

## CHAPTER 5. STOCKS, FLOWS, AND ACCOUNTING RULES

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## I. INTRODUCTION

5.1. This chapter discusses financial *stock positions* and *flows* and the *accounting rules* for the compilation of monetary and financial statistics. The stock and flow concepts and accounting rules follow the *2008 SNA* (and other statistical manuals). The framework 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. The framework divides flows into separate components for *transactions*, *revaluations (holding gains and losses)*, and *other changes in the volume of assets* (OCVA).

5.2. This chapter first describes the characteristics of stock positions and flows. It then presents the accounting rules that include time of recording, valuation principles, transactions costs and financial services fees, and the principles of aggregation, netting and consolidation. In addition, four annexes and four boxes focus on special issues and provide numerical examples.

## II. STOCK POSITIONS AND FLOWS

5.3. This section deals with stock positions and flows as defined within the framework of the *2008 SNA* focusing mainly on financial assets and liabilities. ***Stock positions refer to holdings of nonfinancial assets, financial assets, and liabilities at a specific point in time. Flows refer to economic actions and effects of events within an accounting period.***

5.4. ***Flows reflect the creation, transformation, exchange or extinction of economic value within an accounting period.*** 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.

5.5. ***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 (see footnote 20). Other flows are changes in the value of assets and liabilities that do not result from transactions.***

5.6. The terms used in the framework in which changes in stock positions account for all economic flows in a period are as follows:<sup>1</sup>

- (a) Opening stock (OS). The value of the outstanding stock position in, or holdings of, assets or liabilities at the beginning of an accounting period.
- (b) Transactions (T). Economic flows that constitute transactions as defined in paragraph 5.5 above.

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<sup>1</sup> These definitions also apply to nonfinancial assets.

- (c) Revaluations or valuation changes (VC) (holding gains and losses). Flows arising from changes in (1) the prices of financial assets and liabilities and/or (2) the exchange rates.
- (d) OCVA. Other flows that result from asset and liability value changes other than those arising from transactions and revaluations. Examples are write-offs of claims, reclassification of assets, and monetization or demonetization of gold (see paragraph 5.66). This *Manual* recognizes provisions of financial corporations (FCs) for losses on assets, treats provisions as the precursor of possible asset write-offs, and records as an OCVA; the associated asset is recorded at gross nominal value.
- (e) Closing Stock (CS). The value of the outstanding stock position in, or holdings of, financial assets or liabilities at the end of an accounting period, which equals the value of the opening stock plus flows arising from transactions, revaluations, and OCVA.

5.7. Table 5.1 illustrates the recorded stock positions and economic flows for an asset or liability. The total flow during the period is divided into three components: *transactions*, *valuation changes*, and *OCVA*.

<b>Table 5.1. Stocks and Flows for a Financial Asset or Liability Category</b>						
	<b>OS</b>	<b>T</b>	<b>VC</b>		<b>OCVA</b>	<b>CS</b>
			Due to price changes	Due to exchange rate changes		
Asset/liability	100	+10	-2	+3	-5	106

#### **A. Adding-up Identities**

5.8. The stock and flow framework for the 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.

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

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

5.10. 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.

**Table 5.2 Stock and Flow Data: Adding-Up Requirements**

	<i>OS</i>	<i>T</i>	<i>VC</i>	<i>OCVA</i>	<i>CS</i>	<i>CS – OS – T – VC – OCVA</i>
<b>Assets</b>						
Asset 1						0
Asset 2						0
...						...
Asset <i>m</i>						0
<b>Total Assets (<i>TA</i>)</b>						<b>0</b>
<b>Liabilities</b>						
Liability 1						0
Liability 2						0
...						...
Liability <i>n</i>						0
<b>Total Liabilities (TL)</b>						<b>0</b>
<b>Vertical check: <i>TA – TL</i></b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**B. Flows**

5.11. Economic flows discussed in the context of monetary and financial statistics mostly constitute the flows in financial assets and/or liabilities. This *Manual* recommends to compile data on stock positions 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, balance of payments, and government finance statistics on the other side, which also contain detailed flow data.

**Compilation of transaction data for financial instruments**

5.12. Every transaction is either a monetary or nonmonetary transaction. The monetary and financial statistics are concerned mostly with the monetary transactions as the focus is on transactions in financial instruments (see Table 5.3). *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.*<sup>2</sup>

5.13. *The amount the debtor owes to the creditor is known as the principal amount.* The provision of economic value by the creditor, or the creation of liabilities through other means, establishes a principal amount of liability for the debtor. *For financial assets, for the use of the principal amount, interest can (and usually does) accrue on the principal amount, resulting in an interest cost for the debtor. 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.*

<sup>2</sup> A non-monetary transaction is one that is not initially stated in units of currency.

**Table 5.3. Main Transactions by Asset /Liability Category**

<b>Asset/Liability</b>	<b>Transactions</b>
Monetary gold (central bank asset)	Purchases <i>less</i> sales (between monetary authorities and international financial institutions only) <i>Plus</i> accrued interest on unallocated gold accounts with nonresidents that give title to claim the delivery of gold
SDR holdings (central bank asset)	Purchases <i>less</i> sales <sup>1</sup> <i>Plus</i> accrued interest on SDR holdings <i>Plus</i> remunerations in SDRs from the IMF on the reserve tranche position <i>Less</i> payments of charges in SDRs to the IMF
SDR allocations (central bank liability)	New SDR allocation <i>less</i> SDR cancellation <i>Plus</i> accrued interest on SDR allocation
Domestic currency holdings (other than central bank)	Net acquisition
Domestic currency (central bank liability)	Change in currency in circulation (see Chapter 6, paragraph 6.22c)
Foreign currency holdings	Purchases <i>less</i> sales
Deposits: Non-interest-bearing—assets or liabilities	Deposit placements <i>less</i> withdrawals
Deposits: Interest-bearing—assets or liabilities	Deposit placements <i>less</i> withdrawals <i>Plus</i> accrued interest for the current period
Debt securities—assets	Purchases <i>less</i> sales, redemptions and interest payment receipts <sup>2</sup> <i>Plus</i> accrued interest for the current period
Debt securities—liabilities	Issuances <i>less</i> redemptions and interest payments <sup>2</sup> <i>Plus</i> accrued interest for the current period
Loans—assets	New lending <i>less</i> loan principal and interest payments <sup>2</sup> <i>Plus</i> accrued interest for the current period
Loans—liabilities	New borrowing <i>less</i> loan principal and interest payments <sup>2</sup> <i>Plus</i> accrued interest for the current period
Equity and investment fund shares—assets	Purchases and new contributions <i>less</i> sales and withdrawal of capital
Equity and investment fund shares—liabilities	New funds contributed by owners <i>less</i> outflow from dividends when shares go ex-dividend and withdrawal of capital

Insurance, pension and standardized guarantee schemes—assets	Prepayments of insurance premiums and net fees for standardized guarantees <i>Plus/minus</i> change in claims of pension funds on pension managers for any underfunding/overfunding
Insurance, pension and standardized guarantee schemes—liabilities	Amounts of estimated obligations to beneficiaries and holders accrued during the period <sup>3</sup> <i>less</i> payments to beneficiaries from reserves and provisions
Financial derivatives—assets	Purchases <i>less</i> sales and settlements
Financial derivatives and employee stock options—liabilities	Sales <i>less</i> settlements
Other accounts receivable/payable	Transactions in trade credit and advances, etc.
Nonfinancial assets	Acquisitions <i>less</i> disposals <i>Less</i> consumption of fixed assets
<sup>1</sup> Transactions also include SDRs obtained from a new SDR allocation. <sup>2</sup> Includes “redemptions”/“repayments” arising from debt reorganization, including debt cancellation by mutual agreement (debt forgiveness). <sup>3</sup> For more details see paragraphs 5.44–5.46.	

5.14. For those debt instruments for which the contract 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.<sup>3</sup>

5.15. The transactions for each category can be derived residually, if data are available for the opening stock (*OS*), closing stock (*CS*), and *OCVA*. If *VC* = 0, transactions for the asset or liability category are given by:

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

5.16. In most reporting periods, *OCVA* entries are unlikely for some asset and liability categories. If *OCVA* = 0 and *VC* = 0, transactions are the only source of period-to-period change in the stock of the asset or liability denominated in the same unit of account as the monetary data; that is,  $T = CS - OS$ .

5.17. Assets and liabilities valued at market prices (or fair values) and/or denominated in foreign currency (Table 5.4) generally have non-zero values for valuation changes.

<sup>3</sup> See also *External Debt Statistics Guide for Compilers and Users* (2013), paragraphs 2.97-98 and Box 2.4.

5.18. A discussion of the compilation of these transactions for each category of assets and liabilities is set out in the remainder of this section.

***Monetary gold (central bank asset)***

5.19. A central bank sale (purchase) of monetary gold to (from) another central bank (or international financial institution (IFI) such as the IMF) is recorded by both parties as a transaction in monetary gold. Transactions in monetary gold should be valued at gold market prices and at market exchange rates on the dates of the individual transactions. Transactions in nonmonetary gold are treated as acquisitions less disposals of nonfinancial assets. (See also paragraph 5.66e.)

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

5.20. Transactions in SDR holdings and/or allocations arise from (1) SDR purchases and sales between qualified SDR holders, (2) a new allocation of SDRs—a very infrequent event—or the cancellation of an amount of the SDR allocation, (3) accrued interest on SDR holdings/SDR allocations,<sup>4</sup> (4) member country payment of charges to the IMF, and (5) IMF payments to (that is, remuneration of) member countries.<sup>5</sup> Stock position 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.<sup>6</sup> (See also Chapter 4, Annex 4.1.)

***Domestic currency***

5.21. Transactions are equal to the period-to-period changes in the currency in circulation—that is,  $T = CS - OS$ , given  $VC = 0$  and  $OCVA = 0$ .

***Foreign currency holdings***

5.22. Transactions data on foreign currency holdings should be available from the foreign exchange records in the recording systems of FCs. Transactions in foreign currency are converted into the domestic currency using the exchange rate prevailing at the time of the transaction (the mid-point between the buying and selling rate should be used).

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<sup>4</sup> A member country receives interest on its SDR holdings and pays interest on its SDR allocation. A single rate, the *SDR interest rate*, applies to both SDR holdings and allocations. The SDR interest rate is revised at the end of each financial quarter (based on the IMF's fiscal year), as of the end of April, July, October, and January.

<sup>5</sup> For the IMF's currency purchase and lending facilities, creditor members receive remuneration in SDRs, and debtor members pay charges in SDRs.

<sup>6</sup> The central bank in each member country receives a monthly statement from the IMF's Finance Department that shows the SDR balances and transactions during the month. The Statistics Department of the IMF also directly provides SDR and other Fund accounts data to compilers in many member countries. Detailed data on the financial position in the Fund (and transactions with the Fund) are also posted monthly on the Internet (see [www.imf.org](http://www.imf.org)) after the end of the reference month.

### ***Deposits—assets or liabilities***

5.23. 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* OCVA, if applicable. Transactions in foreign-currency-denominated deposits are valued using the market exchange rates prevailing at the time of the transaction (the mid-point between the buying and selling rate should be used).<sup>7</sup> Direct collection of data on transactions is recommended. 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—assets and liabilities***

5.24. Transactions in debt securities, on the asset side of the balance sheet, consist of securities purchases *less* securities sales, redemptions and interest payment receipts *plus* accrued interest earned in the period. Transactions in debt securities, on the liability side, consist of new securities issuances *less* securities redemptions (including partial redemptions) and interest paid<sup>8</sup> *plus* accrued interest incurred in the period. For transactions in foreign-currency-denominated securities the same principles as for deposits apply (see paragraph 5.23 above).

#### ***Accrued interest calculations for debt securities***

5.25. It should be noted that for debt securities, the valuation of purchase, sale and redemption transactions and stock positions in the balance sheets do not depend on the method used for the calculation and recording of accrued interest. Purchases and sales of debt securities are recorded at transaction prices and the stock 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 accrued interest (i.e., to transactions) and to holding gains or losses (i.e., revaluations).

5.26. Defining and measuring interest for traded debt securities is not straightforward. Bonds and similar instruments (such as, large-denomination negotiable certificates of deposit and preferred stock) pay a fixed or variable amount of coupon payment. 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 in the accrued interest on a bond two components need to be accounted for: the amortization of the discount or premium vis-a-vis the value to be paid at maturity, and the coupon that is earned but not yet paid. The accrued interest can either be

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<sup>7</sup> Stock and flow data for the *IMF No. 1 and No. 2 Accounts* are provided to central banks by the IMF's Finance Department and, upon request, by the IMF's Statistics Department, as well as are posted monthly on the Internet (see [www.imf.org](http://www.imf.org)). These data should be reconciled with the accounting records of the central bank.

<sup>8</sup> Redemption usually occurs through settlement at maturity, but it can occur through issuers' purchase of their own securities prior to maturity.



calculated as the sum of the two components or using the effective yield at the time of issuance, purchase, or the beginning of the period.

5.27. 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:

- (a) Debtor approach. 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 creditors. Interest accrual on a debt instrument is determined for the entire life by the conditions set at inception of the instrument, taking account of (1) the issue price, (2) the term to maturity, (3) the coupon payments over the life of the security, and (4) the redemption value of the security. 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) Creditor approach. Under this approach, the effective yield used to compute accrued interest on the securities is updated (that is, recalculated) in each period to reflect the current market price.
- (c) Acquisition approach. 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 in the secondary market.

5.28. In applying the acquisition or creditor 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. However, the amortization of the discount (or premium) by the acquisition or creditor approach may differ significantly from the amortization by the debtor approach—in particular, if market interest rates and security prices have changed appreciably between time of issuance and the time of purchase in the secondary market.

5.29. Many countries' accounting standards for accrued interest on debt securities contain a combination of the debtor and acquisition approaches.<sup>9</sup> 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 methodology for the national account statistics as contained in the *2008 SNA* and the recommendation in this *Manual* (see paragraph 5.33).

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<sup>9</sup> *Debtor approach* and *acquisition approach* are terms that are not used in the IAS or national financial reporting standards.

5.30. 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.

5.31. In the secondary market, a bond has two prices—the so-called *clean price* and *dirty price*, which are market prices that exclude and include, respectively, the part of the coupon that has accrued up to the time of purchase in the secondary market. 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.

5.32. Box 5.1 below presents additional information on interest rate calculations for debt securities.

### Box 5.1. Accrued Interest on Debt Securities—Further Considerations

*For a fixed-coupon bond or similar security issued at face value* (that is, at the redemption value, or par), the accrued interest (under the debtor approach) is the accrued coupon.

*For a fixed-coupon bond issued at a discount from the face value*, accrued interest can be calculated as the accrued coupon *plus* the amortization of the discount. The accrued coupon for a reporting period is calculated in the same way as the accrued coupon for a fixed-rate bond sold at par. Amortization of the discount is based on the  $r$  value that satisfies the following equation:

$$\text{Issue price} = \frac{\text{Face value}}{(1+r)^D},$$

where  $D$  is the number of days over the life of the bond.<sup>10</sup> Having solved for  $r$  (on a daily basis), the amortization amount for each day over the life of the bond is calculated, and the daily amortizations for the reporting period are summed.

*For a fixed-coupon bond issued at a premium over the face value*, accrued interest can be calculated as the accrued coupon *minus* the amortization of the premium. The accrued coupon for a reporting period is calculated in the same way as the accrued coupon for a fixed-rate bond sold at par.

*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.<sup>11</sup> 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<sup>12</sup> 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 uprate the level of principal to which the interest is linked and on the currency in which the interest and principal are denominated. (See paragraphs 5.90-97) 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

<sup>10</sup> The amortization rate,  $r$ , could be calculated as a monthly rate (monthly compounded), a quarterly rate (quarterly compounded), a semiannual rate (semiannual compounded), or an annual rate (annual compounded). However, amortization at a daily rate (based on daily compounding) facilitates the allocation of the discount amortization to the individual reporting periods.

<sup>11</sup> 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.

<sup>12</sup> 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.

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.

*For securities purchased in the secondary market*, national financial reporting standards may stipulate that the effective yield, which is used to calculate accrued interest, should be based on the redemption value, remaining coupon payments, remaining term to maturity, and *dirty price* at which the securities were purchased in the secondary market—that is, based on the *acquisition approach*. Similar calculations would apply if the *creditor approach* were implemented, except the effective yield would be recalculated for each reporting period, using the current market price (dirty price) as of the end of each period, rather than continuing to use the price at which the securities were acquired in the secondary market.

### *Accrued interest reporting*

5.33. ***The debtor approach is the approach to record interest accrual on debt securities in this Manual, in accordance with the 2008 SNA methodology (2008 SNA, paragraph 17.263).*** Where the accounting data have been compiled in accordance with the creditor or acquisition approach and reported to the compiler by the FC, supplementary data may 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.

5.34. Ideally, supplementary data would be reported to the compilers of monetary and financial statistics on a security-by-security basis<sup>13</sup> (see Box 5.2) for all securities for which the acquisition or creditor approach had been applied in the accounting data. 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 appreciable—such as securities whose price has changed significantly since issuance.

### ***Loans—assets and liabilities***

5.35. 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). A loan transaction that occurs in an exceptional case of loan repayment after it has been written-off is discussed in paragraph 5.73c.

5.36. Transactions in foreign-currency-denominated loans are converted into domestic currency units by using the market midpoint exchange rates prevailing at the time of the transaction. 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).

<sup>13</sup> See the *Handbook on Securities Statistics* (jointly published by BIS, ECB, and the IMF), [Part 1, Annex 4.]

5.37. 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.<sup>14</sup>

5.38. Financial lease payments are treated as interest and principal payments on a loan extended by the lessee. Financial leases are often structured similar to the interest and principal payment schedules for a loan that calls for periodic payments in equal amount over the term of the loan. Unlike a mortgage or installment loan, a financial 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 does not acquire the legal ownership of the asset, the final payment includes a payment in kind in the form of return of the asset to the lessor, who records the transaction as an acquisition of a nonfinancial asset in the amount of the residual value of the asset. Most financial leases are *net leases* in which the lessee pays any operating expenses and property tax and agrees to maintain and insure the asset.

#### ***Equity and investment fund shares—assets and liabilities***

5.39. Transactions in equity 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 from issuance of new shares,<sup>15</sup> *less* any outflow of dividends when shares go ex-dividend.

5.40. 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.

5.41. Transactions in other equity (defined in Chapter 4, paragraph 4.141) 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

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<sup>14</sup> In many cases, homeowners are entitled to repay mortgage loans without incurring prepayment penalties.

<sup>15</sup> 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

retained earnings and reserves) is assumed to be held by the owners.<sup>16</sup> Equity withdrawals exclude current withdrawals from and contributions to the income of quasi-corporations.

5.42. For equity on the liability side of the balance sheets of FCs, the transactions, valuation changes, and OCVA include (see also paragraphs 5.168–5.170):

- (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) Transactions in retained earnings are valued based on the amount of retained earnings inflow or outflow with the transactions recorded only for foreign direct investment enterprises and for dividends when shares go ex-dividend (outflows).<sup>17</sup> For public and other financial and nonfinancial corporations where government, another public corporation, or a private corporation is the only shareholder and the shares are not publicly traded, the dividends are recorded at the time they are payable.<sup>18</sup> All other retained earnings inflow or outflow arising from the net profit or loss for the period is recorded as an OCVA.
- (c) Current year result represents the accumulation of the current profit or loss, recorded as transactions, valuation changes, or OCVA depending on the type of the income or expense (i.e., whether the corresponding flows are transactions, valuation changes, or OCVA).<sup>19</sup>
- (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 revaluations for the period, excluding the gains and losses posted to profit or loss—that is, the *sum* of valuation changes for assets and liabilities (other than equity) and excluding all valuation changes posted as gains or losses in the profit or loss account. For the valuation adjustment, no transactions are recorded.

5.43. Current and capital transfers<sup>20</sup> received and provided by FCs are treated as transactions. The receipt of a current or capital transfer is recorded as an increase in currency or deposits (or

<sup>16</sup> 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.

<sup>17</sup> Depending on national financial reporting standards, this transaction could be attributed to the current year result.

<sup>18</sup> For more details on the recording of dividends see *BPM6*, paragraph 3.48, and *GFSM 2014* paragraphs 5.111–5.117.

<sup>19</sup> Transactions, valuation changes, or OCVA recorded for this item are reflected within the change in net worth in the *2008 SNA*.

<sup>20</sup> For definitions of current and capital transfers see *BPM6*, paragraphs 12.7 and 12.12–15.

nonfinancial assets) on the asset side of the FC's balance sheet. The contra entry is an increase in equity of the FC. The provision of a current or capital transfer is recorded as 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.

### ***Insurance, pension, and standardized guarantee schemes***

5.44. The recorded transactions for nonlife insurance technical reserves are the amounts of estimated obligations to beneficiaries and holders accrued during the period, as well as payments made to beneficiaries from reserves and provisions (see also paragraph 5.175). 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). The premiums are shown as first payable to the direct insurer and then a lesser premium is payable to the reinsurer. This non-consolidation is referred to as gross recording on the part of the direct insurer. (See subsection on recording principles in this chapter for descriptions of *consolidation* and *gross recording*.)

5.45. Transactions for life insurance and annuity entitlements to be recorded are the amounts of estimated obligations to beneficiaries and holders accrued during the period. The transactions for provisions for calls under standardized guarantee schemes are similar to the reserves for nonlife insurance; they include unearned fees and outstanding calls not yet settled.

5.46. The changes in the volume of reserves for pension entitlements apply to defined benefit schemes, those where the pension benefits provided are based wholly or in part on a pre-determined formula. 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.<sup>21</sup> 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 valuation change.

### ***Financial derivatives and employee stock options***

5.47. 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 5.192). For transactions in foreign-currency-denominated financial derivatives the same principles as for deposits apply (see paragraph 5.23).

5.48. The recording of a futures contract involves the recording of flows—transactions and valuation changes—in the category of financial derivatives and the associated transactions in margin deposit accounts. For the reporting period in which the contract is settled (on the delivery

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<sup>21</sup> See also the 2008 SNA, part 2 of Chapter 17, and BMP6, paragraph 9.24.

date or earlier), the settlement is recorded as a transaction. Changes in value over time are recorded as valuation changes.

5.49. 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) basis (revaluation).

5.50. Most options 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 transactions at the maturities of other financial instruments:

- (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. When a cash settlement payment is made, a reduction of a financial derivative liability is recorded.
- (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 are in asset positions and some are 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.<sup>22</sup>

5.51. The recording of flows for credit derivatives is similar to those for forward-type and option-type contracts. Periodic fee and other payments under credit derivative contracts and secondary market purchases/sales of financial derivatives are recorded as transactions. The settlement and exercising of contracts are also recorded as transactions.

5.52. Transactions in employee stock options are recorded as the counterpart to the element of compensation of employees represented by the value of the stock option.

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<sup>22</sup> The net basis is, however, recommended for transactions in financial derivatives classified as reserve assets.



### ***Indexed financial instruments***<sup>23</sup>

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 changes in prices. 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. This *Manual*, consistent with the *2008 SNA* and other statistical manuals, recommends the recording (separating out) of transactions and valuation changes depending on the type of index used to uprate 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 before repayment are uncertain and cannot be determined with certainty. 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; and
- (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.

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<sup>23</sup> See also the *2008 SNA* (paragraphs 17.274–282) and *BPM6* (paragraphs 11.59–65).

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, any deviation of the underlying index from the originally expected path is treated as holding gains or losses (valuation changes) which will not normally cancel out over the life of the instrument. In this case, interest accruals may 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.

5.59. Financial instruments with both the amount to be paid at maturity and interest payments indexed to 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 that apply to foreign currency denominated instruments.<sup>24</sup> Interest should accrue throughout the period using the foreign currency as the currency of denomination and converted into the domestic currency using mid-point 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).

#### **Compilation of data on valuation changes (revaluations)**

5.60. The *revaluation account*, as specified in the 2008 SNA, is used to show the holding gains or losses (valuation changes). ***A holding gain occurs whenever an asset increases in value or a liability decreases in value; a holding loss occurs whenever an asset decreases in value or a liability increases in value.***

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

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<sup>24</sup> 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, IMF No.1 and No.2 accounts, and IMF securities account*).

<b>Table 5.4. Valuation Changes by Asset/Liability Category</b>		
<b>Asset or Liability</b>	<b>Price Changes</b>	<b>Exchange Rate Changes</b>
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 and investment fund shares (liabilities)	√ (Financial statistics <sup>1</sup> only)	√ (Financial statistics <sup>1</sup> only)
Insurance, pension and standardized guarantee schemes (assets)	√	√ <sup>2</sup>
Insurance, pension, and standardized guarantee schemes (liabilities)	√	√ <sup>3</sup>
Financial derivatives and employee stock options		
In domestic currency	√	
In foreign currency	√	√
Other accounts receivable/payable		√
Nonfinancial assets	√	
<sup>1</sup> For financial statistics, liabilities in the form of equity are valued at market or fair value		
<sup>2</sup> Applies to components denominated in foreign currency.		

5.62. This *Manual* recommends, in order of preference, the following three alternatives for obtaining data for valuation changes:

- (a) Collect the data directly from the accounting or other recording systems of the FC.
- (b) Derive the data from the horizontal adding-up requirement and the data for the stocks and other flows—that is, using  $VC = CS - OS - T - OCVA$ . Data for  $T$ , as well as for  $OS$ ,  $CS$  and  $OCVA$ , is required.
- (c) Estimate the data for valuation changes using the data for the asset prices and exchanges rates that prevailed during the reporting period.

5.63. Availability of data on valuation changes 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 the monetary and financial statistics. The recommendation is that, to the extent possible, the valuation change data 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 on valuation changes 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.

5.64. 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.<sup>25</sup> 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.

### **Compilation of data on OCVA**

5.65. The OCVA account records the changes in assets and liabilities between opening and closing stocks that are not due to transactions between institutional units nor to valuation changes. Separate entries for the financial flows arising from OCVA should be shown for all categories of assets and liabilities included in the monetary statistics, as described in Chapter 7, and in the financial statistics as described in Chapter 8.

5.66. In the 2008 SNA, the circumstances that result in entries in the OCVA account are grouped into six categories, most of which have several subcategories.<sup>26</sup> The following are the categories and subcategories that are relevant for the 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:

<sup>25</sup> The daily average should be the average of exchange rates for all days of the period.

<sup>26</sup> For more detailed descriptions of OCVA categories see Chapter 12 of the 2008 SNA and subheading “Other flows” in Annex 1 (page 553).

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 that reflect the market values of financial assets should be accounted for in the revaluation account.).

- (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 or confiscated) 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 the 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 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.

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 a government underwrites a standardized guarantee scheme, a provision should be entered in the government 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.<sup>27</sup>

(e) Changes in classifications. This category comprises the following events:

Changes in sector classification and structure. 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.<sup>28</sup> 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.<sup>29</sup> Sectoral reclassifications of FCs should be recorded as

<sup>27</sup> See also *GFSM 2014*, Appendix 4, paragraphs 4.78–4.79.

<sup>28</sup> 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” to “other depository corporations.” 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 arising from changes in economic territory when countries are unified into a single nation or when one country is divided into two or more countries.

<sup>29</sup> When a corporation is absorbed by one or more other corporations, all claims and liabilities between the corporation that is absorbed and those that absorbed it 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 into the OCVA account.

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. 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.

Changes in classification of assets and liabilities. 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, securities may be converted into equity under the conversion options in securities contracts and loans may be reclassified as debt securities, in accordance with the rule 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 monetary authority purchases gold bullion as a reserve asset from counterparty that is not a monetary authority or IFI, 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 with reclassification from nonfinancial to financial assets (valuables to monetary gold) 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 and IFI), 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 *BPM6* paragraph 9.18). The gold price and market exchange rate that prevailed on the date of the gold monetization or demonetization should be used in determining the amounts of the OCVA entries.

<b>Table 5.5 Other Changes in Volume of Assets Asset/Liability Category</b>			
<b>Asset or Liability</b>	<b>Economic appearance of assets, catastrophic losses (assets only), and uncompensated seizures (assets only)</b>	<b>Other changes in volume not elsewhere classified, including provisions<sup>1</sup> and accounting entries</b>	<b>Changes in classification</b>
Monetary gold (central bank asset)			√
SDRs (central bank asset)			
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	√	√	√
<sup>1</sup> In monetary statistics, OCVA entries for provisions are shown in Other accounts payable and in equity liability (as an expense). The entry for nonfinancial assets in this category relates to the corrections in the calculation of consumption of fixed capital.			

5.67. In reference to changes in classifications, the OCVA account is used to record changes in the correct classification of institutional units or assets and liabilities, but not corrections of data that were misclassified in earlier periods. It is important to trace the origins of data misclassification and to correct all current and historical data on stocks and flows.

5.68. Data for some OCVA entries should be available from an FC's accounting records. The OCVA entries for an individual FC discussed in the above paragraphs 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 asset categories.

5.69. Concerning a change in a subsector classification of an FC, several sets of OCVA entries are needed. 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 7.30–32.)

5.70. 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.

5.71. 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 assets when they are created or used.
- (d) Write-offs of loans, securities, or other types of impaired financial assets.

5.72. 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 bullets above 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*.

***OCVA—provisions for loan losses and other loan-related categories***

5.73. The *2008 SNA* framework does not contain accounts for provisions for losses on loans and other 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 nonperforming loans which 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 and is treated as the precursor of a loan (or other asset) write-off and, like loan write-offs, is treated as an OCVA.<sup>30</sup> Major categories of loan-related OCVA arise from loan impairments or bad debt losses—that is, potential or actual losses arising from the inability of a FC to collect all amounts due (principal and interest) according to the contractual terms of the loans. OCVA entries and contra-entries for these categories are:

- (a) Provisions for loan losses. 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—other*). The OCVA contra-entry is an expense in the profit or loss accounts (current year result) resulting in a decrease in the liability account for *Equity and investment fund shares*.<sup>31</sup>
- (b) Loan loss write-offs. A loan write-off is shown as an OCVA reduction in the outstanding amount of loans to the economic sector that includes the debtor in default. The OCVA contra-entry is a reduction in *Provisions for loan losses* within *Other accounts payable—other*. If the full amount of the loan write-off has been provisioned, the negative OCVA entry for the reduction in the amount of loans (an asset account) 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 loan, or the provision for loss may have been insufficient to cover the entire amount of the loan loss that is written off. In such instances, all or part of the OCVA contra-entry is posted as a reduction in *Equity and investment fund shares* reflecting the recording of an expense in the profit or loss account (current year result) or the reduction in *General and special reserves* within the liability category of equity.<sup>32</sup>
- (c) Reversal of provisions for loan losses. Loan recoveries—that is, unexpected repayment of impaired loans—sometimes occur prior to loan write-off. Whereas the repayment is recorded as a transaction (an increase in currency or other financial asset and a reduction in loans), an OCVA entry in the amount of the loan recovery is also made to reverse the earlier provisioning for loan loss, and an OCVA contra-entry is posted as an increase in *Equity and investment fund shares* (which is channeled through revenue in the profit or loss accounts to reverse the previous expense that was posted when the provision for loss

<sup>30</sup> The provision is entered as an OCVA in the provision account with a corresponding OCVA contra-entry in expenses within the profit or loss accounts. Write-off of the loan results in OCVA entries in the loan account and the provision account, thereby eliminating the loan and the provision for loan losses, as posted earlier, from the balance sheet.

<sup>31</sup> The positive entry in provisions for loan losses and negative entry in equity and investment fund shares preserve the adding-up requirement for the OCVA column (see the stock and flow illustration in Table 5.2).

<sup>32</sup> The permissibility of using special and general reserves to absorb all or part of the loan write-off would depend on the national accounting standard, 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.

was made). The recovery may be the full amount or only part of the principal and interest. In exceptional cases, loan repayment may occur after the loan write-off. If this is the case, the loan recovery is recorded as a transaction and the amount of the recovery is posted to revenue, thereby reversing the earlier entry of an expense in the amount of the loan write-off, and a contra-entry is made for the cash or other form of payment from the defaulted borrower.

### III. ACCOUNTING RULES

5.74. This section discusses the accounting rules for monetary and financial statistics. Time of recording and the treatment of transactions costs and financial service fees are first presented. Then general valuation principles are discussed, followed by a detailed discussion on the valuation of stocks and flows for each type of financial asset. The final two subsections present the recording of debt reorganizations and the principles of aggregation, netting and consolidation.

#### A. Time of Recording

##### Recording on an accrual basis

5.75. Accrual recording is used in this *Manual* as well as in other major macroeconomic statistical systems. ***Accrual accounting records flows and stocks at the time economic value is created, transformed, exchanged, transferred, or extinguished.*** This means that flows and stocks are recorded when a change of economic ownership 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 simultaneously.

5.76. The change of economic ownership is central in determining the time of recording on an accrual basis for transactions in financial assets. The term “economic ownership” reflects what macroeconomic statistics are attempting to measure. Economic ownership takes account of the risks and rewards of ownership. A change in ownership from an economic point of view means that all risks, rewards, and rights and responsibilities of ownership in practice are transferred.

5.77. In general, a change in “legal ownership” also involves a change in economic ownership. In some cases, a change of “economic ownership” takes place even though the “legal ownership” remains unchanged (e.g., financial leases). In other cases, there is no change in economic ownership, even though there is a change in legal ownership. For example, for repurchase agreements involving the provision of securities for cash, the risks and rewards attached to the securities remain with the original holder and the only transaction is a loan. Similarly, in the case of securities lending without cash collateral, there is no change in ownership of the securities.

5.78. In practice, it is not always possible to determine the exact time when the economic ownership has changed, leading the parties to record the 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 of the parties. (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 statistical sources,

compilers may wish to consider the advantage of using data for which the correct timing is recorded. 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 accounting. For deriving interest accrual, the data on positions and contractual interest rates can be used. Adjustments may be needed so that the same transaction date is applied to the data for both parties.

5.79. Accrual recording requires that accrued interest on deposits, loans, and debt securities should be included in the outstanding amount of the financial asset or liability, and not as part of other accounts receivable/payable.

5.80. 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 that represents 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**

5.81. 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).

5.82. In this *Manual*, the transaction (trade date) 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.<sup>33</sup>

5.83. 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; and
- (c) On a reimbursement basis after the borrower has already paid the suppliers—to be recorded when the lender makes reimbursements to the borrower.

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<sup>33</sup> A loan agreement may stipulate that an  $N$ -period loan has a principal amount,  $A (= A_1 + A_2 + \dots + A_{N-1})$ , 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  $A_2, \dots, A_{N-1}$  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*.

5.84. If settlement of a financial transaction occurs after the ownership has changed, this gives rise to accounts receivable/payable. In practice, and the trend towards real-time settlement, the time of settlement is an acceptable proxy for change in ownership, and accounts receivable/payable would not arise. In cases of longer delays, accounts receivable/payable should be identified.

5.85. 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.

5.86. This *Manual* recommends adjustment on a transaction-date basis for transactions that are to be 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. The adjustments are needed for transactions (1) for which the transaction and settlement dates are in different reporting periods, (2) for which accounting records are readily available from the settlement date accounting, and (3) do not require contra-entry adjustments in the profit or loss accounts. 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 IT system.

## **B. Transaction Costs and Financial Service Fees**

### **General principles**

5.87. Transactions in financial assets and liabilities are recorded at the prices at which they were bought and sold and should be recorded exclusive of any transaction costs. This is because both debtors and creditors should record the same amount for the same transaction. Transactions for which payment is to be made in the form of financial assets, goods, or services should be valued at market prices. 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.

5.88. 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. Specific guidance is provided ahead on the treatment of the transaction costs embedded in the bid-ask spreads.

5.89. Explicit commissions, service charges, and fees that buyers and sellers pay as transaction costs are revenue for financial services provided by FCs and are classified as financial service fees. Taxes and similar payments are transfers. Transaction costs are excluded from the valuation of financial transactions, as well as from the valuation of stocks, and are classified as a service or transfer expense/income for the period in which the financial asset is acquired/provided.

5.90. When national financial reporting standards stipulate that some or all types of transaction costs are to be included in the amounts of asset purchases or sales, the explicit and implicit charges would need to be excluded.

### **Bid and ask prices**

5.91. Transactions are to be recorded at the prices at which financial assets are bought and sold, but excluding transaction costs. Transactions data should, therefore, be adjusted to take account of the transactions 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 service expense/income (see *2008 SNA*, paragraph 17.259). This *Manual*, consistent with the *2008 SNA* and other major statistical manuals, recommends that subsequent revaluation of the securities should be based on the mid-price.

5.92. Purchases of foreign currency are also recorded at the mid-price (exchange rate) with the revaluation of the foreign currency at the end of the reporting period also based on the midpoint of the bid-ask spread for the exchange rate. The mid-point exchange rate is used as a numeraire for the translation of all foreign-currency-denominated assets (including foreign currency itself) and foreign-currency-denominated liabilities into domestic currency units.

## **C. Valuation of Financial Assets and Liabilities**

5.93. This subsection discusses the valuation principles of financial assets and liabilities. The general valuation principles are first presented, followed by a detailed discussion on the valuation of stocks and flows for each type of financial asset. Annexes to this chapter provide numerical examples.

### **General principles**

5.94. The valuation principle in this *Manual* is that of market prices for valuing financial assets and liabilities, and nominal values for recording deposits and loans. These valuation principles are consistent with the *2008 SNA* and other major statistical manuals. The valuation of the liability account for equity at book value, however, is a feature of monetary and financial

statistics and, although it does not appear as a preferred valuation method in the 2008 SNA, it is consistent with the valuation approach called *own funds at book value* (see paragraph 5.155e below and 2008 SNA, paragraph 13.71). All these valuation principles are explained in the remainder of this section.

### ***Market prices***

5.95. Valuation of financial assets and liabilities stock positions (and transactions) at market prices is a key principle underlying monetary and financial statistics. ***The market price is that at which financial assets are acquired or disposed of, between willing parties, on the basis of commercial considerations only, excluding commissions, fees and taxes.*** In determining market values, trading parties also take account of accrued interest.

5.96. Stock positions of financial assets and liabilities should be valued 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.

5.97. In the reported data, the valuation of financial assets and liabilities may be based on commercial, supervisory, tax, or other accounting standards that do not fully reflect the market prices of the assets and liabilities. 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.

### ***Fair values***

5.98. ***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. Fair values can be used in most situations in which market-price data are unavailable such as for valuing financial assets and liabilities that are not traded in financial markets or are traded infrequently.

5.99. 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 non-traded or infrequently traded financial assets and liabilities that are being valued; or
- (b) Absolute valuation: Discounted present values of future cash flows.

5.100. Relative valuation involves estimating fair value of non-traded financial assets and liabilities using the market price of a similar but market-traded financial instrument. For example, the fair-value price of a non-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 non-traded instruments. For example, the fair value of unlisted equity shares may be based on the market price of equity shares in 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 non-traded and traded shares.

5.101. In some cases, the financial asset or liability may possess some characteristics of each of several other 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 can be used in estimating the fair value of the non-traded instrument.

5.102. 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. The fair value of a financial asset or liability is calculated as the sum of the present values 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  $(\text{Cash flow})_t$  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.

5.103. 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 or series of discount rates can be estimated. 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.

5.104. In this *Manual*, the recommendation for the 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 durations that are similar to, but with risk (such as, credit, liquidity risk, etc.) that is lower than the securities to be valued. This *Manual* recommends that the yield on the actively traded securities is used as the discount rate, without adding a risk premium, unless evidence is available to substantiate the estimate of a risk premium. The discount rates used are the relevant market interest rates. The need to apply fair value methods should not arise, given that market price quotations are usually available for securities traded in international markets.



5.105. 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, apply time-variant discount rates to the future cash flows—that is, by using:

$$\text{Present value} = \sum_{t=1}^N \frac{(\text{cash flow}_t)}{(1 + i_t)^t},$$

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,  $i_t$  ( $t = 1, 2, \dots, N$ ), in the present value formula. The forward rates 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 (see paragraph 5.102) 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.

### ***Instruments denominated in foreign currency***

5.106. 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. 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 so that any service charge is excluded.

5.107. 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.<sup>34</sup> 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.

5.108. 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*,<sup>35</sup> the data should be adjusted to a market rate basis, to the 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 so as 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.

<sup>34</sup> Rate quotations for weekend days and holidays should be the exchange rates that prevailed at the close of the closest preceding business day.

<sup>35</sup> Official multiple exchange rate systems are schedules of official exchange rates used to apply separate exchange rates to various categories of transactions and/or transactors.

### ***Other valuations***

5.109. It is important to clearly distinguish between various valuation terms used in this *Manual* and other major statistical manuals. *Market values*, *fair values* (explained above), *nominal values*, and *book values* should be distinguished from such notions as *amortized values*, *face values*, and *historic cost* as explained below.

- (a) Nominal value refers to the outstanding amount the debtor owes to the creditor, which comprises the outstanding principal amount including any accrued interest. Thus, the nominal value reflects the sum of funds originally advanced, plus any subsequent advances, plus any interest that has accrued, less any repayments (which includes any payments covering interest accrual). For debt instruments indexed to a “narrow” index, the nominal value can also include holding gains and losses arising from movements in the index. 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 a financial asset may deviate from its market value due to revaluations arising from market price changes.
- (b) Amortized value reflects the process of gradual elimination of the liability by regular payments over a specified period of time. It comprises the amount at which the financial asset or liability was measured at initial recognition minus the principal repayments.<sup>36</sup> 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 maturity. It is also known as “par value” or simply “par.” Before maturity, the market value of a debt security may be greater or less 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.
- (d) Book value in business accounts generally refers to the value recorded in the enterprise’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 denote the valuation method for the components of the liability account for equity and investment fund shares.
- (e) Historic cost reflects the cost at the time of acquisition and sometimes it also may reflect occasional revaluations.

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<sup>36</sup> Amortized value described here is different from the concept of valuation at amortized cost described in IFRSs in that the IFRSs uses the effective interest method to amortize and does take into account the impairment and non-collectability of an asset.

**Valuation and recording of stock positions by asset classification**

5.110. This section reviews the valuation of financial instruments. The asset and liability categories and the FCs that hold the assets or issue the liabilities are shown in Table 5.6. Specific compilation issues are covered in the separate subsections for asset and liability categories to which these issues pertain.

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**Table 5.6. Assets and Liabilities of Financial Corporations**

<b>Table 5.6. Assets and Liabilities of Financial Corporations</b>		
	<b>Balance Sheet</b>	
<b>Asset and Liability Categories</b>	<b>Assets</b>	<b>Liabilities</b>
Monetary gold and SDRs Monetary gold SDRs	Central bank Central bank	Central bank <sup>1</sup>
Currency Domestic currency Foreign currency	FCs FCs	Central bank
Deposits Transferable deposits Other deposits	FCs FCs	DCs <sup>2</sup> DCs and other financial intermediaries except insurance corporations and pension funds <sup>3</sup>
Debt securities	FCs	FCs
Loans	DCs, other financial intermediaries except insurance corporations and pension funds; and captive financial institutions and money lenders <sup>4</sup>	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    Pension funds FCs	Nonlife insurance corporations Life insurance corporations Pension funds Pension funds FCs
Financial derivatives and employee stock options Financial derivatives Employee stock options	FCs  FCs	FCs FCs
Other accounts receivable/payable	FCs	FCs
Nonfinancial assets	FCs	Not applicable
<sup>1</sup> Refers to the SDR allocation. <sup>2</sup> May also include other financial intermediaries that accept transferable deposits from DCs, central government, and/or nonresidents, but do not accept deposits included in the definition of broad money. <sup>3</sup> 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. <sup>4</sup> In addition, life insurance corporations often extend policy loans. Other insurance corporations, pension funds, and financial auxiliaries also may extend relatively small amounts of loans that are incidental to their operations. Non-interest bearing claims of these FCs should be classified as other accounts receivable.		

### ***Monetary gold (central bank only)***

5.111. Both monetary and nonmonetary gold (nonfinancial asset) should be valued on the basis of the market price of gold, and the revaluation account 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 mid-point between the bid-offer prices<sup>37</sup> 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 US 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.

5.112. Valuation of monetary gold at prices other than market prices or revaluation at less than monthly frequency is the national practice in some countries. 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. Further, if for any reason monetary gold is not valued at market prices in monetary statistics, supplementary data on the physical quantity of monetary gold, including gold held in allocated gold accounts and unallocated gold accounts with non-residents that give title to claim the delivery of gold, should be disseminated.

### ***SDRs (central bank only)***

5.113. SDR holdings of a central bank and SDR allocations received are denominated in SDRs, a unit of account as well as the designation for this financial asset, which was 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; see [www.imf.org](http://www.imf.org)) by summing the U.S. dollar value, based on market exchange rates, of a basket of four currencies (the euro, Japanese yen, pound sterling, and U.S. dollar).

5.114. SDRs are considered to be foreign currency in all cases, including for the economies that issue the currencies in the SDR basket. Other currency units issued by an international organization, except in the context of a currency union, are considered foreign currency.

5.115. 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

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<sup>37</sup> 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.

market exchange rate that prevailed between the domestic currency and the U.S. dollar at the end of the reporting period or on the date of the transaction.<sup>38</sup>

5.116. 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.

### ***Domestic currency***

5.117. Domestic currency holdings of FCs are valued at nominal value (which is also the face value in this case); therefore, valuation changes are not applicable.

### ***Foreign currency***

5.118. 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. (See also paragraph 5.22.)

### ***Deposits***

5.119. 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 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 useful because it shows actual legal liability.

5.120. Stock positions in foreign-currency-denominated deposits are converted to domestic currency units as described in paragraph 5.106.<sup>39</sup>

### ***Debt securities***

5.121. Debt securities are valued at market prices or fair values. Securities denominated in foreign currency are recorded at market or fair values expressed in foreign currency and should be converted to domestic currency units as explained in paragraph 5.106. In the accounting systems in many countries, some or all debt securities are valued at nominal value rather than at market or fair value. Nominal value is, therefore, encouraged as a memorandum item for debt security liabilities.

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<sup>38</sup> 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 and that is realigned with market exchange rates on an infrequent basis.

<sup>39</sup> Stock and flow data for the IMF No. 1 and No. 2 Accounts (and securities substituted for No. 1 Account obligations) are provided to central banks by the IMF's Finance Department and, upon request, by the IMF's Statistics Department, as well as are posted monthly on the Internet (see [www.imf.org](http://www.imf.org)). These data should be reconciled with the accounting records of the central bank.

5.122. In the IFRSs, all debt securities 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.<sup>40</sup> 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 IAS 39.47).]

5.123. For the monetary and financial statistics, assets and liabilities in the form of debt securities (other than short-term) not valued at market price, need to be restated at market price or fair value. It is recommended that the amount of the difference as a result of the restated value of the securities be recorded in valuation adjustment within equity. From the compilation perspective, 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.

5.124. 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).

5.125. To support the compilation of monetary and financial statistics, compilers in some economies have introduced the reporting of data on securities on a security-by-security basis. Box 5.2 presents the details of security-by-security systems.

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<sup>40</sup> Effective interest rates used for different approaches to measure interest for debt securities are discussed in the subsection *Accrued interest calculations* in this chapter.

### Box 5.2. Security-by-security Data Collection

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 reporting FCs to report statistical data on securities on a security-by-security basis.

Security-by-security 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 security-by-security 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),<sup>41</sup> 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 security-by-security 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 European Central Bank's Centralized Securities Database (CSDB), which contains all securities with an ISIN code and relevant attributes. Reporting institutions using the security-by-security 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 Centralized Securities Database in Brief*, available on the ECB's website at <http://www.ecb.europa.eu>).

The development of a security-by-security 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 security-by-security 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 security-by-security 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 a security-by-security 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.

<sup>41</sup> ISIN code is an International Securities Identification Number (ISIN) that uniquely identifies a security.



### *Impaired securities*

5.126. Debt securities are deemed to be impaired if the creditor has reliable information that the debtor may renege on the obligation to pay the interest and principal in accordance with the schedule of future cash flows for the securities.<sup>42</sup> The statistical treatment for impaired securities depends on whether a market price exists. If a market price exists, this is the value to be recorded for the impaired security. If a market price is not available, a fair value should be estimated.

5.127. Valuation of impaired securities by the present value method is complicated because of uncertainties involved. In some cases, OTC price quotations may be available, if a market exists for the purchase of impaired securities at prices that are heavily discounted from their pre-impairment prices. The future cash flow(s) must be estimated, even though the cash flows are highly uncertain with respect to both amount and timing. The discount rate for computing the fair value of the impaired securities is, in principle, a measure of the risk-adjusted rate. Although subjectivity and imprecision are inherent to estimation of the fair value of impaired securities, the present value method should be applied in such a way to avoid creditor overstatement of fair value. The difference between the pre- and post-impairment values represents a holding loss on the securities, which is a valuation change.

### *Memorandum items for debt securities*

5.128. 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 financial corporations and debt securities liabilities held by nonresident financial corporation; 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 a useful measure of value from the viewpoint of the debtor, because at any moment, it is the amount that the debtor owes to the creditors.

## **Loans**

### *General principles*

5.129. Loans are held 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 outstanding amount of the loan inclusive of accrued interest. In other words, the nominal value of a loan is the amount of the

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<sup>42</sup> 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.”]

creditor's outstanding claim (equal to the debtor's obligation), which comprises the outstanding principal amount including any accrued interest (i.e., interest accrued but not yet paid).

5.130. Like deposits, the use of nominal values is influenced by pragmatic concerns about data availability and the need to maintain symmetry between debtors and creditors. For loans also, without an active market, estimating a market price can be subjective. Further, nominal value of the loan is useful because it shows legal liability and the starting point of creditor recovery behavior. It is recognized that nominal value provides an incomplete view of the financial position, particularly when the loans are nonperforming. It is recommended that data on expected loan losses (disaggregated by debtor sector) are 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 5.141.)

5.131. For domestic-currency-denominated loans, valuation changes arise in the exceptional cases of debt refinancing and debt swaps (e.g., for debt for equity swaps (see *2008 SNA*, paragraph 22.115, and *BPM6*, paragraphs A2.29–A2.30)). A valuation change 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 a valuation change 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 section *Recording of Debt Reorganizations* and *BPM6* Appendix 2). The same principles apply for valuation changes that are recorded for debt securities prior to securities refinancing or debt swap.

5.132. Loans denominated in foreign currency are recorded at nominal value and are converted to domestic currency units as described in paragraph 5.106.

5.133. The entire loan portfolio is to be valued at nominal value in presenting the loan data in the sectoral balance sheets described in Chapter 7. In particular, loans outstanding are not adjusted for provisions for loan losses. A loan portfolio is adjusted downward as a result of valuation change only when: (1) loans are written off as uncollectible, or (2) when the outstanding amount of a loan has been reduced through formal debt reorganization.

5.134. 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 or fair values in the same way as other types of debt securities.

5.135. Box 5.3 further elaborates on statistical treatment of different types of loans.

### Box 5.3. 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.<sup>1</sup>

A *loan participation* (described in Chapter 4) should be recorded at the nominal value of the FC'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 and, if denominated in foreign currency, is converted into domestic currency units at the market exchange rate that prevailed at the end of the reporting period.

*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 leasing* 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 finance lease payments are treated as *interest payments and principal repayments* (see paragraph 5.38).

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 lease asset is acquired directly from the manufacturer or some other seller and is conveyed to the lessee, without having been recorded as a nonfinancial asset in the lessor's accounts. The lessor shows a reduction in cash or deposits (or an increase in other accounts payable), arising from the purchase of the asset at the time of the lease.
- *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.<sup>2</sup>

Financial leases that become impaired or uncollectible are treated in the same way as impaired loans. 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 *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<sup>3</sup> 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.

<sup>1</sup> Explanation and examples can be found in the *External Debt Statistics Guide for Compilers and Users (2013)*.

<sup>2</sup> 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.

<sup>3</sup> This mechanism is the same as the provision of repayable margin for financial derivative contracts.

### *Nonperforming loans and interest arrears*

5.136. Nonperforming loans (defined in paragraph 4.112) indicate potential losses and may result in actual losses for the FC. The recommendation is that nonperforming loans should continue to be recorded at nominal value and entries in the amount of the provisions for loan losses are included in *Other accounts payable – other*. (See also paragraphs 2.63 and 4.204.)

5.137. Interest should be shown accruing until a nonperforming loan is repaid or the principal is written off, even if interest arrears are being accumulated. An interest arrear—that is, interest overdue for payment—is already included in the relevant asset or liability category in the sectoral balance sheet described in Chapter 7, as the interest should have been recorded on an accrual basis. In other words, the interest shifts from being an accrual to an arrear at the time that

it changes from an amount earned but not yet due (that is, accrued) to an amount overdue (that is, in arrears).

5.138. Interest arrears data should be reported in the memorandum items that accompany the sectoral balance sheets. Interest arrears accumulated during a reporting period are included in the outstanding amount of the loan, and are also included in income for the period. In recognition that the interest may not be paid in the future, an additional provision for expected loss in the amount of interest arrears could be made and reported in *Other accounts payable-other*. The income entry for interest arrears is offset by the expense entry for the provision for expected loss.

5.139. Depending on the national financial reporting standards and supervisory regulations 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.<sup>43</sup>

#### *Memorandum items for loans*

5.141. This *Manual* recommends including the following loan-related stock and flow 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 financial corporations and loans received from them.

5.142. Data on interest and principal arrears should include all overdue payments that are past due by 90 days or more, as per the definition of nonperforming loans. For some FCs, interest and principal arrears are likely to arise mainly from their loans to nonfinancial corporations and/or to households. It is recommended that FCs report interest and principal arrears on loan assets disaggregated by borrowing sector.

5.143. 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 for losses on loans that are identifiable as nonperforming. *General provisions* are provisions for losses that are expected to arise within a portfolio of loans, even though the individual loans that will become uncollectible cannot be

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<sup>43</sup> For example, a country may have interest and principal arrears on IMF loans that are recorded as liabilities of the central bank, which may be designated as the fiscal agent in a member country's relationship with the IMF.

identified and covered by specific provisions.<sup>44</sup> To be directly useful in estimating expected loan losses, the data for general provisions, as well as for specific provisions, for loan losses must be disaggregated by economic sector of the debtor.

5.144. In cases when accounting data on provisions do not reasonably reflect the total expected losses on nonperforming loans, compilers of monetary statistics should attempt to report in memorandum items a more accurate measure of expected loan losses, as discussed below.

5.145. 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.

5.146. 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 discount rate to be used in calculating the present value of expected cash flow is the *original yield to maturity* on the loan.<sup>45</sup> If that loan has a variable interest rate, the discount rate for measuring the recoverable amount should be the *current yield to maturity*.<sup>46</sup> The estimated cash flows from secured loans should be based on the expected net proceeds from the sale of the assets used as collateral;<sup>47</sup> 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. These principles for the measurement of the recoverable amount for impaired assets are consistent with [IAS 39.63–65.]

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<sup>44</sup> The calculation of general provisions is based on national practice, 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.

<sup>45</sup> The original yield to maturity is *original effective interest rate* in IAS terminology.

<sup>46</sup> The current yield to maturity is *current effective interest rate* (current yield to maturity) 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.

<sup>47</sup> See [IAS 39, AG84] for more information on estimating cash flows for collateralized loans.

5.147. Valuation is relatively straightforward for deposits and frequently traded debt securities used as collateral that are acquired through loan foreclosure or other legal means. Typically less precise estimates of value can be made for nonfinancial assets such as commercial or residential real estate, automobiles, specialized machinery or other equipment, or inventory provided as collateral.

5.148. Realizable values (sometimes used as a substitute for fair values) of loans are compiled by deducting expected loan losses (reported in the memorandum items) from the nominal values of the outstanding loans, as recorded on the balance sheet. The data for both outstanding loans and expected loan losses need to be disaggregated by economic sector so that the realizable value of loans to each sector can be derived.

### ***Equity and investment fund shares***

#### *General principles*

5.149. Consistent with the 2008 SNA, equity and investment fund shares—whether held as assets or issued as liabilities<sup>48</sup>—are recorded at market or fair values in the financial statistics described in Chapter 8. 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 the monetary statistics described in Chapter 7, equity and investment fund shares held as assets are recorded at market or fair values, and, equity issued as liabilities are recorded at the book value of the components of equity—funds contributed by owners, retained earnings, current year result, general and special reserves, and valuation adjustment.

5.151. Corporations sometimes purchase or buy back their own shares from shareholders. In the 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 the monetary statistics, reacquired shares (called *treasury shares*) should be deducted from *Funds contributed by owners* within the liability account for equity, and no gain or loss should be recognized on the sale, issuance, or cancellation of treasury shares.<sup>49</sup> This means that the recording of the reacquired shares as a transaction should be done based on the book value of shares with contra entries recorded as a reduction in currency or deposit holdings and a reduction (by the amount of the difference between the transaction and book values of the reacquired shares) in one of the other (than *Funds contributed by owners*) components of equity in accordance with national financial reporting standards.

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<sup>48</sup> *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.

<sup>49</sup> This treatment is consistent with IAS 32.33 and IAS 32.AG36 and national financial reporting standards in many countries.

5.152. Equity and investment fund shares 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 5.106.<sup>50</sup>

*Listed shares, unlisted shares, and other equity*

5.153. 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.

5.154. 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 over-the-counter shares.<sup>51</sup> 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.

5.155. Fair values need to be estimated for non-traded and infrequently traded shares, which collectively are referred to as unlisted or unquoted shares. 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 of a recent transaction price. The following six alternative methods for approximating the market value of unlisted shares are distinguished (see *2008 SNA*, paragraphs 13.69–74 and *BPM6*, paragraphs 7.15–19):

- (a) Recent transaction price. Recent prices of unlisted shares at which they were traded within the past year may be used. 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).<sup>52</sup> 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 (within the past year).
- (c) Present value/price to earnings ratios. The present value of unlisted equity can be estimated by discounting the forecast 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

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<sup>50</sup> With few exceptions, shares are denominated in the domestic currency of the issuer.

<sup>51</sup> For example, daily price quotation are available for shares sold on the New York Stock Exchange, as well as for those sold in over-the-counter markets such as the Nasdaq.

<sup>52</sup> Use of net asset value (NAV) for the valuation of the shares of open-end investment pools is covered in this chapter.



appropriate where there is a paucity of balance sheet information but earnings data are more readily available.<sup>53</sup>

- (d) Market capitalization method. 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.<sup>54</sup> Alternately, 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) Own funds at book value. 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 liabilities in monetary statistics (see paragraph 5.94 and paragraphs 5.168–5.169).
- (f) Apportioning global value. 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.)

5.156. In cases where none of the above methods or a combination of MCM and PVA<sup>55</sup> is feasible, less suitable 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.

<sup>53</sup> The dividend discount model (DDM) 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. 565–76.

<sup>54</sup> An equivalent statement of the market capitalization formula (unadjusted for relative liquidity of the shares) is:

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

where *MV of Corporation B* is its market value, calculated as the quoted price per share *times* the total number of outstanding shares, and *BV of Corporation A* and *BV of Corporation B* denote the total book values of the funds contributed by the owners of each corporation, respectively.

<sup>55</sup> 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.

5.157. 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 “capital contributions”), share premiums, 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.

5.158. 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.

5.159. *Other equity* covers equity in any corporation or quasi-corporation that is not in the form of securities (see paragraph 4.141–4.143). Other equity should be valued using the NAV method.

#### *Depository receipts*

5.160. 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 DC arranging the issue has acquired the underlying instruments in the custodial account. To avoid double counting, the DC 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.

5.161. 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. 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.

*Investment fund shares or units*

5.162. Shares (or units) in money market funds (MMFs) or in other investment funds should be valued in a manner similar to equity. Holdings of listed shares should be valued using the market price of the share, and unlisted shares should be valued according to one of the methods described above for unlisted equity.

5.163. Shares in a closed-end investment fund are valued at market prices that are established through trading of the fixed number of shares that constitute the total equity of the fund. Closed-end investment fund shares usually are actively traded in OTC markets, and market price quotation are obtainable from current sources.<sup>56</sup> 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, and 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.

5.164. 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.

5.165. 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. The market value of the fund's asset portfolio is determined by the market value (or fair value) of the bonds, equity shares, and other assets in the portfolio. Investment funds' asset portfolios normally 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 (often including pension funds, insurance corporations, and other types of FCs) 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.

5.166. 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

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<sup>56</sup> For example, Morningstar, Inc. offers comprehensive analysis and pricing information for more than 10,000 open-end and closed-end funds.

accordance with the general principle that transaction costs are to be excluded from the outstanding amount of the financial asset.

5.167. Changes in value of an investor's equity holding in a MMF are usually reflected by variation in the number of shares held, rather than through changes in the price per share. 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.

*Equity—liability account for monetary statistics*

5.168. For monetary statistics, data should be reported on the separate components of equity on the liability side of the balance sheets of FCs, as discussed in Chapter 4 (paragraphs 4.145–4.146). Even though equity shares can be valued at market prices or fair values, this approach is not possible for valuing all individual components of equity as presented in monetary statistics, given that no method exists for market valuation of funds contributed by owners, retained earnings, and general and special reserves. Therefore, this *Manual* recommends using the following valuation principles for the components of equity on the liability side of the sectoral balance sheets described in Chapter 7.

5.169. Stock positions for *funds contributed by owners, retained earnings, and general and special reserves* are to be recorded at book value, consistent with the valuation method *own funds at book value*. The stock data for *valuation adjustment* represent the accumulation of all valuation changes recorded directly in equity (which excludes those posted as gains or losses in the profit or loss accounts). The *current year result* represents the accumulation of the current profit or loss.

*Memorandum items for shares—liability account for the monetary statistics*

5.170. This *Manual* recommends including the total market value of a FC's shares (liability side) in memorandum items classified by holding sector if possible, for example, by the use of share registers. Reporting the market valuation of shares on the liabilities 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 held that have been issued by nonresident financial corporations and equity liabilities held by nonresident financial corporation.

***Insurance, pension and standardized guarantee schemes***

*General principles*

5.171. The liabilities of insurance, pension and standardized guarantee schemes and their counterpart assets should be valued in principle at market value. The specific methods of valuing these liabilities are described ahead. Reinsurance should be treated in the same way as direct insurance, in accordance with the valuation rules for respective financial assets, such as deposits,

loans, securities, etc., as already set forth in this chapter. Although under the IFRS 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.

5.172. 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. Measurement of life insurance and pension plan benefits both involve assumptions of an actuarial nature. Most insurance corporations have in-house actuarial capabilities for the estimation of life insurance entitlements. It is recommended that pension funds should be encouraged to involve a qualified actuary in the measurement of the post-employment benefits.

5.173. In some countries, expected post-pension obligations are revalued on a relatively infrequent basis (e.g., every three years or even less frequently). The recommendation is that revaluation should occur at least quarterly, including for life insurance entitlements.

5.174. When the reserves for insurance and standardized guarantee schemes are denominated in domestic currency, there are generally no nominal holding gains and losses just as there are none for currency or deposits and loans. 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.

#### *Nonlife insurance technical reserves*

5.175. 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. This *Manual* recommends that 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 are paid for short-term insurance coverage, often on a semi-annual basis but sometimes monthly, quarterly, or annually. Consideration should be given to discounting the value of the prepayments relevant flows only if the premium prepayment applies to coverage for several years.

5.176. 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).

5.177. Reserves to meet outstanding nonlife insurance claims should be recorded as 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.

### *Life insurance and annuities entitlements*

5.178. Life insurance and annuities entitlements represent the financial claims policyholders have against a corporation offering life insurance or providing annuities.<sup>57</sup> The amount to be recorded in the balance sheet for life insurance and annuities entitlement is similar to that for nonlife insurance technical reserves in that it represents reserves sufficient to meet all future claims. In the case of life insurance, the level of the reserves is considerable.

5.179. Life insurance and annuities entitlements should be recorded in the amount of the net present value of all expected future claims of holders of life insurance (excluding term life insurance) policies and annuities, based on actuarial techniques that are standard for life insurance corporations. Adjustment of data to a net-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.

5.180. This *Manual* recommends that 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.

5.181. 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.<sup>58</sup>

### *Pension entitlements*

5.182. The amounts recorded for pension entitlements depend on the type of pension scheme—one when 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 scheme). For both types of schemes, pension entitlements of the participants are recorded as they build up.

5.183. 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 of 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 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; benefit levels and future salary.

<sup>57</sup> See also Part 1 of Chapter 17 in the 2008 SNA, for the recording of annuities.

<sup>58</sup> See, paragraph 12.59, 2008 SNA.

5.184. 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.

5.185. 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 future beneficiaries.

5.186. This *Manual* recommends that, if feasible, pension entitlements should be recorded in the full amount of the present value of estimated pension obligation. 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.

5.187. Special consideration is given to corporations for whom additions to pension entitlements with an accompanying contra-entry in profit or loss 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.

#### *Claims of pension funds on pension manager*

5.188. When the pension manager is a unit different from the administrator (see paragraphs 4.158–159), 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. The difference is payable to the pension manager of the scheme.

#### *Provisions for calls under standardized guarantees*

5.189. Provisions for calls under standardized guarantees consist of prepayments of net fees and provisions to meet outstanding calls under standardized guarantees. 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***

#### *General principles*

5.190. 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.

5.191. For a more thorough coverage of the pricing approaches for financial derivatives, including different pricing models, please consult 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.

5.192. 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 normally have, at inception, zero value if the instrument is a forward and 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 (i.e., no income arises from settlements of financial derivatives);
- (e) record, in the sectoral balance sheets, stock positions in financial derivatives at market or fair values.

5.193. Based on the above principles, financial derivatives (both exchange-traded and OTC) and employee stock options 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.<sup>59</sup>

5.194. Positions of the same type of financial derivative held as both a financial asset and a liability are presented gross, so that assets are recorded under assets, and liabilities are recorded under liabilities. 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.

5.195. Some options and forwards operate with margin payments, such as futures, where profits or losses are settled daily; in these cases there will not be any entries at the end of each day in the balance sheets as the value of financial derivatives will be zero.

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<sup>59</sup> 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.



5.196. 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.<sup>60</sup>

5.197. 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.

#### *Forward-type contracts*

5.198. A forward-type contract normally has zero value at inception, because the parties exchange risk exposures of equal market value.<sup>61</sup> 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, debtor/creditor relationship will be established. 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.

#### *Options*

5.199. 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.

5.200. The recorded market or fair value at inception of the call or put option equals to 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. Then the option purchaser records the value of the premium

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<sup>60</sup> This treatment does not apply to periodic fees swapped under CDS contracts, as these fees are part of the derivative.

<sup>61</sup> The treatment of forward-type contracts which 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 4.181. The loan component of the off-market swap is valued at nominal value and the derivative component at market or fair value.

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. 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.

5.201. 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. The value of a swap contract is derived from the difference, appropriately discounted, between expected gross receipts and gross payments.

5.202. 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.

*Fair values for non traded or infrequently traded financial derivatives*

5.203. For non-traded or infrequently-traded financial derivatives which are valued at fair values, interest rates used in 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 5.3.

5.204. 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 5.106.

Box 5.4 Compounding and Discounting at Continuously Compounded Rates
Definitions
<p>The <i>future value (FV)</i> of an amount <math>C</math> invested today (<math>T=0</math>) for <math>N</math> years, at a continuously compounded rate <math>R</math>, at time <math>T=N</math> is:</p> $FV = Ce^{RN},$ <p>where <math>e^{RN}</math> is the <i>compounding factor</i>. <math>N = (\text{days until the cash flow})/(\text{days in a year})</math>; for example, <math>N = 0.25</math>, <math>N = 0.37</math>, <math>N = 1</math>, <math>N = 2.31</math>.</p> <p>The <i>present value (PV)</i> today (<math>T=0</math>) of an cash flow <math>C</math> at time <math>T=N</math> discounted at a continuously compounded rate <math>R</math> is:</p> $PV = Ce^{-RN},$ <p>where <math>e^{-RN}</math> (or expressed as <math>1/e^{RN}</math>) is the <i>discounting factor</i>.</p> <p>Conversions between a continuously compounded rate (<math>R_c</math>) and an <math>m</math>-times-per-year-compounded rate (<math>R_m</math>) and vice versa are made using:</p> $R_m = m(e^{R_c/m} - 1) \text{ and } R_c = m \ln[1 + (R_m / m)].$
Examples
<p><b>Combining forward rates in successive periods</b></p> <p>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, <math>R</math>, is <math>0.108 = (0.105 + 0.105 + 0.114)/3</math>. The three-year (<math>N = 3</math>) compounding factor is <math>e^{RN} = e^{(0.108)(3)} = 1.383</math> and the corresponding discounting factors is <math>e^{-RN} = 0.723</math>.</p> <p><b>Present value formulations</b></p> <ul style="list-style-type: none"> <li>• <b>A three-year zero-coupon bond with a face value of 1000</b> <math display="block">PV = Ce^{-RN} = (1000) (0.723) = 723</math> </li> <li>• <b>A three-year 10 percent coupon bond with a face value of 1000 using time-variant discount rates</b> <math display="block">PV = C_1e^{-R_1t_1} + C_2e^{-R_2t_2} + \dots + C_Ne^{-R_Nt_N} = 100e^{-(0.105)(1)} + 100e^{-(0.105)(2)} + 1100e^{-(0.114)(3)} = 965.912</math> </li> </ul>

### Employee stock options (ESOs)

5.205. ESOs are usually non-tradable 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 Black-Scholes model (see Annex 5.3).

5.206. 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 17.388–394). 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 the asset category of financial derivatives in FCs accounts,

because ESOs are assets of households. 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 compensation of employees; any change in value between vesting date and exercise date is treated as a holding gain or 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.

5.207. At the time of granting an ESO, the employer records a liability in ESO, with the contra-entry a decrease in the liability account for *Equity and investment fund shares* reflecting an expense for compensation of employees reducing *Current year results*. 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.

### ***Other accounts receivable/payable***

#### *Trade credit and advances*

5.208. 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).

5.209. Trade credits that offer a discount to the debtor for early payment are recorded at the full value of the goods and services. If payment is made within the discount period, the difference between the value of trade credit receivable/payable and the currency or other type of payment is recorded as a valuation change. If the invoice is not paid in time to qualify for a discount, the full value of the trade credit remains outstanding.

5.210. 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”<sup>62</sup> and the amount of trade credit extended is very large, the conclusion may be that implicitly interest has been 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.<sup>63</sup>

#### *Other accounts receivable/payable—Other*

5.211. Valuation in nominal amounts—that is the amount of principal the debtors are contractually obliged to pay the creditors when the obligation is extinguished—is applied for most subcategories, including, settlement accounts, items in the process of collection, , and most

<sup>62</sup> 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).

<sup>63</sup> See also *GFSM 2014*, paragraph 3.118.

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 contra-entries for valuation changes should be recorded in valuation adjustment within equity. Provisions for expected losses on assets included in *Other accounts payable–other* is valued at book value.

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

### ***Nonfinancial assets***

5.213. Stock positions and flows of financial assets and liabilities of FCs are the primary focus of the monetary and financial statistics. Nonetheless accurate data on nonfinancial assets (as defined in Chapter 8, Annex 8.1, paragraphs 8.101–8.103) are required for completing the stock and flow data in the balance-sheet framework of the monetary statistics. The recommendation is that the valuation of produced and non-produced nonfinancial assets should be at market value on the balance sheet date consistent with SNA principles and taking account of national methods for depreciation of fixed assets.

5.214. In practice, nonfinancial assets held by FCs are reported based on accounting data, as compiled in accordance with the national financial reporting standards. 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. Nonetheless the carrying amount of a nonfinancial asset in the form of fixed assets and intangible assets such as goodwill is defined as the asset acquisition cost *less* the accumulated depreciation.

5.215. If nonfinancial assets are not recorded at market or fair value, the carrying amounts should be compiled and reported for monetary and financial statistics, in accordance with the national financial reporting standards; that is, the data on nonfinancial assets should be reported on a net basis (i.e., gross nonfinancial assets *less* accumulated depreciation).

5.216. 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 the integrated set of macroeconomic accounts of the *2008 SNA*, *net lending/borrowing*—that is, net acquisition of financial assets *minus* net incurrence of liabilities, as shown in the financial account—should equal the balance on *current and capital account*. 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.)

## D. Recording of Debt Reorganizations

5.217. There are four main types of debt reorganization described in the *2008 SNA*: (1) debt forgiveness; (2) debt rescheduling or re-financing; (3) debt conversion and (4) debt assumption.<sup>64</sup>

5.218. 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, mutual cancellation of a creditor's claim and a debtor's obligation, which is recorded as a transaction in the form of a capital transfer from the creditor to the debtor. Debt forgiveness is unlikely to arise between commercial entities. In the balance sheet, the debtor's liability and creditor's asset are reduced by the amount of debt that is forgiven. 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.

5.219. 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.

5.220. 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.

5.221. 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. However, unlike in rescheduling, the old debt is extinguished at the value of the new debt instrument. The balance sheet reflects the transactions extinguishing the old debt instrument and the creation of the new debt instrument along with any valuation change recorded in the revaluation account. 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.

5.222. Debt conversion (swap) 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

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<sup>64</sup> See *2008 SNA*, paragraphs 22.104–130. See also *BPM6 Appendix 2, Debt Reorganization and Related Transactions*, and, *Public Sector Debt Statistics: Guide for Compilers and Users (2011)*, Chapter 4, subsection Debt Reorganization.

policy. This includes *debt-for-equity swaps* and *debt prepayment* 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.

5.223. Debt prepayments consist of a repurchase, or early payment, of debt at conditions that are agreed between the debtor and the creditor (i.e., debt is extinguished in return for a cash payment agreed 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.

5.224. 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).<sup>65</sup>

5.225. Debt repudiation refers to a unilateral cancellation of a financial claim by a debtor and is not recognized in this *Manual*.

## E. Aggregation, Netting, and Consolidation

### Aggregation

5.226. ***Aggregation is summation of stocks or flows across all institutional units within a subsector or sector or the summation of stocks or flows within an asset or liability category.*** 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 credits 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 FCs sector.

### Gross and net recording

5.227. 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 security. ***Aggregation in which assets and liabilities are shown for their full values is referred to as gross recording.***

5.228. This *Manual*, consistent with the 2008 SNA and other major statistical manuals, follows gross recording for stock positions. In particular, 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

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<sup>65</sup> For a fuller discussion of the recording of debt assumption, please see *BPM6*, paragraph 8.45 and *Public Sector Debt Statistics: Guide for Compilers and Users* (2011), paragraphs 4.56–4.57.

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).

5.229. Compilation on a net basis may be necessary due to the unavailability of 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. The limited circumstances in which netting of an asset and liability is permissible are described in a separate subsection ahead on *Data netting and offsetting*.

5.230. Netting in the sense of recording stock positions and flows on a purchases-*less*-sales basis (i.e., net acquisition of a specific category of financial assets or liabilities) should be used. For example, positions in deposits in a particular category are recorded as opening stock *plus* new deposits *less* withdrawals, and deposit transactions, as new deposits *less* withdrawals during the period. Similarly, debt securities transactions are defined as the amount of debt securities purchased *less* the amount redeemed or sold, loan transactions are defined as the amount of new loans *less* loans repayments.

5.231. It is important to distinguish between compilation and presentation of data on a net basis for analytical purposes. Some data 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 purpose. For example, the DCS in Chapter 7 shows net foreign assets and net claims on central government. It also shows separately the stock positions and flow data for the asset and liability components that are being netted. The DCS shows "claims on nonresidents" and "*less*: liabilities to nonresidents" as the separate components of net foreign assets.

### ***Data netting and offsetting***

#### ***Debt defeasance***

5.232. *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 an institutional unit.

#### ***Offsetting of a financial asset and liability***

5.233. Offsetting in accounting terms is also known as netting and is the presentation of certain assets and liabilities as a net amount in the balance sheet. This *Manual*, consistent with the IFRSs, recommends that offsetting should only be deemed appropriate when (1) an entity has a legally enforceable right to offset the respective amounts with the same counterparty and (2) it



intends either to settle on a net basis, or to realize the asset and settle the liability simultaneously.<sup>66</sup>

*Hedge accounting* [IFRS references to be updated.]

5.234. Hedge accounting, as specified in IAS 39,<sup>67</sup> pertains to accounting for gains or losses on financial assets and liabilities that are included in hedging relationships. Implementation of the hedge accounting rules results in netting or reclassification of hedged items and hedging instruments in the balance-sheet presentation. Hedge accounting recognizes the offsetting effects on profit or loss of changes in the fair values of the hedging instrument and the hedged item.<sup>68</sup>

5.235. Hedge accounting recognizes the offsetting effects on profit or loss of changes in the fair values of the hedging instrument and the hedged item (IAS 39.85). Basic definitions included in IAS 39.9 are:

*A hedging instrument* is a designated derivative or (for a hedge of the risk of changes in foreign currency exchange rates only) a designated non-derivative financial asset or non-derivative financial liability whose fair value or cash flows are expected to offset changes in the fair value or cash flows of a designated hedged item (paragraphs 72–77 and Appendix A paragraphs AG94–AG97 elaborate on the definition of a hedging instrument).

*A hedged item* is an asset, liability, firm commitment, highly probable forecast transaction or net investment in a foreign operation that (a) exposes the entity to risk of changes in fair value or future cash flows and (b) is designated as being hedged (paragraphs 78–84 and Appendix A, paragraphs AG98–AG101 elaborate on the definition of hedged items).<sup>69</sup>

*Hedging effectiveness* is the degree to which offsetting changes in the fair value or cash flows of the hedged item that are attributable to a hedged risk are offset by changes in the fair value or cash flows of the hedging instrument (see Appendix A, paragraphs AG105–AG113).

5.236. Hedge accounting consistent with IFRS does not affect the recording of transactions and stock positions in monetary and financial statistics (except for *Valuation adjustment* component of *Equity* in monetary statistics) because hedge accounting concerns the recording of gains or losses on financial assets and liabilities that are included in hedging relationships, but not the recording of the gross values of the instruments. If national financial reporting standards specify hedge accounting rules that allow for the netting of hedged items and hedging instruments, data

<sup>66</sup> See IAS 32, paragraph 42.

<sup>67</sup> A distinction is drawn between *hedging strategies* and *hedge accounting*. Portfolio managers use hedging strategies to reduce the investment risks associated with financial assets and liabilities on the balance sheet, regardless of whether *hedge accounting* is applied to the recording of gains or losses for hedged items and hedging instruments. However, hedging strategies may be influenced by hedge accounting rules, if applicable.

<sup>68</sup> See IAS 39, paragraph 85.

<sup>69</sup> “The hedged item can be (a) a single asset, liability, firm commitment, highly probable forecast transaction or net investment in a foreign operation, (b) a group of assets, liabilities, firm commitments, highly probable forecast transactions or net investments in foreign operations with similar risk characteristics, or (c) in a portfolio hedge of interest rate risk only, a portion of the portfolio of financial assets or financial liabilities that share the risk being hedged.” (IAS 39.78)

adjustments are needed in order to present the recording of assets and liabilities in gross terms in the appropriate financial asset or liability categories. The exception is in the unlikely case in which the hedged item and hedging instrument satisfied the conditions for offsetting a financial asset and liability, as described in paragraph 5.233.

## Consolidation

**5.237. *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 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.

5.238. An institutional unit consisting of a headquarters office and branch offices within the same economy should report stock and flow data consolidated across all resident entities of the institutional unit. Financial flows and stock positions between institutional units should be reported on a gross basis for the 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.

5.239. For analytical purposes, the survey data of the FCs subsectors and the *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 and 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 *CBS* and the *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.

## Annex 5.1. Estimation of Transactions and Valuation Changes from Exchange Rate Movements

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

5.241. Equations for estimating  $T$  and  $VC$  are presented for two cases: a category of foreign-currency-denominated deposits that has no 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.

5.242. Suppose that transactions and valuation changes are to be estimated for a single category of an ODC's deposits—namely, those denominated in a single foreign currency and constituting liabilities to nonfinancial corporations. 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.

5.243. The recommendation in this *Manual* is that *the daily average exchange rate for the period—denoted as  $e_m$ —should be used to represent the single exchange rate for all transactions during the period.*<sup>70</sup>  $e_m$  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.

### Estimation in the absence of OCVA

5.244. Transactions and valuation changes 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:

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

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<sup>70</sup> The exchange rates refer to the number of units of domestic currency per unit of foreign currency.

5.245. The valuation change 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:

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

5.246. 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 transaction and valuation-change estimates are:

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

and

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

5.247. Transactions and valuation change 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 valuation change can be derived—that is, can be obtained from  $V = CS - OS - T$ , where  $T$  is the transaction estimate from equation (5.4) or (5.6).

### *Numerical example*

5.248. 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,  $e_0$ :  $N2.1/€$

End-of-period exchange rate,  $e_1$ :  $N2.2/€$

Opening stock in domestic currency,  $OS$ :  $N235.20$  [ $= (N2.1/€)(€112)$ ]

Closing stock in domestic currency,  $CS$ :  $N268.40$  [ $= (N2.2/€)(€122)$ ]

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

$OCVA = 0$

### *Transactions estimate*

$$T = (2.18)(€122 - €112) = N21.80 \text{ (see equation (5.12))}$$

$$T = (2.18/2.2)(N268.40) - (2.18/2.1)(N235.20) = N21.80 \text{ (see equation (5.14))}$$

### *Valuation-change estimate*

$$VC = (2.2 - 2.18)(€122) - (2.1 - 2.18)(€112) = N11.40 \text{ (see equation (5.13))}$$

$$VC = [1 - (2.18/2.2)](N268.40) - [1 - (2.18/2.1)](N235.20) = N11.40 \text{ (see equation (5.15))}$$

$$VC = N268.40 - N235.20 - N21.80 = N11.40 \text{ (derived)}$$

### Estimation in the presence of OCVA

5.249. Transactions and valuation changes 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:

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

and

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

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

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

and

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

5.251. 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).

5.252. 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.<sup>71</sup> 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.

5.253. 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 that applied to the individual

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<sup>71</sup> Quantitatively less significant categories include foreign-currency-denominated prepayments of insurance premiums and trade credit and advances, which normally would arise from transactions with nonresident corporations.

transactions. In general, the 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.

5.254. 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  $VC$ , since 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.

5.255. 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 so as 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***

5.256. Transactions and valuation changes 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,  $e_0$ : N2.1/€

End-of-period exchange rate,  $e_1$ : N2.2/€

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

Opening stock in domestic currency,  $OS$ : N319.20 [= (N2.1/€)(€152)]

Closing stock in domestic currency,  $CS$ : N301.40 [= (N2.2/€)(€137)]

$OCVA = €13$

*Transactions estimate:*

$$T = (2.18) (\text{€}137 - \text{€}152 - \text{€}13) = -N61.04 \text{ (see equation (5.16))}$$

$$T = (2.18/2.2) (N301.40) - (2.18/2.1) (N319.20) - (2.18) (\text{€}13) = -N61.04 \text{ (see equation (5.18))}$$

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*Valuation-change estimate:*

$$VC = (2.2 - 2.18) (\text{€}137) - (2.1 - 2.18) (\text{€}152) - (2.20 - 2.18) (\text{€}13) = N14.64 \text{ (see equation 5.17))}$$

$$VC = [1 - (2.18/2.2)] (N301.40) - [1 - (2.18/2.1)] (319.20) - (2.20 - 2.18) (\text{€}13) \\ = N14.64 \text{ (see equation 5.19))}$$

$$VC = N301.4 - N319.2 - (-N61.04) - (2.2) \text{€}13 = N14.64$$

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

### Valuation and Recording of Specific Types of Debt Securities

#### *Fair values for infrequently traded debt securities*

5.257. Fair value methods need to be applied to the valuation of those securities that are traded infrequently, or are traded only in 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 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.

5.258. Calculation of the present value requires data on future cash flows and an appropriate discount rate. 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 for use 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 appropriate representation of the discount rate to be applied to the specific securities that are to be valued. Please see numerical example on fixed coupon securities issued at a discount later in this annex.

#### *Perpetuities*

5.259. Some bonds or similar instruments are *perpetuities*—that is, securities that have no stated maturities, but offer a fixed-coupon payment for each year (or at some other periodic interval) to perpetuity. 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 securities are “perpetuities” because of the inclusion of call or convertibility options that the issuer most likely will exercise in the foreseeable future. The fair value of such securities is determined in accordance with the approaches used for callable or convertible securities that have stated maturities, utilizing a prediction of when the call or convertibility option will be exercised.

#### *Variable-rate bonds*

5.260. Variable-coupon bonds and similar securities are one of several types of securities for which future cash flows are uncertain.<sup>72</sup> Features of variable-rate bonds include:

<sup>72</sup> 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 the 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.

- (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* 2 percent.<sup>73</sup>
- (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.

5.261. 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. 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. Suppose the interest rate for a variable-rate security increases along with an increase in market interest rates. Whereas the cash flows from the security would increase, the discounted cash flows would increase by less, if at all, because of the increase in the discount rate based on the higher market interest rates.

5.262. Forecasting of the interest payments for variable-rate securities should take into account any *cap*, *collar*, or *floor* imposed on variation in the interest rate (or total interest payments) for the securities. 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.

5.263. Some securities have interest rates that are linked to both a reference rate and the credit rating of the issuer. In forecasting the future cash flow for such securities, it would be necessary to consider the likelihood of deterioration in the securities issuer's credit rating, which would lead to an increase in the issuer's payments during the life of the securities or at maturity. However, credit-rated securities are often traded in active markets and, if so, can be valued on the basis of market price quotations.

***Securities with embedded derivatives (not closely related to the host securities)***

5.264. 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.

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<sup>73</sup> 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, 10 percent *minus* LIBOR.

- (c) Conversion option. The right to exchange the 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.<sup>74</sup>
- (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, the price of a commodity, or some other market price variable.

5.265. 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.

5.266. 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.

5.267. Creditor estimation of fair values for securities that are callable at the option of the issuer. The creditor must predict the risk that the securities will be called and, if so, whether the call will occur on or after the call date. If market interest rates have declined appreciably since the securities were issued<sup>75</sup> (or are expected to fall significantly in the period up to the call date for the securities), it is recommended that the fair value be based on the presumption that the securities will be called—that is, a fair value given by the sum of the discounted values of the coupon payments up to the call date, the repayment at call, and the call premium.<sup>76</sup> If market interest rates have risen (or are expected to rise) appreciably prior to the call date, the fair value of the securities should be based on the discounted value of the future cash flows over the full term to maturity for the securities—that is, by presuming that the securities will not be called. The recommendation for the discount rate is the effective yield on similar but actively traded callable securities, if identifiable, or actively traded non-callable securities for which the

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<sup>74</sup> Conversion to equity shares at the option of the security holder often is 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.

<sup>75</sup> If the market price of the securities exceeds the call price (typically, the par value plus a call premium), the call option usually is exercised. If a market price quotation is unavailable, judgment must be applied in deciding if a decline in market interest rates is expected to be sufficient for the securities value to be above the call price as of the call date. Similarly, judgment must be used in predicting if the decline in market rates will lead to exercise of a put option in a security contract.

<sup>76</sup> A call premium, if applicable, is often stated as one or more coupon payments that the issuer is obligated to pay in exercising the call.

remaining term to maturity is approximately the same as the period up to the call date for the securities to be valued, if call is expected, or the full maturity for the securities to be valued, if call is not expected.

5.268. Debtor (issuer) estimation of fair values for securities that are puttable at the option of the creditor. The principles are the same as those for a creditor's valuation of callable securities. The debtor must predict the risk that the put option will be exercised. If market interest rates have increased substantially since the securities were issued (or are expected to rise in the period leading up to the put date), estimation of the fair value can be based on the presumption that the securities will be put, and the fair value can be estimated as the sum of the discounted values of the coupon payments up to the put date, the repayment due on the settlement date, and the put premium, if any. If market interest rates have fallen (or are expected to decline) appreciably prior to the put date, it is recommended that the fair value of the securities be based on the discounted value of the future cash flows over the full term to maturity for the securities—that is, by presuming that the securities will not be put. The recommendation for the discount rate is the effective yield on similar but actively traded securities with a put option, if identifiable, or actively traded securities with no put option and for which the remaining term to maturity is approximately the same as the period up to the put date for the securities to be valued, if put is expected, or the full maturity for the securities to be valued, if put is not expected.

5.269. Estimation of fair value for securities with indexed interest and/or principal. 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. Please see the numerical example on index-linked securities and foreign currency indexed securities 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.

### ***Preferred stocks***

5.270. 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 are so are classified as securities.

5.271. Fair values for preferred shares are estimated by the methods described above 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.<sup>77</sup> 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.

5.272. 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<sup>78</sup> and have a maturity that approximates the expected term to maturity, call, or conversion of the preferred shares.

5.273. 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***

5.274. 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.<sup>79</sup> The FCs that securitize mortgage loan pools and issue the pass-through securities use sophisticated models for the initial pricing and ongoing valuation of these securities, taking into account the expected prepayments. FCs that issue, trade, or deal in pass-throughs have developed various empirical models for estimating the prepayments and valuing the pass-through securities. The best-known models include:<sup>80</sup>

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<sup>77</sup> 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].”

<sup>78</sup> 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.

<sup>79</sup> 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.

<sup>80</sup> These models are described in [Saunders and Million (2003), Chapter 28, Securitization.]

- (a) *PSA model*. An empirical prepayment model developed by the Public Securities Association (PSA)—a trade organization of brokers, dealers, and underwriters<sup>81</sup>—and using current and past data to estimate the average rates of monthly prepayment for specific types of mortgage loan pools.
- (b) *Proprietary PSA-type models*. FCs that issue, trade, or deal in pass-through mortgage securities has 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 (mortgagees).<sup>82</sup> 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.

5.275. 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***

5.276. 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.

### **Numerical Examples of Valuation and Recording of Different Types of Securities [Numbers to be updated.]**

5.277. This section presents numerical examples of recording and valuation of three types of securities—fixed coupon security issued at discount, index linked (CPI) security, and foreign currency indexed security. All three types of securities 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 the end of the life of the security. Suppose all the securities are issued in domestic currency (dc) and purchased by a FC on March 31. Table below presents conditions under which the securities are issued.

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<sup>81</sup> 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).

<sup>82</sup> Prepayment is tantamount to repurchase of the mortgage loan by the debtor (mortgagee). In the absence of a prepayment penalty, the “strike price” in the call option is the amount of the outstanding principal of the mortgage loan.

**Table 5.7. Parameters of Issuance**

	Coupon security	Index-linked security	Foreign currency-linked security
Face value (in dc)	1000	1000	1000
Issue price (in dc)	940	1000	1000
Coupon, %	7.59	4.77	10.00
Indexation	No	Principal to CPI	Principal and coupon to USD

5.278. The following market developments were observed at issuance of the securities and at the end of each year.

**Table 5.8. Market Developments**

	Year 0	Year 1	Year 2	Year 3
Market interest rate, % <sup>83</sup>	10.0	8.0	6.0	12.0
Actual CPI, %	5.47	7.00	6.00	5.00
Exchange rate (dc x USD)	3.67	2.94	3.49	4.04

The following three subsections present, for each type of security, the calculations of the **fair value** (approximation to market value) and corresponding revaluations for each end-year and all the three components of flows (transactions, revaluations and OCVA) for each annual period.

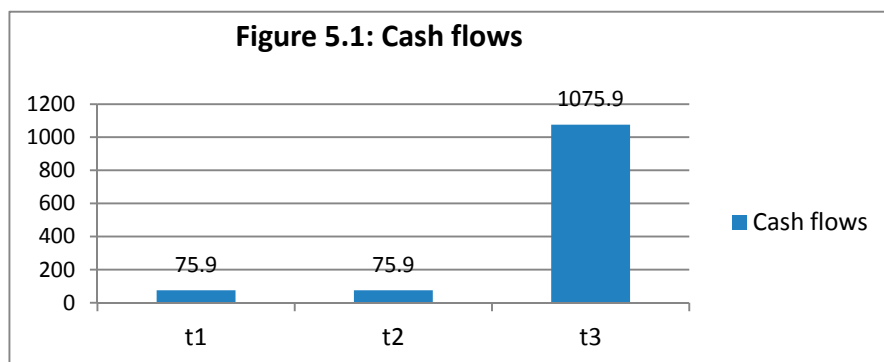
### **1. Fixed coupon security issued at discount**

#### ***Fair value***

5.279. The fair value of a financial asset or liability is calculated as the sum of the present values of all future cash flows, as shown in the equation in paragraph 5.82.

<sup>83</sup> Market interest rate represents an interest rate of the same or similar type of security traded in the market.

5.280. Annual coupon payments that the FC holding the security will receive at the end of each year is equal to 75.9 units of dc ( $1000 * 7.59\% = 75.9$ ). Figure 5.1 shows cash flows for this security at the end of each year.



5.281. The fair value of the security at inception is calculated based on the equation noted above as follows:

$$\text{Fair value}_0 = \frac{75.9}{(1+0.1)^1} + \frac{75.9}{(1+0.1)^2} + \frac{1075.9}{(1+0.1)^3} = 940 \text{ dc}$$

5.282. Using the same equation and taking into account the change in market interest rate (see Table 5.8 above), the fair value of the security at the end of the first and second years, after the coupon has been paid, is 992.6 dc and 1015 dc, respectively.

### ***Accrued interest***

5.283. Accrued interest for this security is comprised of two components: accrued coupon and amortization of the discount. Amortization of the discount at the end of the first year is calculated based on the following formula:

$$\text{Amortized discount}_t = \text{IP} \left\{ \left( \frac{\text{FV}}{\text{IP}} \right)^{t/m} - 1 \right\},$$

where FV denotes the face value of the security, IP is the issue price, m is the maturity of the security in years, t is the number of years after inception.

5.284. Based on this formula the amortized discount for the first year will be calculated as follows:

$$\text{Amortized discount}_1 = 940 \left\{ \left( \frac{1000}{940} \right)^{1/3} - 1 \right\} = 19.59$$

The amortized discount for the first two years is 39.59 dc and for the third year, 60 dc.



**Recording entries**

5.285. The following entries will be recorded for monetary statistics in the accounts of the FC:

<b>At inception/purchase</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	0	940			940
Deposits		-940			
<b>First year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	940	19.59	33 <sup>84</sup>		992.59
<i>Liabilities</i>					
Current year result (profit) <sup>85</sup>		19.59	33		
<b>Second year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	992.59	20	2.41		1015
<i>Liabilities</i>					
Current Year result (profit)		20	2.41		
<b>Third period (before redemption)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1015	20.41	-35.41		1000
<i>Liabilities</i>					
Current Year result (profit)		20.41			
Current Year result (loss)			35.41		
<b>Flows for the three year period after the purchase of debt securities</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	940	60	0		1000
<i>Liabilities</i>					
Current Year result (profit)			35.41		
Current Year result (loss)			35.41		
<b>Redemption</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt securities	1000	-1000			0
Deposits		+1000			

<sup>84</sup> Valuation changes for all three types of securities are calculated as residual assuming there are no OCVA.

<sup>85</sup> The contra-entry can be recorded in either *current year result* (transferred to *retained earnings*) or *valuation adjustment*, in accordance with national practice. In the national accounts, the contra-entry is recorded as a change in net worth.

## 2. Index-linked (CPI) security

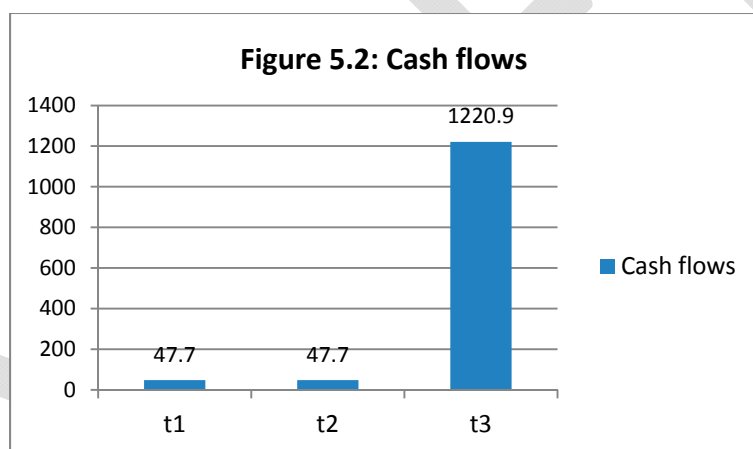
### *Fair value*

5.286. For the index-linked (CPI) security, changes in the CPI will affect the fair value of the security through changes in its expected redemption value (RV), discounted at the current market interest rate. Assuming the CPI of the past 12 months will prevail in the future, the expected RV of the security at the beginning of the first year is calculated as follows:

$$RV_0 = FV (1+CPI)^t = 1000 (1+0.0547)^3 = 1173.2$$

5.287. The RV of the security for the next periods should include an actual inflation during the given period and the expected inflation for the upcoming periods. Based on these assumptions, the RV for the end of each year will be 1225 dc, 1202.3 dc, and 1190.9 dc, respectively.

5.288. Annual coupon payments at inception is equal to 47.7 dc ( $1000 * 4.77\% = 47.7$ ). Figure 5.2 shows cash flows for this security at the end of each year.



5.289. The fair value of the security at inception is calculated based on the fair value formula as follows:

$$\text{Fair value}_0 = \frac{47.7}{(1+0.1)^1} + \frac{47.7}{(1+0.1)^2} + \frac{1173.2+47.7}{(1+0.1)^3} = 1000$$

5.290. Using the fair value formula and taking into account the change in market interest rate, as well as the change in the RV because of inflation, the fair value of the security for the end of the first and second years, after the coupon has been paid, will be 1135.3 dc and 1179.2 dc, respectively.<sup>86</sup>

<sup>86</sup> Fair value  $t_1 = 47.7/(1+0.08)^1 + 47.7/(1+0.08)^2 + 1225/(1+0.08)^2 = 1135.3$

***Accrued interest***

5.291. Accrued interest for this security is linked to RV and is comprised of two components: accrued coupon and accrued interest because of indexation. Accrued interest for the first year because of indexation is calculated as follows:

$$\text{Accrued interest--indexation}_1 = (\text{IP}) \text{CPI}_1 = 1000 * 0.07 = 70$$

5.292. For the second and third years, the accrued interest--indexation will be 64.2 dc and 56.7 dc, respectively.

**Recording entries**

5.293. The following entries will be recorded for monetary statistics in the accounts of the FC:

<b>At inception/purchase</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt securities	0	1000			1000
Deposits		-1000			

<b>First year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1000	70	65.3		1135.3
<i>Liabilities</i>					
Current Year result (profit)		70	65.3		

<b>Second year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1135.3	64.2	-20.3		1179.2
<i>Liabilities</i>					
Current Year result (profit)		64.2			
Current Year result (loss)			-20.3		

<b>Third year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1179.2	56.7	-45		1190.9
<i>Liabilities</i>					
Current Year result (profit)		56.7			
Current Year result (loss)			-45		

<b>Flows for the three year period after the purchase of debt securities</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1000	190.9	0		1190.9
<i>Liabilities</i>					
Current Year result (profit)			65.3		
Current Year result (loss)			65.3		

<b>Redemption</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt securities	1190.9	-1190.9			0
Deposits		1190.9			

### 3. Foreign currency indexed security

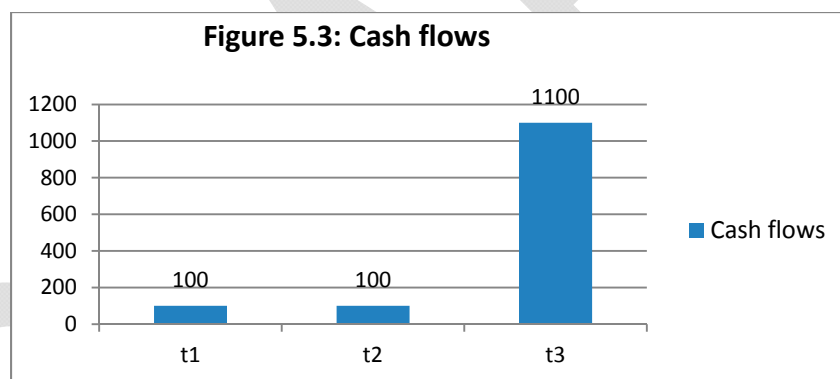
#### *Fair value*

5.294. Securities with coupon and principal that are indexed to foreign currency are treated as though they are denominated in foreign currency. For the foreign currency-indexed-security, changes in the exchange rate will affect the fair value of the security through changes in its expected RV, discounted at the current market interest rate. Assuming the spot exchange rate will prevail in the future, the expected RV at the beginning of the first year is calculated as follows:

$$RV_1 = \frac{ER_{t2}}{ER_{t1}} IP = \frac{2.94}{3.67} 1,000 = 801 \text{ dc}$$

5.295. Using the same equation and taking into account the change in market interest rate and exchange rate, the fair value of the security at the end of the second and third years, after the coupon has been paid, will be 950 dc and 1,100 dc, respectively.

5.296. Annual coupon payment at inception will be 100 dc ( $1000 * 0.1 = 100$ ). Figure 3 shows cash flows for this security at the end of each year.



5.297. The fair value of the security at inception is calculated based on the fair value formula as follows:

$$\text{Fair value}_0 = \frac{100}{(1+0.1)^1} + \frac{100}{(1+0.1)^2} + \frac{1100}{(1+0.1)^3} = 1,000$$

5.298. Using the fair value formula and taking into account the change in market interest rate, as well as the change in the RV because of exchange rate change, the fair value of the security, for the end of the first and second years, after the coupon has been paid, will be 853 dc and 1051.6 dc, respectively.

#### *Accrued interest*

5.299. Accrued interest for this security is linked to RV and there will be no accrued interest because of indexation, as foreign currency linked securities are treated as if denominated in

foreign currency, i.e. the change in RV is treated as valuation change. Accrued interest for the first year is calculated as follows:

$$\text{Accrued interest}_1 = (\text{FV}) (1+r) = 801 * 0.1 = 81$$

5.300. For the second and third years, the accrued interest–indexation will be 95 dc and 105 dc, respectively.

5.301. The following entries will be recorded for monetary statistics in the accounts of the FC:

<b>At inception/purchase</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt securities		1,000			1,000
Deposits	0	-1,000			
<b>First year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1000	+80-80=0	-147		853
<i>Liabilities</i>					
Current Year result (loss)			-147		
<b>Second year</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	853	+95-95=0	198.6		1051.6
<i>Liabilities</i>					
Current Year result (profit)			198.6		
<b>Third period (before redemption)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1051.6	+105-105=0	48.4		1100.0
<i>Liabilities</i>					
Current Year result (profit)			48.4		
<b>Flows for the three year period</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Debt securities	1000	0	100		1100
<i>Liabilities</i>					
Current Year result (profit)		180	257		
Current Year result (loss)		180	147		
<b>Redemption</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt securities	1,100	-1,100			0
Deposits		1,100			

### Annex 5.3. Valuation, Recording of Financial Derivatives and a Numerical Example

#### Forward contracts

5.302. 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).

5.303. Notation in the valuation equations for forward contracts<sup>87</sup> 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; and
- $r$ : Risk-free rate of interest per annum, which represents the continuous-compounded rate of return on a risk-free investment of  $N$ -year maturity.

5.304. 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:

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

(c) where  $CF$  denotes the present value of all cash flows through  $N$ ; and

(d) 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.

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<sup>87</sup> The model formulations and most notations are taken from Hull (2012).

5.305. 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 *value 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:

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

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

5.307. 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:*

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

(c) *Value of a long forward contract for an asset with cash flows continuously compounded:*

$$f_L = S_0e^{-qN} - Ke^{-rN},$$

where  $q$  denotes the *average* annual yield.

5.308. 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.

5.309. 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). Since 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:

$$F_0 = S_0e^{(r_A - r_B)N},$$

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;  $F_0 = S_0e^{(r - q)N}$ , where  $r \equiv r_A$  and  $q \equiv r_B$ . The relationship is often shown with non-compounded rates; for example, for a forward contract for a U.S. dollar purchase of British pounds in one year:  $F_0 = S_0[(1 + r_{ues})/(1 + r_{ook})]$ , where  $r_{ues}$  and  $r_{ook}$  are non-compounded annual rates of return on dollar- and pound-denominated investments.



5.310. The values of a long forward contract and short forward contract on currencies are:

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

5.311. 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 ( $e^{-r_{un}}$ ), 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.

5.312. 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  $(VC - VC_A)$  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:

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

$$\text{where } VC = T - OS = (S_0 - K) - OS.$$

### ***Foreign currency forward contracts***

5.313. 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.

5.314. At the interception the contract is usually structured so that the fair value is zero (0). Suppose Bank A and Bank B enter into a three months 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 forward exchange rate. Normally, 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 dollar, the interest rate for US dollar is three percent, and the interest rate for domestic currency is five percent, then the forward exchange rate would be:

$$F = S \frac{\left( \frac{1+I_N}{C} \right)^t}{\left( \frac{1+I_F}{C} \right)^t} = 1.250 * ((1+0.05)^{3/12} / (1+0.03)^{3/12}) = 1.256$$

5.315. The fair value measured in domestic currency of a forward contract is calculated in the same way as the forward exchange rate at interception, 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 with the domestic currency interest rate (e.g., 3 percent) and the spot exchange rate discounted with foreign currency interest rate (e.g., 5 percent) times the contractual amount (e.g., \$10,000).

## Accounting

5.316. 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:

$$\text{Fair value (Bank A)} = FC (F (1 + I_{NC})^{-t} - S (1 + I_{FC})^{-t}) = \\ 10,000 * ((1.256 * (1 + 0.03)^{-2/12} - 1.278 * (1 + 0.005)^{-2/12}) = -258.9$$

$$\text{Fair value (Bank B)} = 258.9$$

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

First period (July), Bank A	OS	T	VC	OCVA	CS
<i>Liabilities</i>					
Financial derivatives	0	-	258.9	-	258.9
Current year result (loss)			-258.9		
<b>Bank B</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Financial derivatives	0	-	258.9	-	258.9
<i>Liabilities</i>					
Current year result (profit)			258.9		

5.318. In the second period (August), suppose the domestic currency appreciates to 1.275, while the interest rates remain unchanged. The fair value of the forward is:

$$\text{Fair value (Bank A)} = 10,000 * ((1.256 * (1 + 0.03)^{-1/12} - 1.275 * (1 + 0.05)^{-1/12}) = -209.6$$

$$\text{Fair value (Bank B)} = 209.6$$

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

Second period (August), Bank A	OS	T	VC	OCVA	CS
<i>Liabilities</i>					
Financial derivatives	258.9	-	-49.3	-	209.6
Current year result (profit)			49.3		
<b>Bank B</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
<i>Assets</i>					
Financial derivatives	258.9	-	-49.3	-	209.6
<i>Liabilities</i>					
Current year result (loss)			-49.3		

5.319. For the last period (September), suppose that at the settlement date the exchange rate further 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:

$$\text{Fair value (Bank A)} = 10.000 * ((1.256 * (1 + 0.03)^{-0/12} - 1.267 * (1 + 0.05)^{-0/12}) = -110$$

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

The following entries will be recorded for MFS purposes:

Third period (September), Bank A	OS	T	VC	OCVA	CS
<i>Assets</i>					
Currency and deposits in F/C		-12,670			
Currency and deposits in N/C		+12,560			
<i>Liabilities</i>					
Financial derivatives	209.6	-110-	-99.6	-	0
Current year result (profit)			+99.6		

Bank B	OS	T	VC	OCVA	CS
<i>Assets</i>					
Financial derivatives	209.6	-110	-99.6	-	0
Currency and deposits in F/C		+12,670			
Currency and deposits in N/C		-12,560			
<i>Liabilities</i>					
Current year result (loss)			-99.6		

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

### ***Futures contracts***

5.321. Market price quotations for futures contracts are generally available as they are traded on organized exchanges, and therefore there is no need to estimate fair values. 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).

5.322. 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).

### ***Forward rate agreements (FRAs)***

5.323. 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 $N_2$ ; and
$R_2$	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:*

$$V_{FRA} = L(R_F - R_K)(N_2 - N_1)e^{-R_2 N_2}.$$

5.324. 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 equations above. 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  $RL$ .

5.325. 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,  $CS = VC = V_{FRA}$ .

5.326. 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***

5.327. An *interest-rate swap* is an agreement that fixed-rate based payments by one party are to be 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.

5.328. Notation in the valuation formulas for interest rate swaps includes:

$L$	<i>Notional principal</i> in the swap agreement;
$t_i$	<i>Time</i> until the $i$ th payments ( $i = 1, \dots, n$ ) are exchanged;
$r_i$	<i>LIBOR zero rate</i> (that is, zero-coupon rate) <sup>88</sup> corresponding to time $t_i$ ;
$k$	<i>Amount of fixed payment</i> at the end of each payment period; and
$k_i^*$	<i>Amount of floating-rate payment</i> at the end of the $i$ th payment period, which is a known amount as of the beginning of the $i$ th period.

5.329. 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 ( $V_{\text{swap}}$ ) is equal to the difference between the floating-rate bond value ( $B_{fl}$ ) and the fixed-rate bond value ( $B_{fix}$ ):

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

and for the party with the opposite position,

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

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

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

5.331. 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,  $V_{\text{swap}}$  as of end of the period is recorded as the closing stock (CS), and the valuation change (VC) is the amount by which  $V_{\text{swap}}$  changed during the period, i.e.,  $VC = CS - OS$ , given that  $T = 0$ .

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<sup>88</sup> Swap agreements can be based on variable rates other than LIBOR, but swapping fixed-rate based payments for LIBOR-based payments is prevalent and, therefore, is used in the exposition.

- (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  $VC = CS - OS - T$ .

5.332. 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**

5.333. 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 the currency swap, both principal and “interest”<sup>89</sup> are exchanged. 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*.

5.334. 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.

5.335. 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.

5.336. 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.

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<sup>89</sup> The quotation marks are to emphasize that the amounts for the exchanged payments are based on interest calculations, but the payments are not recorded as interest income or expense. The payment exchange affects the swap value ( $V_{swap}$ ), and changes in  $V_{swap}$  are recorded as valuation changes.

## ***Options contracts***

### *Pricing models for valuing OTC options*

5.337. 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, and separate valuation models for European and American-type options (see Chapter 4) are needed. For stock options, separate models are needed for the valuation of options on non-dividend and dividend-paying corporate shares.

5.338. 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<sup>90</sup> applies directly to the pricing of European and American call options and European put options on non-dividend-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. The Black-Scholes approach to options pricing and the basic stock-option valuation equations are presented in Box 5.4.
- (b) Binomial-tree model. This model is an extension<sup>91</sup> 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.<sup>92</sup>

5.339. Users of this *Manual* may wish to consult one or more textbooks or other references on options pricing and analysis.<sup>93</sup> 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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<sup>90</sup> Black and Scholes (1973) and Merton (1973).

<sup>91</sup> Cox, Ross, and Rubinstein (1979).

<sup>92</sup> The binomial-tree model is a set of computational procedures, rather than a set of formulas. Fundamental to these pricing procedures is the concept of a *replicating portfolio*—a perfectly hedged portfolio of assets with the same payoff as an option (or set of options) and with a more direct valuation than the option. For a description and numerical examples of the binomial-tree model, see [Chance (2004), Chapter 4; and Hull (2003), Chapter 10.]

<sup>93</sup> 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.



### Box 5.5. Black-Scholes Model for Pricing European Stock Options

Assumptions:

- The stock is non-dividend-paying.
- The risk-free rate of interest ( $r$ ), and the variance ( $\sigma^2$ ) of the rate or return on the stock are constant over the life of the option.
- Trading in the stock is continuous.
- The stock price is continuous—that is, no jumps in the price occur, for example, from announcement of expected events for the corporation that issued the stock.
- No transactions costs or taxes apply to trading in the stock or the stock option.

The values of a European call option and a European put option are:

$$\text{Call option value} = C = S_0 N(d_1) - K e^{-rT} N(d_2)$$

and

$$\text{Put option value} = P = K e^{-rT} N(-d_2) - S_0 N(d_1)$$

where

$$d_1 = \frac{\ln(S_0 / K) + (r + \sigma^2 / 2)T}{\sigma \sqrt{T}}$$

and

$$d_2 = \frac{\ln(S_0 / K) + (r - \sigma^2 / 2)T}{\sigma \sqrt{T}} = d_1 - \sigma \sqrt{T}.$$

$S_0$  is the current stock price (that is, at time zero),  $K$  is the strike price in the options contract,  $r$  is the continuously compounded risk-free interest rate,  $\sigma$  is the stock price volatility (that is, annualized standard deviation of the continuously compounded rate of return), and  $T$  is the time to maturity of the call or put option.

The function  $N(x)$  is the cumulative probability distribution for a standardized normal distribution—that is, the probability that a variable with a standard normal distribution with zero mean and unit variance ( $= 1$ ) will be less than  $x$ .

## Annex 5.4. Settlement Date and Transaction Date Accounting

5.340. Separate examples for purchase and sale of a financial asset are presented in this annex. The *IAS 39—Implementation Guidance*, 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

5.341. On December 29, 2011 (trade date), Financial Corporation A (FCA) acquires debt securities that are denominated in domestic currency (NC) at a price of NC1,000. The settlement date for the transaction is January 4, 2012. NC1,002 is the market value of the securities at the end of the first reporting period—that is, as of December 31, 2011. The market value of the securities on the settlement date is NC1,003, and the market value at the end of the second reporting period—that is, as of January 31, 2011—is NC1,005. In the *IAS 39 IG* example, the securities are marked to market (that is, are revalued) at NC1,003 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 NC1,005 has been added to the *IAS 39 IG* example.

5.342. 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
<i>Other entries</i>					
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
<i>Other entries</i>					
Current year result (change through profit or loss)			3		
Deposits (payment for securities on January 4, 2012)		-1,000			

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

<b>First period (December)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	0	1,000	2		1,002
<i>Other entries</i>					
Current year result (change through profit or loss)			2		
Other accounts payable: securities settlement account		1,000			1,000
<b>Second period (January)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	1,002		3		1,005
<i>Other entries</i>					
Current year result (change through profit or loss)			3		
Deposits (payment for securities on January 4, 2003)		-1,000			
Other accounts payable: securities settlement account	1,000	-1,000			

### Example 2: Sale of debt securities

5.344. 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, 2011 and uses settlement-date accounting to record the sale. The opening balance for the securities, as of December 1, 2011, is NC996.

5.345. Using *settlement-date accounting* for the *securities sale*, the accounting records are:

<b>First reporting period (December)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	996		4		1,000
<i>Other entries</i>					
Current year result (change through profit or loss)			4		
<b>Second reporting period (January)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	1,000	-1,000			<b>Account Closed</b>
<i>Other entries</i>					
Deposits: received for securities (January 4, 2003)		1,000			

5.346. Using *trade-date accounting* for the *securities sale*, the accounting records are:

<b>First reporting period (December)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	996	-1,000	4		<b>Account Closed</b>
<i>Other entries</i>					
Current year result (change through profit or loss)			4		
Other accounts receivable: securities settlement account		1,000			1,000

<b>Second period (January)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	<b>Account Closed</b>				
<i>Other entries</i>					
Deposits: received for securities (January 4, 2004)		1,000			
Other accounts receivable: securities settlement account	1,000	-1,000			

**Example 3: Purchase or sale of debt securities: settlement and transaction dates in the same reporting period**

5.347. The data for the reporting period do not need to be adjusted if the settlement and transaction dates occur in the same reporting period.

5.348. Suppose that, on December 15, 2011 (trade date), FCA acquires securities other than shares at a price of NC1,000. The settlement date for the transaction is December 19, 2011. FCB, seller of the securities, shows a market value of NC996 for the securities at the beginning of the period (December 1, 2011). The market values on the settlement date (December 19, 2011) and at the end of the period (December 31, 2011) are NC1,002 and NC1,005, respectively.

5.349. Using *settlement-date or trade-date accounting* for the *securities purchase* by FCA, the relevant data for the reporting period are:

<b>FCA: Reporting period (December)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	0	1,000	5		1,005
<i>Other entries</i>					
Deposits: payment for securities on December 19		-1,000			
Current year result (change through profit or loss)			5		

5.350. Using *settlement-date or trade-date accounting* for the *securities sale* by FCB, the relevant data for the reporting period are:

<b>FCB: Reporting period (December)</b>	<b>OS</b>	<b>T</b>	<b>VC</b>	<b>OCVA</b>	<b>CS</b>
Debt Securities	996	-1,000	4		<b>Account Closed</b>
<i>Other entries</i>					
Deposits: received for securities (December 19)		1,000			
Current year result (change through profit or loss)			4		