0S_0 - e_1OCVA - e_m(S_1 - S_0 - OCVA)$$
$$= (e_1 - e_m)S_1 - (e_0 - e_m)S_0 - (e_1 - e_m)OCVA. \qquad (5.9)$$

5.253 The equations for estimating T and VC from the stock data converted into domestic currency units are:

$$T = (e_m/e_1)e_1S_1 - (e_m/e_0)e_0S_0 - e_mOCVA$$
$$= (e_m/e_1)CS - (e_m/e_0)OS - e_mOCVA, \qquad (5.10)$$

and

$$VC = (1 - e_m/e_1)e_1S_1 - (1 - e_m/e_0)e_0S_0$$
$$- (e_1 - e_m)OCVA$$
$$= [1 - (e_m/e_1)]CS - [1 - (e_m/e_0)]OS$$
$$- (e_1 - e_m)OCVA. \qquad (5.11)$$

5.254 Alternatively, the valuation change can be derived residually from the horizontal adding-up requirement—that is, from $VC = CS - OS - OCVA - T$, where T is the transaction estimate from equation (5.8) or (5.10).

5.255 The estimation method can be applied to foreign currency holdings and any category of foreign-currency-denominated assets or liabilities that are recorded at nominal value when expressed in foreign currency units—principally, foreign-currency-denominated deposits and loans.[74] Extensive data disaggregation is required for FCs that have several categories of assets and liabilities that are denominated in various foreign currencies. Separate estimation is applied to the data for each foreign currency of denomination and each economic sector that is an issuer or holder of the foreign-currency-denominated assets or liabilities in each financial asset/liability category.

5.256 The accuracy of the T and VC estimates depends on the extent to which the daily average exchange rate, e_m, is representative of the actual exchange rates applied to the individual transactions. In general, the

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[74]Quantitatively less-significant categories include foreign-currency-denominated prepayments of insurance premiums and trade credit and advances, which usually would arise from transactions with nonresident corporations.

estimates are likely to be more reliable when deposit or loan activity is characterized by a large number of transactions that are relatively uniform in amount and are spread across the reporting period. The estimates are likely to be less reliable when the exchange rate has been subject to considerable fluctuation, or the exchange rate has depreciated or appreciated sharply during the period.

5.257 The accounting system may specify that accrued interest is to be posted to loan and/or deposit accounts on a daily basis, thereby spreading the accrued-interest transactions across the reporting period. Daily posting of the accrued interest is compatible with the use of the daily average exchange rate (e_m) in estimating T and VC, because the accrued-interest transactions are spread evenly across the period. At the other extreme, the accounting system may specify that all accrued interest is to be posted at the end of the period. The end-of-period exchange rate (e_1) is the exchange rate that is applicable to the end-of period postings of accrued interest, possibly suggesting that e_1 should be used in place of e_m in estimating T and VC. The recommendation in this *Manual* is to use the daily average exchange rate in the estimation and implicitly treat the accrued interest as if it had been posted on a daily basis throughout the period.

5.258 In principle, an exchange rate quotation for a single day or the average exchange rate for a specific week could be used in the estimation, if it were known that most of the transaction volume had occurred in a single day or week during the reporting period. Use of the average exchange rate (e_m) is recommended to standardize the estimation method across asset and liability categories, reporting periods, and FCs. Availability of data on the timing and amount of transactions would indicate that a FC probably has the capacity for developing the direct collection of transactions data, eliminating the need to estimate both T and VC.

Numerical Example

5.259 T and VC are to be estimated for euro-denominated loans for which an OCVA—for example a loan write-off—has been posted for the period:

Opening stock in foreign currency, S_0: €152
Closing stock in foreign currency, S_1: €137

Beginning-of-period exchange rate, e_0: N2.10/€
End-of-period exchange rate, e_1: N2.20/€

Daily average exchange rate, e_m: N2.18/€

Opening stock in domestic currency, OS: N319.20 [= (N2.10/€)(€152)]
Closing stock in domestic currency, CS: N301.40 [= (N2.20/€)(€137)]

OCVA = –€13

Transactions estimate

$$T = (2.18) \, (€137 – €152 + €13)$$
$$= – N4.36 \text{ (see equation (5.8))}$$

$$T = (2.18/2.20) \, (N301.40) – (2.18/2.10) \, (N319.20)$$
$$– (2.18) \, (–€13)$$
$$= – N4.36 \text{ (see equation (5.10))}$$

Valuation-change estimate

$$VC = (2.20 – 2.18) \, (€137) – (2.10 – 2.18) \, (€152)$$
$$– (2.20 – 2.18) \, (–€13)$$
$$= N15.16 \text{ (see equation (5.9))}$$

$$VC = [1 – (2.18/2.20)] \, (N301.40)$$
$$– [1 – (2.18/2.10)] \, (319.20)$$
$$– (2.20 – 2.18) \, (–€13)$$
$$= N15.16 \text{ (see equation (5.11))}$$

$$VC = N301.4 – N319.2 – (–N4.36)$$
$$– (2.20) \, (–€13) = N15.16$$

5.2 Valuation, Recording, and Numerical Examples for Specific Types of Debt Securities

Valuation and Recording of Specific Types of Debt Securities

5.260 Market valuation is the key principle adopted by international statistical standards for valuing transactions and stocks in debt securities. At any specific point in time, the market value of a debt security may deviate from its nominal value due to revaluations arising from market price changes. Movements in market prices arise from general market conditions, mainly due to changes in the market interest rates. Beyond that, market prices also reflect specific circumstances, such as changes in the perceived creditworthiness of the issuer, the demand for a particular debt security, or changes in general market liquidity.

Fair Values for Infrequently Traded Debt Securities

5.261 Fair value methods need to be applied to the valuation of those securities that are traded infrequently, or are traded only in over-the-counter (OTC) markets for which market price quotations are not available on a regular basis. An exception to the fair value method may be applicable to securities for which price quotations are available earlier in the reporting period, but not for the end of the period. It is recommended that the earlier price quotation should be applied for end-of-period security valuation, only if the market prices of securities of comparable maturity and credit risk—traded in active markets—have been relatively stable in the intervening period.

5.262 Calculation of the present value requires data on future cash flows and an appropriate discount rate (see Box 5.1). Cash flow data are readily available for zero-coupon and fixed-coupon securities, given that the amount and timing of coupon payments (for fixed-coupon securities) and the redemption amounts are known. Data on market interest rates (yields) for securities in various classes of credit risk are available to be used as the discount rates in the denominators of the present value formulations. The challenging task is to select an interest rate (yield) that is the most appropriate representation of the discount rate to be applied to the specific securities that are to be valued. Numerical examples are presented later in this annex for different types of fixed-coupon securities.

Perpetuities

5.263 Some bonds or similar instruments are securities that have no stated maturities, but offer a fixed-coupon payment for each year (or at some other periodic interval) to perpetuity. They are called *perpetuities*. The present value (PV) of a perpetuity is equal to the cash flow from the coupon payment (C) divided by the discount rate (r)—that is, $PV = C/r$. The recommended discount rate is the effective yield on a conventional bond with a long remaining term and credit risk similar to the perpetuity. Some perpetual securities include call or convertibility options, but unless the issuer is likely to exercise these options in the foreseeable future the calculation of present value is the same as if the options did not exist.

Variable-rate Bonds

5.264 Variable-coupon bonds and similar securities are one of several types of securities for which future cash flows are uncertain.[75] Features of variable-rate bonds include:

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[75]These medium- or long-term instruments are given various names—for example, variable-rate or adjustable-rate securities, variable-coupon bonds, floating-rate notes, and capital notes. In

a. Reference rate. A market interest rate—for example, the London interbank offered rate (LIBOR)—to which the interest rate for the securities is linked.

b. Variable-rate specification. The relationship between the bond rate and the reference rate—for example, LIBOR *plus* 200 basis points.[76]

c. Reset period. The frequency (for example, quarterly, semiannually, or annually) and exact dates for the periodic revisions in the variable rate. The bond rate is subject to revision at the beginning of each reset period but, after the reset, remains unchanged for the duration of the reset period.

d. Interest/principal indexation. Linkage of the amount of future cash flows—interest payments and/or principal repayments on the securities—to a market price variable such as a general price index (e.g., consumer price index), a specific price index, (e.g., the price of a commodity), or some other market price variable.

5.265 The recommendation in this *Manual* is that when a market price is not available and future cash flows are uncertain, the fair values for securities should be based on the discounted values of expected cash flows. In a low-inflation environment the variation in the interest rate often has a relatively minor effect on the fair value of a variable-rate security for which the credit risk has not changed.

5.266 When estimating interest payments for variable-rate securities, any *cap*, *floor,* or *collar* imposed on variation in the interest rate (or total interest payments) for the securities should be taken into account. A *cap* imposes an upper limit; a *floor* sets a lower limit; and a *collar* specifies upper and lower bounds on the floating-rate payments.

5.267 Some securities have interest rates that are linked to both a reference rate and the credit rating of the issuer.

Credit-rated securities are often traded in active markets and, if so, can be valued on the basis of market price quotations. Any deterioration in the securities issuer's credit rating would lead to an increase in the issuer's payments during the life of the securities or at maturity.

Securities with Embedded Derivatives (Not Closely Related to the Host Securities)

5.268 Embedded derivatives take a multitude of forms. Among the most prevalent types are:

a. Call option. The right of early redemption of the securities at the option of the issuer.

b. Put option. The right of early redemption of the securities at the option of the holder.

c. Conversion option. The right to exchange the debt securities for a specified number of equity shares of the corporation that issued the securities. Conversion may be at the option of the holder or, less often, at the option of the issuer.[77]

5.269 It is recommended that the total value of the securities, inclusive of the values of the embedded derivatives, should be recorded as a single instrument within debt securities, regardless of the national financial reporting standards for valuation and asset classification. Further, the host security and the embedded derivative should be valued in accordance with the national financial reporting standards, even if the accounting standards specify that the underlying security component and the embedded derivative are to be valued and recorded separately. Taken together, these recommendations preserve the classification of an embedded derivative as inseparable from the host instrument and provide flexibility for the valuation.

5.270 A major advantage of the composite valuation approach—that is, a method for estimating the total values of securities (that is, inclusive of the embedded derivatives components)—is its compatibility with the method for estimation of accrued interest on securities with embedded derivatives, as recommended later in this section.

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the International Financial Reporting Standards (IFRS) 9.B4.3.8 (corresponding to IAS39.AG33), the variable-rate feature is designated as an embedded derivative that is *closely related* to the economic characteristics and risks of the host instrument, which means that the variable interest rate does not need to be accounted for as a separate derivative.

[76] An add-on risk premium is typical, but multiplicative specifications—for example, LIBOR *times* 1.05—have been used. A special category is *reverse floating-rate bonds* for which the bond coupon rate is inversely related to the reference rate—for example, 1,000 basis points *minus* LIBOR.

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[77] Conversion to equity shares at the option of the security holder is often combined with a security call option that can be exercised by the security issuer. If the issuer exercises the call option, the security holder is entitled to convert the security to equity within a specified period (for example, a month), This mechanism—called *forced* conversion—is the most common type of convertibility available to issuers.

5.271 <u>Estimation of fair value for securities with indexed interest and/or principal</u>. The same principles as described for indexed financial instruments in this chapter apply (see paragraphs 5.53–5.59 for general principles). Both the creditor and debtor must estimate the future cash flows, as determined by the indexation, and must select an appropriate discount rate. Numerical examples on index-linked securities and foreign currency indexed securities are provided later in this annex. Securities with coupon and principal that are indexed to a foreign currency are treated as though they are denominated in that foreign currency.

Nonparticipating Preferred Stocks

5.272 This subsection discusses the valuation of non-participating preferred stocks or shares that pay a fixed income but do not provide for participation in the distribution of the residual value of an incorporated enterprise on dissolution, and so are classified as debt securities.

5.273 Fair values for preferred shares are estimated by the preceding methods for debt corporate bonds, taking into account that preferred stock may have some cash flow characteristics that are not associated with bonds. Preferred stock offers fixed (or sometimes variable) dividends that are similar to bond coupon payments, with one major exception. Whereas the schedule for bond coupon payments is predetermined, the timing of dividend payments on preferred shares may be at the discretion of the issuer, subject to the requirements that skipped dividend payments are cumulative and that all accumulated dividends on preferred shares must be paid before the corporation is entitled to declare a dividend on common shares. Preferred shares are classified as debt securities unless preferred shares convey a right to residual value upon liquidation of the issuing firm.[78] Some preferred shares do not have a final repayment date; others have a retirement date, or option for repurchase (that is, call) at a specified share price, or an option for conversion into a specified number of common shares.

5.274 To estimate the fair value of not-actively traded preferred shares, assumptions are needed concerning whether dividends will be paid as scheduled or will accumulate and, where applicable, if and when the preferred shares are likely to be called or converted into common shares. The recommendation is to assume that dividends will be paid on schedule unless skipped dividends are already present and appear likely to persist, or objective information—for example, expectation of weak or negative earnings performance of the preferred-share-issuer corporation—indicates that preferred stock dividends are likely to be skipped. If dividends have accumulated (or are likely to accumulate), the amount and timing of the expected cash flows from the eventual payment of the dividends need to be predicted. The recommendation for the discount rate to be applied to the expected cash flows is the effective yield on actively traded preferred shares that are deemed to have the same credit risk and about the same expected maturity as the preferred shares to be valued. If necessary, however, the discount rate can be specified as the effective yield on actively traded corporate bonds that are of comparable credit risk[79] and have a maturity that approximates the expected term to maturity, call, or conversion of the preferred shares.

5.275 Preferred stock that has no stated maturity and no embedded call or convertibility options is similar to a bond that is a perpetuity. The fair value of the preferred stock is calculated using the same formula as for perpetuities, where the coupon payment is replaced by the stream of cash flows from the dividends. The recommended discount rate is the effective yield on similar but actively traded preferred shares or, if necessary, on actively traded long-term bonds.

Mortgage Pass-through Securities

5.276 Forecasting the future cash flows from pools of mortgage pass-through securities is relatively complex because of the inherent uncertainty about the future prepayment of mortgage loans in a pool.[80] FCs that securitize mortgage loan pools and issue pass-through securities use sophisticated models for the

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[78] This approach is consistent with IAS 32.18(a) which states that "a preference share [that is, preferred share] that provides for mandatory redemption by the issuer for a fixed or determinable amount at a fixed or determinable future date, or gives the holder the right to require the issuer to redeem the instrument at or after a particular date for a fixed or determinable amount, is a financial liability [rather than equity]."

[79] The discount rate can be specified as the effective yield on the corporate bonds without adjusting for differential credit risk, even though preferred shareholders' claims are usually subordinated to those of bondholders.

[80] Mortgage-backed securities and related instruments—in particular, mortgage pass-throughs, collateralized mortgage obligations (CMOs), and mortgage pass-through "strips"—are described in Chapter 4.

initial pricing and ongoing valuation of these securities, taking into account the expected prepayments. The best-known models include:[81]

a. *PSA model.* An empirical prepayment model developed by the Public Securities Association (PSA)—a trade organization of brokers, dealers, and underwriters[82]—to estimate the average rates of monthly prepayment for specific types of mortgage loan pools using current and past data.

b. *Proprietary PSA-type models.* FCs that issue, trade, or deal in pass-through mortgage securities have developed their own in-house models for estimating prepayments.

c. *Options-pricing models.* Based on options-pricing theory, these models treat the prepayments as equivalent to the exercise of a call option—an option written by the holders of the pass-through securities and owned by the debtors. The estimated yield on the mortgage pass-through securities is the sum of the yield on securities that are otherwise similar, but not subject to prepayments, *plus* the estimated yield on the "call option" that was "written" (that is, provided) by the pass-through securities holders.

5.277 The FCs that originate and sell the pass-through securities are responsible for providing a monthly statement that shows the current value of the investor's holdings of pass-through securities and the related cash flows—the interest payments and principal repayments (including prepayments) for the reporting period.

Stripped Securities

5.278 An FC sometimes purchases bonds or similar instruments, *strips* the coupon payments, and sells the future cash flows to separate investors—that is, the claim on the principal is sold to one set of investors, and the claim on the coupon payments is sold to other investors. Market price quotations for the strips may be available, or the strips may need to be valued using the present value method.

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[81] These models are described in Saunders and Million (2003), Chapter 28, Securitization.
[82] The PSA was later renamed as the Bond Market Association (BMA), which was the international trade association for the bond market industry. On November 1, 2006, the BMA merged with the Securities Industry Association to form the Securities Industry and Financial Markets Association (SIFMA).

Numerical Examples of Valuation and Recording of Different Types of Securities

5.279 As an approximation to their market value, the examples in this section use the fair value of these securities, calculated as the sum of the present values of all future cash flows, discounted at the market interest rate as shown in the first equation in Box 5.1. All calculations are done following the debtor approach. For these examples, the prevailing market interest rate is used to discount all future cash flows. Semi-annual accrued interest is calculated on a compound basis.

5.280 Four types of securities are presented: (1) a fixed-interest-rate bond issued at par; (2) a fixed-interest-rate bond issued at a discount; (3) a fixed-interest-rate bond with principal linked to the consumer price index; and (4) a fixed-interest-rate bond with principal linked to a foreign currency. All four types of securities are issued in domestic currency, have an original maturity of three years, pay a coupon at the end of each year, and the principal is fully paid in one installment at maturity. Table 5A.1 presents the conditions under which the securities are issued.

5.281 Table 5A.2 presents the market developments observed at issuance of the securities and at the end of each semester.

5.282 The following subsections present, for each type of security, the calculations of fair value and corresponding revaluations for each semester during the life of the bonds. These subsections also present the recording of flows at the end of each semester split into transactions, revaluations, and OCVA, whereby the latter are assumed to be zero.

Fixed-Interest-Rate Bond Issued at Par

5.283 Because the bond pays a coupon (10 percent) equivalent to the market interest rate, its face, nominal, and market value at issuance are all equal to 1,000. Interest accrues on the bond throughout the year and is recorded as being reinvested in the bond, increasing its nominal value from 1,000 to 1,100 at the end of the year, before the coupon is paid to the bondholder. The coupon payment of 100 by the debtor at the end of the year is treated as (partial) redemption of the bond, reducing its nominal value from 1,100 to 1,000.

5.284 To illustrate the relationship between market and nominal value, Table 5A.3 presents the

Table 5A.1 Parameters of Issuance

	Par bond	Discount bond	CPI linked bond	Foreign currency-linked bond
Face value (in domestic currency)	1,000	1,000	1,000	1,000
Issue price (in domestic currency)	1,000	900	1,000	1,000
Coupon, %	10.00	5.98	5.00	10.00
Indexation	No	No	Principal to CPI	Principal to US$

Note: CPI = consumer price index.

Table 5A.2 Market Developments

	End-Year 0	Mid-Year 1	End-Year 1	Mid-Year 2	End-Year 2	Mid-Year 3	End-Year 3
Market interest rate, %	10.0	10.0	7.0	9.0	11.0	12.0	12.0
CPI - Base end $t_0 = 100$	100.0	103.0	104.5	107.4	111.3	113.4	117.0
Exchange rate (domestic currency × US$)	10.00	9.00	8.50	9.50	10.00	10.50	11.00

Note: CPI = consumer price Index.

Table 5A.3 Fixed-Interest-Rate Bond Issued at Par: Stocks and Flows

	End-Year 0	Mid-Year 1	End-Year 1	Mid-Year 2	End-Year 2	Mid-Year 3	End-Year 3
Nominal Value							
Before coupon payment	1,000.0	1,048.8	1,100.0	1,048.8	1,100.0	1,048.8	1,100.0
After coupon payment		1,048.8	1,000.0	1,048.8	1,000.0	1,048.8	1,000.0
Accrued interest		48.8	51.2	48.8	51.2	48.8	51.2
Coupon payments			−100.0		−100.0		−100.0
Market Value (dirty price)	1,000.0	1,048.8	1,154.2	1,062.4	1,091.0	1,039.4	1,100.0
Market Value (clean price)	1,000.0	1,000.0	1,054.5	1,013.6	991.0	990.6	1,000.0
Revaluations arising from market price changes (semi-annual changes)		0.0	54.2	−40.7	−22.6	−0.4	9.4
Revaluations arising from market price changes (accumulated)		0.0	54.2	13.6	−9.0	−9.4	0.0

semi-annual stocks and flows during the life of the bond.

5.285 Because there is no change in the market interest rate during the first semester, the only change in the market price of the bond is the accruing of interest due to the coupon. Therefore, the dirty price of the bond corresponds to its nominal value (face value of 1,000 plus accrued and not paid interest of 48.8) and its clean price equals its face value. With changes in the market interest rate in the following periods, the market price of the bond reflects not only the accrued coupon, but also valuation changes due to changes in the discounted cash flow.

5.286 For example, with a market interest rate of 9 percent at the end of the first semester of year 2, the

discounted cash flow of the bond is 1,062.4, which includes accrued interest for 48.8 and a revaluation change of 13.6. At the end of the life of the bond, its market value equals its nominal value, irrespective of the prevailing market interest rate.

Recording entries

5.287 The following entries will be recorded for monetary statistics in the accounts of an FC that holds such par bond.

At inception/purchase	OS	T	VC	OCVA	CS
Assets					
Debt securities	0.0	1,000.0			1,000.0
Deposits		−1,000.0			

First semester year 1	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,000.0	48.8	0.0		1,048.8
Equity Liability [MS]					
Interest income		48.8			
Valuation adjustments[1]		0.0	0.0		

Second semester year 1	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,048.8	−48.8	54.2		1,054.2
Deposits		100.0			
Equity Liability [MS]					
Interest income		51.2			
Valuation adjustments			54.2		

Second semester year 3 (before Redemption)	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,039.4	−48.8	9.4		1,000.0
Deposits		100.0			
Equity Liability					
Interest income		51.2			
Valuation adjustments			9.4		

Flows for the three-year period after the purchase of debt securities	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,000.0	0.0			1,000.0
Deposits		300.0			
Equity Liability [MS]					
Interest income		300.0			
Valuation adjustments[2]			0.0		

Redemption	OS	T	VC	OCVA	CS
Debt securities	1,000.0	−1,000.0			Account closed
Deposits		1,000.0			

[1] The contra-entry will be recorded either in *Valuation adjustment* if the security is held to maturity or in *Current year result* (transferred to *retained earnings*) if it is designated for trade, in accordance with national practices. In the national accounts, the contra-entry is recorded as a change in net worth.

[2] Valuation adjustments, recorded throughout the life of the bond, cancel each other when the debt security is held to maturity, as is the case in these examples.

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

Fixed-Interest-Rate Bond Issued at Discount

5.288 The second example is also a bond with the same characteristics as the previous one, but which pays an annual coupon of only 5.98 percent per year. With a market interest rate at inception of 10 percent, the fair value of this bond can be calculated as follows:

$$\text{Fair value}_0 = \frac{59.8}{(1+0.1)} + \frac{59.8}{(1+0.1)^2} + \frac{1,059.8}{(1+0.1)^3} = 900$$

5.289 Under normal circumstances, the nominal and the market value of the bond are equal at inception. Therefore, this bond is issued below par, at 900, with the discount of 100 accruing throughout its life and being paid at maturity when the principal of 1,000 is cancelled. Both the coupon payments and the difference between the issue price and the redemption price determine the rate at which interest accrues.

5.290 Table 5A.4 presents the semi-annual stocks and flows during the life of this discount bond.

5.291 The bond accrues interest of 10 percent per year on its nominal value, which is the yield that the original buyer will receive for the investment, and it is equal to the market interest rate at the time of issuance. At the end of the first year, 90 of interest were accrued on the issuing nominal value of 900. Part of it (59.8) was paid as coupon, and the difference (30.2) was added to the nominal value, increasing it

Table 5A.4 Fixed-Interest-Rate Bond Issued at Discount: Stocks and Flows							
	End-Year 0	Mid-Year 1	End-Year 1	Mid-Year 2	End-Year 2	Mid-Year 3	End-Year 3
Nominal Value							
Before coupon payment	900.0	943.9	990.0	975.6	1,023.2	1,010.5	1,059.8
After coupon payment	900.0	943.9	930.2	975.6	963.4	1,010.5	1,000.0
Accrued interest (coupon)		29.5	30.3	29.5	30.3	29.5	30.3
Accrued interest (discount)		14.5	15.7	15.9	17.3	17.6	19.0
Coupon payments		0.0	−59.8	0.0	−59.8	0.0	−59.8
Market Value (dirty price)	900.0	943.9	1,041.3	988.5	1,014.6	1,001.4	1,059.8
Market Value (clean price)	900.0	900.0	951.3	912.9	891.3	890.9	900.0
Revaluations arising from market price changes (semi-annual changes)		0.0	51.3	−38.4	−21.6	−0.4	9.1
Revaluations arising from market price changes (accumulated)		0.0	51.3	12.9	−8.7	−9.1	0.0

to 930.2. During the second year, interest accrues for 93.0, out of which 59.8 are paid as coupon and 33.2 are added to the nominal value of the discount bond.

5.292 As in the case of the previous example, changes in the market interest rate will inversely affect the market value of the bond. The increase in the market interest rate to 12 percent at the end of the first semester of year 3 reflects in a drop in the market value of the bond to 1,001.4. This market value corresponds to the dirty price of the bond, because it includes accrued and not paid interest on the annual

coupon of 29.5 and also the accrued discount of 81.0 during the first five semesters of the life of the bond. The clean price (without accrued interest) of the bond is 890.9, which reflects an accumulated revaluation loss of 9.1, compared with the original issue price of 900.

Recording entries

5.293 The following entries will be recorded for monetary statistics in the accounts of an FC that holds such discount bond.

At inception/purchase	OS	T	VC	OCVA	CS
Assets					
Debt securities	0.0	900.0			900.0
Deposits		−900.0			

Second semester Year 1	OS	T	VC	OCVA	CS
Assets					
Debt securities	943.9	−13.7	51.3		981.5
Deposits		59.8			
Equity Liability [MS]					
Interest income		46.0			
Valuation adjustments			51.3		

First semester Year 3	OS	T	VC	OCVA	CS
Assets					
Debt securities	954.8	47.0	-0.4		1,001.4
Equity Liability [MS]					
Interest income		47.0			
Valuation adjustments			-0.4		

Second semester Year 3 (before redemption)	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,001.4	−10.5	9.1		1,000.0
Deposits		59.8			
Equity Liability [MS]					
Interest income		49.3			
Valuation adjustments			9.1		

Flows for the three-year period after the purchase of debt securities	OS	T	VC	OCVA	CS
Assets					
Debt securities	900.0	100.0			1,000.0
Deposits		179.4			
Equity Liability [MS]					
Interest income		279.4			
Valuation adjustments			0		
Redemption	**OS**	**T**	**VC**	**OCVA**	**CS**
Debt securities	1,000.0	−1,000.0			Account closed
Deposits		1,000.0			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

Fixed-Interest-Rate Bond Linked to a General Index

5.294 The third example refers to a three-year bond that pays annual coupons of 5 percent, but with the principal indexed to the consumer price index (CPI). For the calculation of the fair value of this bond, it is assumed that the inflation observed during the past 12 months will prevail in the future. Considering that the inflation of the past year was 5.24 percent, the fair value of this bond at inception can be calculated as:

$$\text{Fair value}_0 = \frac{50.0}{(1+0.1)} + \frac{50.0}{(1+0.1)^2}$$
$$+ \frac{1{,}000^*(1+0.0524)^3 + 50.0}{(1+0.1)^3} = 1{,}000$$

5.295 Based on its fair value at inception, the bond will be issued at par, with an expected redemption value of 1,165.6, which includes the face value (1,000) and the expected revaluation due to increases in the CPI (165.6). Because the bond is linked to a general price index, the revaluation is recorded as a transaction due to accrued interest.

5.296 The nominal value of the security for the next periods will include—besides its face value—the accrued and not-yet-paid coupon, plus the actual inflation during the past periods. Furthermore, the computation of the fair value for the periods following issuance will need to recalculate the expected redemption price based on the evolution of the CPI during the past 12 months. Because the bond is linked to a narrow index, revaluations of principal will be recorded as accruing of interest (i.e., as transactions).

5.297 Table 5A.5 presents the semi-annual stocks and flows during the life of this CPI-linked bond.

5.298 During the first year, the CPI increased 4.5 percent, bringing the nominal value of the bond, after coupon payment, to 1,045.0. Because of the drop in the inflation rate, compared with its value at inception, the expected redemption price fell from 1,165.6 to 1,141.2. The market interest rate, however, dropped from 10 percent to 7 percent.

5.299 Using the fair value formula and taking into account the change in market interest rate, as well as the change in the expected redemption price because of inflation, the fair value of the security at the end of the first year, after the coupon has been paid, is 1,087.1. This is the dirty price of the bond, which includes accrued interest for 45.0 due to the indexation of principal. The clean price is 1,042.1, a valuation change of 42.1 compared with the issue price.

Table 5A.5 Fixed-Interest-Rate Bond Linked to the CPI: Stocks and Flows							
	End-Year 0	Mid-Year 1	End-Year 1	Mid-Year 2	End-Year 2	Mid-Year 3	End-Year 3
Nominal Value							
Before coupon payment	1,000.0	1,054.7	1,095.0	1,098.2	1,163.0	1,158.2	1,220.0
After coupon payment	1,000.0	1,054.7	1,045.0	1,098.2	1,113.0	1,158.2	1,170.0
Accrued interest (coupon)		24.7	25.3	24.7	25.3	24.7	25.3
Accrued interest (indexation)		30.0	15.0	28.5	39.5	20.5	36.5
Coupon payments		0.0	−50.0	0.0	−50.0	0.0	−50.0
Market Value (dirty price)	1,000.0	1,071.2	1,137.1	1,095.5	1,162.9	1,147.8	1,220.0
Market Value (clean price)	1,000.0	1,016.6	1,042.1	997.3	1,000.0	989.6	1,000.0
Revaluations arising from market price changes (semi-annual changes)		16.6	25.5	−44.8	2.7	−10.4	10.4
Revaluations arising from market price changes (accumulated)		16.6	42.1	−2.7	0.0	−10.4	0.0

Recording entries

5.300 The following entries will be recorded for monetary statistics in the accounts of an FC that holds this CPI-linked bond.

Fixed-Interest-Rate Bond Linked to a Foreign Currency

5.301 The last example is a bond with a fixed coupon of 10 percent per year paid on its face value in domestic

At inception/purchase	OS	T	VC	OCVA	CS
Assets					
Debt securities	0	1,000.0			1,000.0
Deposits		−1,000.0			

Second semester Year 1	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,071.2	−9.7	25.6		1,087.1
Deposits		50.0			
Equity Liability [MS]					
Interest income		40.3			
Valuation adjustments			25.6		

First semester Year 3	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,113.0	45.2	−10.4		1,147.8
Equity Liability [MS]					
Interest income		45.2			
Valuation adjustments			−10.4		

Second semester Year 3 (before redemption)	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,147.8	11.8	10.4		1,170.0
Deposits		50.0			
Equity Liability [MS]					
Interest income		61.8			
Valuation adjustments			10.4		

Flows for the three-year period after the purchase of debt securities	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,000.0	170.0	0		1,170
Deposits		150.0			
Equity Liability [MS]					
Interest income		320.0			
Valuation adjustments			0		
Redemption	**OS**	**T**	**VC**	**OCVA**	**CS**
Debt securities	1,170.0	−1,170.0			Account closed
Deposits		1,170.0			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

currency, but with its principal linked to a foreign currency (US$). It is assumed that the spot exchange rate will prevail in the future. Because of this assumption, the fair value of the foreign currency indexed bond will be the same as the fair value of the first example (i.e., 1,000) and the security will be issued at par.

5.302 In this example, changes in the spot exchange rate will affect the nominal value of the security when its face value is converted into domestic currency using the market exchange rate. They will also affect its market value through the impact that changes in the expected redemption price will have on its fair value.

5.303 Because the bond is linked to a narrow index, changes in valuation due to movements in the exchange rate are recorded as valuation changes and not as transactions (accrued interest) as was the case in the previous example. Only coupon accruals will be recorded as transactions.

5.304 Table 5A.6 presents the semi-annual stocks and flows during the life of this foreign-currency-linked

bond, taking into account changes in the market interest rate and the exchange rate.

5.305 At the end of the first semester of the first year, the exchange rate dropped to 9 units of domestic currency per US$, while the market interest rate stayed at 10 percent per year. The nominal value of the bond fell from 1,000 to 948.8, corresponding to an expected redemption price of 900 plus accrued and not paid interest of 48.8 (10 percent of 1,000).

5.306 The fair value of the bond can be calculated as follows:

$$\text{Fair value} = \frac{100.0}{(1+0.1)^{1/2}} + \frac{100.0}{(1+0.1)^{3/2}}$$

$$+ \frac{1,000*(9/10)+100.0}{(1+0.1)^{5/2}} = 970.0$$

5.307 This market value corresponds to the dirty price, because it includes accrued interest for 48.8. The clean price of the bond would be 921.2, which reflects a drop in its expected redemption value (from

Table 5A.6 Fixed-Interest-Rate Bond Linked to a Foreign Currency: Stocks and Flows							
	End-Year 0	Mid-Year 1	End-Year 1	Mid-Year 2	End-Year 2	Mid-Year 3	End-Year 3
Nominal Value							
Before coupon payment	1,000.0	948.8	950.0	998.8	1,100.0	1,098.8	1,200.0
After coupon payment		948.8	850.0	998.8	1,000.0	1,098.8	1,100.0
Accrued interest (coupon)		48.8	51.2	48.8	51.2	48.8	51.2
Coupon payments		0.0	−100.0	0.0	−100.0	0.0	−100.0
Market Value (dirty price)	1,000.0	970.0	1,023.2	1,018.5	1,091.0	1,086.6	1,200.0
Market Value (clean price)	1,000.0	921.2	923.2	969.7	991.0	1,037.8	1,100.0
Accumulated revaluations		−78.8	76.8	−30.3	−9.0	37.8	100.0
Holding gains and losses		−100.0	−150.0	−50.0	0.0	50.0	100.0
Other market price changes (incl. disc. holding gains/losses)		21.2	73.2	19.7	−9.0	−12.2	0.0
Revaluation (semi-annual change)		−78.8	2.0	46.4	21.3	46.8	62.2

1,000 to 900) partly compensated by the discount rate (the loss will be realized only after five semesters). The revaluation loss for the semester amounts to −78.8.

5.308 The same approach can be used to calculate nominal value, clean and dirty market prices, and revaluations for other periods. For example, at the end of the second year the nominal value before coupon payment is 1,100.0, the dirty price of the bond is 1,091.0, its clean price is 991.0, and the revaluations during the semester were 21.3.

Recording entries

5.309 The following entries will be recorded for monetary statistics in the accounts of an FC that holds this foreign-exchange-linked bond. Contrary to the previous three examples, revaluation gains do not necessarily cancel each other if the bond is held to maturity, because any difference in domestic currency between the issue price of 1,000 and the redemption price due to foreign exchange changes will be recorded at maturity.

At inception/purchase	OS	T	VC	OCVA	CS
Assets					
Debt securities	0	1,000.0			1,000.0
Deposits		−1,000.0			

Second semester Year 1	OS	T	VC	OCVA	CS
Assets					
Debt securities	970.0	−48.8	2.0		923.2
Deposits		100.0			
Equity Liability [MS]					
Interest income		51.2			
Valuation adjustments			2.0		

First semester Year 3	OS	T	VC	OCVA	CS
Assets					
Debt securities	991.0	48.8	46.8		1,086.6
Equity Liability [MS]					
Interest income		48.8			
Valuation adjustments			46.8		

Second semester Year 3 (before redemption)	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,086.6	−48.8	62.2		1,100.0
Deposits		100.0			
Equity Liability [MS]					
Interest income		51.2			
Valuation adjustments			62.2		

Flows for the three-year period after the purchase of debt securities	OS	T	VC	OCVA	CS
Assets					
Debt securities	1,000.0	0.0	100.0		1,100
Deposits		300.0			
Equity Liability [MS]					
Interest income		300.0			
Valuation adjustments			100.0		
Redemption	**OS**	**T**	**VC**	**OCVA**	**CS**
Debt securities	1,100.0	−1,100.0			Account closed
Deposits		1,100.0			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.3 Valuation and Recording of Financial Derivatives with a Numerical Example for Forward Contracts

Forward Contracts

5.310 In a forward contract, the counterparties agree to exchange, on a specified date, a specified quantity of an underlying asset (real or financial) at an agreed-upon contract price (the strike price). Separate, but similar, valuation methods are used depending on whether the underlying assets, during the life of the forward contract, provide: (1) no cash flow, (2) discrete cash flow (for example dividends), or (3) cash flow that is continuously compounded or yield (for example a debt security).

5.311 Notation in the valuation equations for forward contracts[83] includes:

N: *Time until delivery or cash settlement* of a forward-type contract, or if option, time to expiration of the contract (in years)

S_0: *Spot price* (that is, current price) of the underlying asset

F_0: Forward price of the underlying asset

K: *Delivery price* for the underlying asset

r: *Risk-free rate of interest* per annum, which represents the continuous-compounded rate of return on a risk-free investment of N-year maturity.

5.312 The relationship between the forward price (F_0), current (spot) price (S_0), and risk-free rate of interest (r) is:

a. Forward price of an asset with no cash flow:

$$F_0 = S_0 e^{rN};$$

b. Forward price of an asset with one or more cash flows:

$$F_0 = (S_0 - CF)\, e^{rN};$$

where CF denotes the *present value* of all cash flows through N; *and*

c. Forward price of an asset with a known yield:

$$F_0 = S_0 e^{(r-q)N};$$

where q denotes *average* yield per annum with continuous compounding.

5.313 The *fair value of a forward contract*—denoted by f—is determined by relating the *forward price* (F_0) to the *delivery price* (K) in the forward contract. The v*alue of a long-forward contract* (f_L)—that is, a forward purchase of an asset—and the *value of a short-forward contract* (f_S) for the forward sale of an asset are:

$$f_L = (F_0 - K)e^{-rN} \quad \text{and} \quad f_S = (K - F_0)e^{-rN}.$$

5.314 Usually, forward contracts at inception have a zero value, because the forward value of the underlying asset is equal to the delivery price ($F_0 = K$).

5.315 Inserting the equations for the forward prices (F_0), the *fair values of long-forward contracts* in investment assets depend on the income payments (if any) and are:

a. Value of a long-forward contract for an asset with no cash flows:

$$f_L = S_0 - Ke^{-rN};$$

b. Value of a long-forward contract for an asset with one or more cash flows:

$$f_L = S_0 - CF - Ke^{-rN}; \text{ and}$$

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[83] The model formulations and most notations are taken from Hull (2015).

c. Value of a long-forward contract for an asset with cash flows continuously compounded:

$$f_L = S_0 e^{-qN} - Ke^{-rN};$$

where q denotes the *average* annual yield.

5.316 The fair values of f are the same in amount, but opposite in sign, for long- and short-forward positions—reflecting that the asset position of one party to the contract is the liability position of the other party.

5.317 For a *forward contract on currencies*, S_0 and F_0 denote the spot exchange rate and forward exchange rate of a foreign currency (both expressed in number of units of currency A per unit of currency B). Because both currencies can be used to purchase risk-free interest-bearing assets denominated in currency A and currency B, yielding rates of return of r_A and r_B, respectively, the relationship between the forward price (F_0) and the spot price (S_0) is:

$$F_0 = S_0 e^{(r_A - r_B)N};$$

which is the well-known *interest rate parity theorem*. This is a specific case of the relationship between F_0 and S_0 for an investment asset with a known yield; $F_0 = S_0 e^{(r - q)N}$, where $r \equiv r_A$ and $q \equiv r_B$. The relationship is often shown with noncompounded rates; for example, for a forward contract for a U.S. dollar purchase of British pounds in one year: $F_0 = S_0[(1 + r_{US})/(1 + r_{UK})]$, where r_{US} and r_{UK} are noncompounded annual rates of return on dollar- and pound-denominated investments.

5.318 The values of a long-forward contract and short-forward contract on currencies are:

$$f_L = S_0 e^{-r_B N} - Ke^{-r_A N} \text{ and } f_S = Ke^{-r_A N} - S_0 e^{-r_B N}.$$

5.319 At origination of a forward contract, the delivery price (K) is set equal to the forward price (F_0) so that f is initially equal to zero for both the long forward (purchase) and short forward (sale) position. Over the life of the forward contract, the *value of the forward contract* (f) changes due to changes in (1) the spot price (S_0), (2) the discount factor (e^{-run}), and (3) the present value of income flows (if any) from the underlying asset. The value of f becomes positive (an asset) for the long- or short-forward position, and negative (a liability) for the other side of the contract. At any time during the life of the contract, the value recorded as an asset of one party should equal the value recorded as a liability by the other party.

5.320 The change in the forward contract value for each reporting period is recorded as *VC*. In the balance-sheet data, the underlying contra-entry in profit or loss is reflected in *Current year result*. For each reporting period, the *CS* shows a financial derivative asset (if $f > 0$) or liability (if $f < 0$) as follows:

a. When the change in the forward contract value does not lead to a switch from an asset position to a liability position or vice versa, the recording is:

$$CS = OS + VC$$

b. When the change in the forward contract value in the recording period leads to a switch from an asset position to a liability position, a valuation change (VC_A) is recorded to close out the asset position, and the remaining valuation change is recorded as a liability-account valuation change (VC_L):

Asset position: $CS_A = OS_A + VC_A = 0$, where $VC_A = -OS_A$.

Liability position: $CS_L = VC_L$, where $VC_L = -(VC - VC_A)$. The minus sign preceding ($VC_2 - VC_A$) converts a "negative asset" to a "positive liability."

The same accounting rules apply to a switch from a liability to an asset:

Liability position: $CS_L = OS_L + VC_L = 0$, where $VC_L = -OS_L$.

Asset position: $CS_A = VC_A$, where $VC_A = -(VC - VC_L)$.

c. When the contract is settled through a cash payment on the delivery date, which is the usual practice, the settlement amount is equal to the difference between the spot price of the asset (S_0) and the delivery price (K) as specified in the contract. The holder of the long-forward position receives a payoff of ($S_0 - K$) if the spot price is above the delivery price, or provides a payoff ($K - S_0$) if K is larger than S_0. The recipient and provider each record a transaction (T) in the amount of the payoff (with a contra-entry for the cash receivable/payable) and a valuation change in the amount of the difference between the payoff and the opening

stock (with a contra-entry in profit or loss). The adding-up requirement for the asset and liability positions of the respective parties are:

$$CS = OS + T + VC = 0,$$

where $VC = T - OS = (S_0 - K) - OS$.

A Numerical Example of Foreign Currency Forward Contracts

5.321 The two parties to a currency forward contract agree to buy and sell, respectively, foreign currency at a specified price, at a specified quantity, and on a specified future date. The party obligated to sell enters into a short-forward contract and the party obligated to buy enters into a long-forward contract. The value of the foreign currency forward contract is the difference between the discounted present value of the future payment in domestic currency, calculated based on the foreign currency amount and the forward exchange rate, and the discounted present value of the future payment in foreign currency, calculated based on the foreign currency amount and the spot exchange rate.

5.322 The contract is usually structured so that at inception its fair value is zero (0). Suppose Bank A and Bank B enter into a three-month currency forward contract on June 30, whereby Bank A commits to sell and Bank B commits to purchase $10,000 on September 30 at a specified exchange rate, called a forward exchange rate. Usually, the forward exchange rate is set according to the uncovered interest rate parity, which says that the difference in interest rates between the two currencies is equal to the expected change in exchange rates between the two currencies. Say, on June 30 the spot exchange rate (S) is 1.250

units of domestic currency per U.S. dollar, the interest rate for the U.S. dollar is 3 percent, and the interest rate for domestic currency is 5 percent, then the forward exchange rate would be:

$$F = S \frac{(1 + r_{NC})^t}{(1 + r_{FC})^t} = 1.250 * ((1 + 0.05)^{3/12} / (1 + 0.03)^{3/12})$$
$$= 1.256$$

5.323 The fair value measured in domestic currency of a forward contract is calculated in the same way as the forward exchange rate at inception, except the prevailing market interest rates and spot exchange rate is used rather than the rates at the time of the inception of the contract. That is, the fair value is the difference between the contractual forward exchange rate (e.g., 1.256) discounted at the domestic currency interest rate (e.g., 5 percent) and the spot exchange rate discounted at the foreign currency interest rate (e.g., 3 percent) times the contractual amount (e.g., $10,000).

Accounting

5.324 In the first period (July), suppose that the domestic currency depreciates to 1.278 at end-July, while the interest rates remain unchanged. The fair value of the forward is:

Fair value (**Bank A**) $= FC\,(F\,(1 + r_{NC})^{-t} - S\,(1 + r_{FC})^{-t})$
$$= 10,000 * ((1.256 * (1 + 0.05)^{-2/12}$$
$$- 1.278 * (1 + 0.03)^{-2/12}) = -258.9$$

Fair value (**Bank B**) $= 258.9$

5.325 The following will be recorded for MFS purposes at the end of the first month:

First period (July)	OS	T	VC	OCVA	CS
Bank A					
Liabilities					
Financial derivatives	0	-	258.9	-	258.9
Current year result (loss)			−258.9		
Bank B					
Assets					
Financial derivatives	0	-	258.9	-	258.9
Liabilities					
Current year result (profit)			258.9		

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.326 In the second period (August), suppose that the exchange rates and both interest rates remain unchanged. The fair value of the forward is:

$$\textit{Fair value (Bank A)} = 10.000((1.256(1+0.05)^{-1/12}$$
$$- 1.278(1+0.03)^{-1/12}) = -239.5$$

$$\textit{Fair value (Bank B)} = 239.5$$

5.327 In this case, although nothing has changed in terms of exchange rates and interest rates, there has been a change in the value of the contract because as time elapses a shorter period is used to discount the future cash flows. The following will be recorded for MFS purposes at the end of the second month.

Second period (August)	OS	T	VC	OCVA	CS
Bank A					
Liabilities					
Financial derivatives	258.9	-	−19.4	-	239.5
Current year result (profit)			19.4		
Bank B					
Assets					
Financial derivatives	258.9	-	−19.4	-	239.5
Liabilities					
Current year result (loss)			−19.4		

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.328 For the last period (September), suppose that at the settlement date the exchange rate appreciates to 1.267, then the fair value is simply the difference between the forward exchange rate agreed and the spot rate, times the amount in the contract:

$$\textit{Fair value (Bank A)} = 10,000 \, ((1.256(1+0.03)^{-0/12}$$
$$- 1.267(1+0.05)^{-0/12}) = -110$$

$$\textit{Fair value (Bank B)} = 110$$

5.329 The following entries will be recorded for MFS purposes.

Third period (September)	OS	T	VC	OCVA	CS
Bank A					
Assets					
Currency and deposits in foreign currency		−12,670.0			
Currency and deposits in domestic currency		+12,560.0			
Liabilities					
Financial derivatives	239.5	−110.0	−129.5	-	Account closed
Current year result (profit)			+129.5		
Bank B					
Assets					
Financial derivatives	239.5	−110.0	−129.5	-	Account closed
Currency and deposits in foreign currency		+12,670.0			
Currency and deposits in domestic currency		−12,560.0			
Liabilities					
Current year result (loss)			−129.5		

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.330 The entries under currency and deposits reflect that domestic currency and dollars are delivered by Bank A and B, respectively.

Futures Contracts

5.331 Market price quotations for futures contracts are generally available as they are traded on organized exchanges. Price quotations for futures contracts often cover the (1) commodity or financial asset and delivery month, (2) exchange where traded, (3) contract size, (4) pricing unit, (5) opening price for the day, (6) highest and lowest price for the day, (7) settlement price (a representative price near the end of the day), (8) change (in price) for the day, (9) highest and lowest price over the life of the contract, and (10) open interest (number of outstanding contracts).

5.332 The opening and closing stocks for futures contracts are always zero, given that the futures contract value at inception is zero and that any change in the value of the futures contract is settled on a daily basis by margin payments (settlements). The change in daily value of futures contracts is recorded as a valuation change in profits and loss, with a contra-entry in transactions (currency and deposits) to settle the open position.

Forward Rate Agreements (FRAs)

5.333 An FRA is an OTC agreement to apply a specified interest rate to a notional principal (L) for a specified future period from time N_1 to time N_2. Notations for the interest rates used in the valuation of an FRA are:

R_K　Interest rate to be applied, as specified in the FRA

R_F　Forward LIBOR interest rate for the time interval between N_1 and N_2

R　Actual LIBOR interest-rate observed at future time N_1 for a maturity N_2

R_2　LIBOR zero (that is, zero-coupon) rate for a maturity N_2.

The compounding frequency for R_K, R_F, and R corresponds to the term to maturity ($N_2 - N_1$), whereas R_2 is a continuous-compounded rate.

For the recipient of the payment based on R_K, the value of the FRA is:

$$V_{FRA} = L(R_K - R_F)(N_2 - N_1)e^{-R^2 N^2}.$$

For the provider of the payment based on R_K, the value of the FRA has the opposite sign:

$$V_{FRA} = L(R_F - R_K)(N_2 - N_1)e^{-R^2 N^2}.$$

5.334 An FRA can also be valued by assuming that the forward rate will be realized—that is, by assuming that $R = R_F$—and by substituting R for R_F in the preceding equations. Using this approach, an FRA can be treated as equivalent to an interest-rate swap that has only one exchange of fixed-rate payment for floating-rate payment—that is, R_F*L swapped for $R*L$.

5.335 An FRA usually has zero value at inception, because R_K is set equal to the forward rate (R_F) at the outset of the contract. As R_F changes over the life of the FRA, the V_{FRA} equations are used to calculate the current value of the FRA. The end-of-period value of V_{FRA} is recorded as a valuation change (VC) that constitutes the closing stock (CS) for the FRA: that is, $CS = VC = V_{FRA}$.

5.336 An FRA is usually settled at time N_1, when the settlement amount can be determined. At time N_1, the actual LIBOR rate (R) for a LIBOR loan of ($N_2 - N_1$) maturity can be used to calculate the FRA cash flows at time N_2 and to discount the cash flows back to time N_1. The cash settlement received or paid is recorded as a transaction (T) with a contra-entry for the cash received or paid. The closing stock for the reporting period is:

$$CS = OS - T - VC = 0,$$

and VC is the amount of the change in V_{FRA} in the pre-settlement period within the reporting period.

Interest-Rate Swap Contracts

5.337 An *interest-rate swap* is an agreement through which fixed-rate based payments by one party are swapped for variable-rate based payments by the other party. The notional principal, L, is the amount to which a fixed rate and a variable rate is applied for calculating the cash flows—that is, the amount of the swapped payments.

5.338 Notation in the valuation formulas for interest rate swaps includes:

L   *Notional principal* in the swap agreement

t_i *Time* until the *i*th payments ($i = 1, \ldots, n$) are exchanged

r_i *LIBOR zero rate* (that is, zero-coupon rate)[84] corresponding to time t_i

k   *Amount of fixed payment* at the end of each payment period

$k_i{}^*$ *Amount of floating-rate payment* at the end of the *i*th payment period, which is a known amount as of the beginning of the i*th* period.

5.339 For valuation purposes, an interest-rate swap can be viewed as a long position in one bond and a short position in another bond. One party is viewed as having a long position in a fixed-rate bond and a short position in a floating-rate bond, and the other party is viewed as having the opposite positions in the two bonds. For the provider of fixed-rate based payments (and variable-rate based payment recipient), the value of the swap (V_{swap}) is equal to the difference between the floating-rate bond value (B_{fl}) and the fixed-rate bond value (B_{fix}):

$$V_{swap} = B_{fl} - B_{fix},$$

and for the party with the opposite position,

$$V_{swap} = B_{fix} - B_{fl}.$$

The fair value of the swap can be calculated as the discounted values of the two bonds' cash flows.

5.340 The accounting entries for the interest-rate swap depend on whether payments have been exchanged during the reporting period and/or whether V_{swap} has switched from a positive value (asset position) to a negative value (liability) or vice versa.

5.341 Suppose the interest-rate swap did not switch from an asset to a liability position, or vice versa, during the reporting period. The accounting entries for the reporting period are:

a. *If no payments have been exchanged* during the reporting period, V_{swap} as of the end of the period is recorded as the closing stock (CS), and the

valuation change (VC) is the amount by which V_{swap} changed during the period (i.e., $VC = CS - OS$) given that $T = 0$.

b. *If payments have been exchanged* during the reporting period, the total flow for the period is divided into a transaction (T) for the net swap payment/receipt (with a contra-entry to cash) and a valuation change (VC) to account for the post-payment change in V_{swap} in the latter part of the reporting period, after the net swap payment/receipt. VC can be derived residually, using $VC = CS - OS - T$.

5.342 Suppose V_{swap} switched from a positive value (asset) to a negative value (liability) or vice versa during the reporting period. The same accounting principles as described for a forward contract that switched from an asset to a liability (or vice versa) would apply for an interest rate swap.

Currency Swaps

5.343 The valuation principles for a fixed-for-fixed currency swap and an interest-rate swap are similar in that the value of the swap can be derived as the difference between the values of two bonds. For a currency swap, two *actual principals*—one on each side of the contract—are exchanged at the beginning and end of the swap contract, whereas an interest rate swap has a single *notional principal*.

5.344 Currency swaps usually are structured so that, at inception, V_{swap} is equal to zero. At the outset of the contract, the principals are exchanged, and each party records the resulting increase/reduction in currency holdings.

5.345 At inception, the parties exchange the underlying currencies at prevailing market exchange rates. At the time of settlement, there may be a difference between the agreed and the prevailing exchange rate of the swapped currencies, and therefore in the total amount of the swapped currencies. This difference is allocated to a transaction in a financial derivative. The underlying swapped currencies are valued at the prevailing market exchange rate at the time of the settlement and recorded as transactions in the underlying currencies.

5.346 For the first reporting period, the change in the value of currency swap is recorded as a valuation

change (VC) with a contra-entry in profit or loss. Assuming $V_{swap} = 0$ at inception and that no payments (other than the initial principal exchange) were made during the first reporting period, the adding-up requirement is:

$$CS = VC \; (= V_{swap}).$$

For subsequent reporting periods, the adding-up requirement is:

$$CS = OS + T + VC,$$

where T denotes the net amount from the exchange of payments.

5.347 Over its life, the currency swap is likely to switch from a positive value (asset) to a negative value (liability) or vice versa. If V_{swap} switches signs during the reporting period, the accounting entries are analogous to those for an interest-rate swap or forward contract that switches from an asset to a liability, or vice versa.

Pricing Models for Valuing OTC Options Contracts

5.348 The valuation of options contracts that are exchange traded is based on the market prices for the contracts. Similarly, options dealers provide market-price quotations for some types of OTC options contracts. For other OTC options, pricing models cannot be covered fully in this *Manual*. In the absence of market-price data, empirical models are needed for valuing options contracts in several categories—stock options, bond options, futures options, caps and floors, exotic options, etc. Within these categories, valuation of call and put options is addressed separately in the empirical modeling. For stock options, separate models are needed for the valuation of options on non-dividend and dividend-paying corporate shares.

5.349 Two of the most widely used empirical methods for valuation of options contracts are:

a. Black-Scholes options pricing model. The best-known empirical model for options pricing, the basic Black-Scholes model,[85] applies directly to the pricing of European and American call options and European put options on nondividend-paying corporate shares. Variants of the Black-Scholes model have been developed for the pricing of dividend-paying stock options, bond options, and many other types of European and American options.

b. Binomial-tree model.[86] This model is an extension of the two-state binomial model—an options-pricing model in which it is assumed that, over any short period, a stock price will move to one of only two possible values. The two-state binomial model has been extended in a multi-period framework in which the price of an option can take many possible paths (that is, follow different branches of a pricing "tree") during the many short periods over the life of the option.

5.350 Users of this *Manual* may wish to consult one or more textbooks or other references on options pricing and analysis.[87] FCs that are counterparties to options contracts that need to be fair-valued, as well as brokers who arrange the contracts, may be able to provide option price estimates, options valuation software, or other useful support.

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[85] See Black and Scholes (1973) and Merton (1973).

[86] See Cox, Ross, and Rubinstein (1979).

[87] In addition to valuation methods, the textbooks contain substantial coverage of investment decision making, hedging strategies, etc. The materials on options pricing models and valuation methods for other types of over-the-counter derivatives are directly applicable in the context of monetary and financial statistics.

5.4 Settlement Date and Transaction Date Accounting

5.351 Separate examples for purchase and sale of a financial asset are presented in this annex. The *IAS 39— Implementation Guidance (IG)*, Section D.2.1, presents an example of entries for settlement-date and transaction-date (trade-date) accounting for the purchase of a financial asset. In this annex, a modified and expanded version of the example in IAS 39 IG D.2.1 is used to illustrate the settlement-date and transaction-date accounting for either purchase or sale of securities other than shares. The principles apply to the purchase or sale of any financial asset recorded at market or fair value.

Example 1: Purchase of Debt Securities

5.352 On December 29 (trade date), Financial Corporation A (FCA) acquires debt securities that are denominated in domestic currency (NC) at a price of NC 1,000. The settlement date for the transaction is January 4 of the next year. NC 1,002 is the market value of the securities at the end of the first reporting period—that is, as of December 31. The market value of the securities on the settlement date is NC 1,003, and the market value at the end of the second reporting period—that is, as of January 31 of the next year—is NC 1,005. In the IAS 39 IG example, the securities are marked to market (that is, are revalued) at NC 1,003 on the settlement date. In the following examples, securities are revalued within the period, whereas the methodology in this *Manual* requires only end-of-period revaluation. The end-of-period value of NC 1,005 has been added to the IAS 39 IG example.

5.353 Using settlement-date accounting for the securities purchase, the accounting records are:

First period (December)	OS	T	VC	OCVA	CS
Debt Securities	0		2		2
Other entries					
Current year result (change through profit or loss)			2		

Second period (January)	OS	T	VC	OCVA	CS
Debt Securities	2	1,000	3		1,005
Other entries					
Current year result (change through profit or loss)			3		
Deposits: payment for securities (January 4)		−1,000			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.354 Using transaction-date (trade date) accounting for the securities purchase, the accounting records are:

First period (December)	OS	T	VC	OCVA	CS
Debt Securities	0	1,000	2		1,002
Other entries					
Current year result (change through profit or loss)			2		
Other accounts payable: securities settlement account		1,000			1,000

Second period (January)	OS	T	VC	OCVA	CS
Debt Securities	1,002		3		1,005
Other entries					
Current year result (change through profit or loss)			3		
Deposits: payment for securities (January 4)		−1,000			
Other accounts payable: securities settlement account	1,000	−1,000			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

Example 2: Sale of Debt Securities

5.355 The securities transaction in the first example is used for Example 2, but from the other side of the transaction. In Example 2, Financial Corporation B (FCB) sells the securities on December 29 and uses settlement-date accounting to record the sale. The opening balance for the securities as of December 1 is NC 996.

5.356 Using *settlement-date accounting* for the *securities sale*, the accounting records are:

First reporting period (December)	OS	T	VC	OCVA	CS
Debt Securities	996		4		1,000
Other entries					
Current year result (change through profit or loss)			4		

Second reporting period (January)	OS	T	VC	OCVA	CS
Debt Securities	1,000	−1,000			Account closed
Other entries					
Deposits: received for securities (January 4)		1,000			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.357 Using *trade-date accounting* for the *securities sale*, the accounting records are:

First reporting period (December)	OS	T	VC	OCVA	CS
Debt Securities	996	−1,000	4		Account closed
Other entries					
Current year result (change through profit or loss)			4		
Other accounts receivable: securities settlement account		1,000			1,000

Second period (January)	OS	T	VC	OCVA	CS
Debt Securities	Account closed				
Other entries					
Deposits: received for securities (January 4)		1,000			
Other accounts receivable: securities settlement account	1,000	−1,000			

Note: OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

Example 3: Purchase or Sale of Debt Securities: Settlement and Transaction Dates in the Same Reporting Period

5.358 The data for the reporting period do not need to be adjusted if the settlement and transaction dates occur in the same reporting period.

5.359 Suppose that, on December 15 (trade date), FCA acquires securities other than shares at a price of NC 1,000. The settlement date for the transaction is December 19. FCB, seller of the securities, shows a market value of NC 996 for the securities at the beginning of the period (December 1). The market values on the settlement date (December 19) and at the end of the period (December 31) are NC 1,002 and NC 1,005, respectively.

5.360 Using *settlement-date* or *trade-date accounting* for the *securities purchase* by FCA, the relevant data for the reporting period are:

FCA: Reporting period (December)	OS	T	VC	OCVA	CS
Debt Securities	0	1,000	5		1,005
Other entries					
Deposits: payment for securities (December 19)		−1,000			
Current year result (change through profit or loss)			5		

Note: FCA = Financial Corporation A; OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.

5.361 Using *settlement-date* or *trade-date accounting* for the *securities sale* by FCB, the relevant data for the reporting period are:

FCB: Reporting period (December)	OS	T	VC	OCVA	CS
Debt Securities	996	−1,000	4		Account closed
Other entries					
Deposits: received for securities (December 19)		1,000			
Current year result (change through profit or loss)			4		

Note: FCB = Financial Corporation B; OS = opening stock; T = transactions; VC = valuation changes; OCVA = other changes in the volume of assets; CS = closing stock.