

Chapter Six

Specification of Financial Soundness Indicators for Deposit-Takers

Introduction

6.1 This chapter brings together the concepts and definitions set out in Part I of the *Guide* to explain how FSIs for deposit-takers are to be calculated. The next two chapters cover the calculation of FSIs for other sectors and for financial market FSIs, respectively. The final chapter in Part II covers real estate price indices.

Accounting principles

6.2 To summarize the guidance in Chapters 2 and 3:

- The definition of deposit-takers is provided in Chapter 2 (paragraphs 2.4 to 2.12)
- Transactions and positions should be recorded on an **accrual** basis, and only existing actual assets and liabilities should be recognized (paragraphs 3.3 to 3.9).
- The *Guide* prefers **valuation methods** that can provide the most realistic assessment at any moment in time of the value of an instrument or item. Market value is the preferred basis of valuation of transactions, as well as for positions in traded securities. For positions in nontradable instruments, the *Guide* acknowledges that nominal value (supported by appropriate provisioning policies) may provide a more realistic assessment of value than the application of fair value (see paragraphs 3.20 to 3.33).
- **Residence** is defined in terms of where an institutional unit has its center of economic interest (see paragraphs 3.34 to 3.36).
- Transactions and positions in **foreign currency** should be converted into a single unit of account based on the market rate of exchange (see paragraphs 3.44 to 3.48).
- Short-term **maturity** is defined as one year or less (or payable on demand), with over one year defined as long-term (see paragraphs 3.49 to 3.50). Duration is also defined (see paragraphs 3.51 to 3.56).

6.3 Except where otherwise noted, these are the concepts to be employed in compiling the underlying series used to calculate FSIs.

Underlying series

6.4 The underlying series to be used in calculating individual FSIs are defined in Chapter 4. In describing the FSIs ahead, some brief descriptions of the underlying series are provided, together with cross-references to the more detailed definitions provided in earlier chapters. The sector data should be compiled on a consolidated-based approach as described in Chapter 5; that is, encompassing both consolidated group reporting and consolidation adjustments at the sector-level (Box 5.1).

Calculation of FSIs

6.5 Most FSIs are calculated by comparing two underlying series to produce a ratio, as described ahead. For each ratio, the calculation should use data with the same periodicity for both the numerator and the denominator—either flows recognized during the period, or end-period or average period positions depending on the ratio being calculated. The *Guide* considers that for the production of time series, the data for the shortest period available should be used (e.g., quarterly data). However, even when higher frequency data are available, annual calculations might also be considered, among other things to reduce the impact of seasonal factors.¹⁶³

6.6 Given that this is a new field of financial and economic statistics, and experience of compiling and using FSIs at both the national and international level is relatively limited, it is recognized that the definitions underlying available data series for use in calculating FSIs might differ among countries, as well as from the guidance set out in the *Guide*. Any dissemination of such FSI data should be accompanied by metadata so that the basis of calculation is transparent.

6.7 The *Guide* discusses the compilation of data on a domestically controlled, cross border consolidated basis and domestic consolidated basis in Chapter 5 (paragraphs 5.31 and 5.33). However, the compilation of FSIs in accordance with the *Guide* requires data on a domestically controlled, cross-border consolidated basis. Additional possibilities arise—for instance, separate ratios could be calculated for all domestically incorporated deposit-takers, foreign-controlled deposit-takers, deposit-takers that are commercial banks, and deposit-takers that are savings banks. For all FSIs, ratios could be calculated for groupings based on these or other structural disaggregations of the financial sector.¹⁶⁴

6.8 Depending upon the analytical needs of users, the guidance provided in the *Guide* is intended to allow compilers the flexibility to calculate additional FSIs that are not specifically described in this *Guide*, using the concepts and definitions provided for the underlying series.

¹⁶³ See also the discussion in Chapter 11 on availability of data, breaks in series, and seasonal factors.

¹⁶⁴ Chapter 12 describes a range of possible structural indicators that could be disseminated.

Financial soundness indicators

6.9 There are 12 core and 14 encouraged FSIs for deposit-takers. Other than the two interest rate based indicators, which are described in Chapter 8, the agreed FSIs are set out in the table below and described in this chapter. The core FSIs are indicated. For exposition purposes, *capital-based FSIs* are presented first, followed by *asset-based FSIs*, and then by *income and expense FSIs*.¹⁶⁵ Numerical examples of how to compile and present these data series are provided in Appendix V.¹⁶⁶

6.10 During the drafting of, and consultation on, the *Guide*, ideas for further developing or redefining some of the FSIs described ahead were provided. These ideas are set out in Appendix III as examples of additional ratios that go beyond the agreed list, but which nonetheless countries might find of relevance to their own national circumstances.

| Deposit-Takers: Financial Soundness Indicators | |
|---|---|
| <i>Capital-based</i> | |
| (i) | Regulatory capital to risk-weighted assets (core) |
| (ii) | Regulatory Tier 1 capital to risk-weighted assets (core) |
| (iii) | Capital to assets |
| (iv) | Nonperforming loans net of provisions to capital (core) |
| (v) | Return on equity (net income to average capital [equity]) (core) |
| (vi) | Large exposures to capital |
| (vii) | Net open position in foreign exchange to capital (core) |
| (viii) | Gross asset and liability positions in financial derivatives to capital |
| (ix) | Net open position in equities to capital |
| <i>Asset-based</i> | |
| (x) | Liquid assets to total assets (liquid asset ratio) (core) |
| (xi) | Liquid assets to short-term liabilities (core) |

¹⁶⁵ This presentation is also adopted in the dissemination tables in Chapter 12. However, it is recognized that alternative presentations are possible, such as grouping return on equity and return on assets together.

¹⁶⁶ In comments on an earlier draft, some experts proposed that setting benchmarks for specific FSIs might be considered. Countries could then judge their own ratios against these international benchmarks. However, given the limited experience with FSIs at the time of writing, the *Guide* does not provide such benchmarks, nor is the *Guide* considered the appropriate vehicle for presenting such information.

- (xii) Customer deposits to total (noninterbank) loans
- (xiii) Return on assets (net income to average total assets) (core)
- (xiv) Nonperforming loans to total gross loans (core)
- (xv) Sectoral distribution of loans to total loans (core)
- (xvi) Residential real estate loans to total loans
- (xvii) Commercial real estate loans to total loans
- (xviii) Geographical distribution of loans to total loans
- (xix) Foreign-currency-denominated loans to total loans
- (xx) Foreign-currency-denominated liabilities to total liabilities

Income and expense-based

- (xxi) Interest margin to gross income (core)
- (xxii) Trading and foreign exchange gains (losses) to [gross] total income
- (xxiii) Noninterest expenses to gross income (core)
- (xiv) Personnel expenses to noninterest expenses

6.11 Monitoring interest-rate risk for the deposit-taking sector is important and in early drafts of the *Guide*, two FSIs—duration of assets and duration of liabilities—were included for this purpose. However, given that the techniques for monitoring system-wide interest-rate risk are still being developed, including by the BCBS,¹⁶⁷ it is premature to include at this point specific indicators of interest-rate risk in the list of FSIs to be compiled. Research is continuing on the various possible techniques to assess interest-rate risk, including duration and gap analysis, as is described in Appendix VI.

6.12 Unless otherwise stated, all the line references in this section refer to Table 4.1: Deposit-Takers.

¹⁶⁷ See, for instance, BCBS (2003c). This publication outlines both gap and duration models, as well as hybrid models whereby duration-based weights are used in conjunction with a maturity/repricing schedule.

Capital-based FSIs

6.13 Capital is defined in terms of the Tier 1 capital (line 32), total regulatory capital (line 36), and capital and reserves (line 30).

6.14 As noted by the Basel Committee in its Capital Accord, ***Tier 1 capital*** is a common feature in all countries' banking systems, being the basis on which market and supervisory judgments of capital adequacy are made and having a crucial bearing on profit margins and on a bank's ability to compete. It is less affected than capital and reserves by period-to-period unrealized valuation changes.

6.15 The data for ***capital and reserves*** (compiled from balance sheet data) is the residual interest of the owners in the assets of the sector after the deduction of liabilities. It provides a comprehensive measure of the capital resources available to the sector, not least to absorb losses. For instance, when total capital is employed in the "return on capital" FSI ratio, an insight is provided into the extent to which available capital resources are being put to profitable use, while when total capital is employed in the "nonperforming loans net of provisions to capital" ratio an indication is provided of the extent to which losses can be absorbed before the sector becomes technically insolvent.

6.16 In the absence of Tier 1 data, ***funds contributed by owners and retained earnings*** (including those earnings appropriated to reserves) could be identified (paragraph 4.64).

(i) Regulatory capital to risk-weighted assets

6.17 This FSI (as well as the second one) measures the capital adequacy of deposit-takers and is based on the definitions used in the Basel Capital Accord. The source should be supervisory data. In the metadata provided, the national treatment in Tier 1 of equity investments in other banks and financial institutions should be described, as under the Basel Capital Accord such investments may be excluded from Tier 1 capital at the discretion of the national authorities.

6.18 This FSI is calculated by (1) aggregating data on regulatory capital for the reporting population, (2) aggregating risk-weighted assets for the reporting population, and (3) dividing (1) by (2). Regulatory capital (line 36) and risk weighted assets (line 37) are defined using regulatory standards and concepts and do not correspond directly to capital and assets as shown in the financial balance sheet. The concept of regulatory capital is described in paragraphs 4.68 to 4.73 and 4.75 and that of risk-weighted assets in paragraph 4.74.

(ii) Regulatory Tier 1 capital to risk-weighted assets

6.19 This FSI is a narrower measure of the previous FSI and is calculated by (1) aggregating data on Tier 1 regulatory capital for the reporting population, (2) aggregating risk-weighted assets for the reporting population as the denominator, and (3) dividing (1) by (2). The concepts of Tier 1 capital (line 32) and risk-weighted assets (line 37) are defined in

paragraphs 4.70 and 4.73, and 4.74, respectively. Tier 1 capital can be considered a core measure of capital.¹⁶⁸ As noted above, regulatory capital and risk-weighted assets are defined using regulatory standards and concepts and do not correspond directly to capital and assets shown in financial balance sheets.

(iii) Capital to assets

6.20 This FSI provides an indication of the financial leverage—i.e., the extent to which assets are funded by other than own funds—and another measure of capital adequacy of the deposit-taking sector.

6.21 The FSI is calculated by taking capital and reserves as the numerator, and, for cross-border consolidated data, also Tier 1 capital. In the absence of Tier 1 data, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be used. As for the denominator, total assets (line 14) are all nonfinancial and financial assets. Nonfinancial and financial assets are defined in paragraphs 4.37 and 4.38.

(iv) Nonperforming loans net of specific provisions to capital

6.22 This FSI is intended to compare the potential impact on capital of NPLs, net of provisions. Provided that there is appropriate recognition of NPLs, this ratio can provide an indication of the capacity of bank capital to withstand NPL-related losses. However, the impact of NPL losses on capital is uncertain in most circumstances as, for various reasons, the lender might expect to recover some of the potential NPL losses; for instance, the borrower might have provided the lender with collateral or other forms of credit risk mitigation.¹⁶⁹

6.23 The FSI is calculated by taking the value of NPLs (line 42) less the value of specific loan provisions (line 18 (ii)) as the numerator, and capital as the denominator. Capital is measured as capital and reserves, and, for cross-border consolidated data, also total regulatory capital. NPLs and specific provisions are defined in paragraphs 4.84 and 4.50, respectively.¹⁷⁰

6.24 It is important to understand how provisions affect both the numerator and denominator. Using balance sheet data as described in Chapter 4, specific provisions are deducted in calculating the numerator, while general provisions are included in the denominator. Therefore, if a general rather than a specific provision is made, both the numerator and the denominator are larger than otherwise would be. Conversely, both are

¹⁶⁸ See, for instance, BCBS (1988), p. 3.

¹⁶⁹ In the terminology of the Basel Capital Accord, the expected recovery given default (ERGD) is unlikely to be zero.

¹⁷⁰ The dissemination of data for this indicator could be supplemented with detailed metadata on national supervisory rules for collateral. Appendix III outlines an additional indicator of NPLs net of specific provisions and net of the value of collateral relative to capital.

lower if a specific provision is made rather than a general provision. For regulatory capital the position is more complicated. Under the present Basel Accord, the outcome is similar to that for the balance sheet data, given that total regulatory capital may include general provisions up to 1.25 percent of risk-weighted assets. However, under the proposed Internal Ratings Based approach in the new Basel Accord, as presently drafted,¹⁷¹ if expected losses are not covered, the denominator might be lower than otherwise would be because of the “shortfall” in the numerator. Put differently, the ratio would give an ex-post not an ex-ante measure of the extent to which capital is covering expected losses, as measured by the NPL less specific provisions. In such circumstances, the authorities could monitor the extent of underprovisioning and how it affects total regulatory capital (see the memorandum items to Table 4.1 in Appendix III).

v) Return on equity (net income to average capital)

6.25 This FSI is intended to measure deposit-takers’ efficiency in using their capital. Over time it can also provide information on the sustainability of deposit-takers’ capital position. The ratio needs to be interpreted in combination with FSIs on capital adequacy, because a high ratio could indicate high profitability and/or low capitalization, and a low ratio could indicate low profitability and/or high capitalization.

6.26 Return on equity is calculated by dividing net income (gross income less gross expenses) by the average value of capital over the same period. As a minimum, the denominator can be calculated by taking the average of the beginning- and end-period positions (e.g., at the beginning and the end of the month), but compilers are encouraged to use the most frequent observations available to calculate the average. The preferred definition of net income is that before extraordinary items and taxes (line 8), as this provides an indication of net operating income. But net income after extraordinary items and taxes (line 11) might be used in its stead, or used in addition.¹⁷² Net income and its components are defined in paragraphs 4.17 to 4.35. Capital is measured as capital and reserves and, for cross-border consolidated data, also Tier 1 capital.¹⁷³ In the absence of Tier 1 data, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be identified.

¹⁷¹ See paragraph 4.71 for an explanation of provisioning and expected losses under the draft revised Basel Capital Accord.

¹⁷² In comments and discussions on the *Guide*, views on which income measure to adopt were more-or-less equally split, although arguably the pre-tax measure allows for greater cross-country comparability of data in that it is unaffected by different tax policies.

¹⁷³ On a cross-border consolidated basis, some countries may prefer to employ total regulatory capital in calculating the remaining capital-based ratios instead of, or in addition to, Tier 1 capital. The measures employed should be outlined in the metadata accompanying any data release, and it is strongly recommended that a consistent approach be employed by a reporting country over time.

(vi) Large exposures to capital

6.27 This FSI is intended to identify vulnerabilities arising from the concentration of credit risk. Large exposure refers to one or more credit exposures to the same individual or group that exceed a certain percentage of regulatory capital, such as 10 percent. This supervisory tool is intended to be applicable at the level of the individual deposit-taker. The *Guide* sets out three approaches to monitoring large exposures at the sector-level.

6.28 One approach is to report the total number of large exposures of deposit-takers that are identified under the national supervisory regime (line 38). For such a measure, information on the distribution of the number of large exposures among deposit-takers is particularly relevant in order to highlight whether large exposures are concentrated in a few or many deposit-takers. In any metadata, the national supervisory approach to large exposures should be described.¹⁷⁴

6.29 Another approach is to assess large exposures in the context of lending to the largest entities in other sectors, such as in the other financial corporations and nonfinancial corporations sectors, as failure of the largest entities in the economy could have systemic consequences. One can estimate the total exposure of the five (or around five) largest deposit-takers to the five (or around five) largest resident nondeposit-taking entities by asset size (including all branches and subsidiaries) in both the other financial corporations sector and the nonfinancial corporations sector, together with that to the general government (line 51). This figure is then divided by the capital of the five (or around five) largest deposit-takers to produce the FSI. Capital is measured as their capital and reserves, and, for cross-border consolidated data, also their Tier 1 capital. In the absence of Tier 1 data, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be identified.

6.30 In addition, it is important to monitor connected lending, as evidence suggests that with such lending credit standards might be relaxed and a significant leveraging of capital within a group of companies might occur, both increasing the vulnerability of the deposit-taking sector. Connected lending can be used as a measure of large exposures. It is calculated by taking total exposures to affiliated entities and other “connected” counterparties (line 52) as a percentage of capital. Capital is measured as capital and reserves, and, for cross-border consolidated data, also Tier 1 capital.¹⁷⁵ In the absence of Tier 1 data, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be used.

¹⁷⁴ Some supervisors also measure the value of large exposures to total regulatory capital. This measure might be additionally considered but it does not indicate the extent of large exposures in the sector as a whole.

¹⁷⁵ On a cross-border consolidated basis, some countries may prefer to employ the total regulatory capital in calculating the remaining capital-based ratios instead of, or in addition to, Tier 1 capital. The measures employed should be outlined in the metadata accompanying any data release, and it is strongly recommended that a consistent approach be employed by the country over time.

(vii) Net open position in foreign exchange to capital

6.31 This FSI is intended to identify deposit-takers' exposure to exchange rate risk compared with capital. It measures the mismatch (open position) of foreign currency asset and liability positions to assess the potential vulnerability of the deposit-taking sector's capital position to exchange rate movements. Even if the sector as a whole does not have an exposed foreign exchange position, this might not be true for individual deposit-takers or groups of deposit-takers and thus peer group or dispersion analysis, as described in Chapter 15, might be used to identify risks affecting key segments of the sector.

6.32 A deposit-taker's open position in foreign exchange should be calculated by summing the foreign currency positions as set out ahead into a single unit of account.¹⁷⁶ As described in paragraph 3.46, foreign currency items are both those payable (receivable) in a currency other than the domestic currency (foreign-currency-denominated) and those payable in domestic currency but with the amounts to be paid linked to a foreign currency (foreign-currency-linked). Foreign currency positions should be converted into the unit of account using the mid-market spot exchange rate as of the reporting date.

6.33 The FSI requires a single net position. Table 6.1 provides a disaggregation of the net position by type of exposure and by currency that can be used by compilers. This table allows for the identification of significant exposures to particular currencies and any mismatches across currencies (such as for the U.S. dollar and the euro). It also allows for partial information on foreign currency positions to be compiled, such as the net open position for on-balance-sheet items. For these reasons, the *Guide* encourages the use of the table to present data on the net open position. The component elements of the net position, as set out in Table 6.2, are described below, and are based upon the approach recommended by the BCBS.¹⁷⁷ In line with BCBS guidance, gold is classified as foreign exchange.¹⁷⁸

- The net position in on-balance-sheet foreign currency debt instruments: all foreign currency debt asset items less all foreign currency debt liability items, including accrued interest. Debt instruments include currency and deposits, loans, debt securities, and other liabilities, as defined paragraph 4.61;
- Net notional positions in financial derivatives: Foreign currency amounts to be received less all foreign currency amounts to be paid under forward foreign exchange transactions,¹⁷⁹ including currency futures and the principal on currency swaps not

¹⁷⁶ In the special case where an economy uses as its only legal tender a foreign currency, the net open position could be calculated vis-à-vis the legal tender currency.

¹⁷⁷ BCBS, (1996), p. 23.

¹⁷⁸ BCBS guidance regards gold as a foreign exchange rather than a commodity position because its volatility is more in line with foreign currencies and deposit-takers manage it in a similar manner to foreign currencies.

¹⁷⁹ Forward positions should be valued at current spot market exchange rates as using forward exchange rates would result in the measured positions reflecting current interest rate differentials to some extent. However,

(continued)

included in the spot position, the notional principal amounts for forward and future contracts where the notional amount is not exchanged, and the notional position in foreign currency options. A more accurate measure of the option position is the delta-equivalent as calculated by multiplying the market value of the underlying notional position by the “delta” of the option, which is the first-order or linear approximation of changes in the value of the option with respect to exchange rates.¹⁸⁰ If these data can be compiled, this measure of the option position is preferred. Given the potential measurement uncertainties surrounding options, a separate identification of options positions is encouraged.¹⁸¹

- Equity assets are on-balance-sheet holdings of foreign currency equity assets as defined in paragraph 4.54, and include investments in associates and unconsolidated subsidiaries (and reverse equity investments).

deposit-takers that base their normal management accounting on net present values are expected to use the net present values of each position (discounted using current interest rates and valued at current spot rates) for measuring their forward currency and gold positions.

¹⁸⁰ For deposit-takers with large short positions in foreign currency options, a more accurate second order approximation, such as “gamma” may need to be used instead of the first order (“delta”) approximation.

¹⁸¹ According to data published semi-annually by the BIS, notional values of foreign currency options are typically around 15-20 percent of the notional amount of foreign currency over-the-counter foreign currency derivatives.

Table 6.1. Net Open Position in Foreign Currencies¹⁸²

(unit of account)

| | US\$ | Euro | Yen | Other | Total |
|---|------|------|-----|-------|-------|
| 1. Financial debt assets | | | | | |
| 2. Debt liabilities (-) | | | | | |
| 3. Net position on foreign currency debt instruments (1+2) | | | | | |
| 4. Principal of financial derivative contracts in a bought position (+) | | | | | |
| <i>of which: options in a bought position</i> | | | | | |
| 5. Principal of financial derivative contracts in sold position (-) | | | | | |
| <i>of which: options in a sold position</i> | | | | | |
| 6. Net position on foreign currency debt unhedged after derivatives (3+4+5) | | | | | |
| 7. Equity assets | | | | | |
| 8. Net open position in foreign exchange for on-balance-sheet items (6+7) | | | | | |
| 9. Net receipts (+) and payments (-) not yet accrued but fully hedged | | | | | |
| 10. Guarantees (and similar instruments) that are certain to be called and likely to be irrecoverable (-) | | | | | |
| 11. Other exposures | | | | | |
| 12. Total net open position in foreign exchange (8+9+10+11) | | | | | |

Notes:

- (a) This table covers foreign currency items only. Foreign currency items are those payable (receivable) in a currency other than the domestic currency, including foreign-currency-denominated and foreign-currency-linked instruments, as described in paragraph 3.46.
- (b) Amounts to be reported should be converted into the unit of account using the mid-market spot exchange rate as of the reporting date.
- (c) Specific other currencies could be identified, such as on the basis of those particularly relevant for the economy and/or those currencies in which the deposit-takers are in the most over bought or over sold positions.
- (d) Line items 1 and 2: Debt instruments comprise currency and deposits, loans, debt securities, and other liabilities, as defined in paragraph 4.61.
- (e) Line items 4 and 5: Financial derivatives include futures, swaps, and options, as defined in paragraph 4.56. The nominal (underlying) value of the contract to buy (positive) or sell (negative) foreign currency should be reported. The nominal amount underlying foreign currency options can be reported, or the “delta”-based equivalent, if available.
- (f) Line item 7: Equity assets comprise all instruments and records acknowledging, after the claims of all creditors have been met, claims on the residual value of a corporation, such as shares, stocks, and participations, as defined in paragraph 4.54.
- (g) Line item 9: Amounts to be reported are those not yet accrued but expected to be received with reasonable certainty and are already fully hedged.
- (h) Line item 10: Includes guarantees and credit commitments, as defined in paragraphs 3.14 to 3.17, that are certain to be called.
- (i) Line item 11: Depending on local accounting conventions, this includes amounts representing a profit or loss in foreign currencies not included elsewhere in the table.

¹⁸² This table draws on the work of the Australian Bureau of Statistics (2001).

6.34 The net position of the three items above comprises the *net open position in foreign exchange for on-balance-sheet items*. The remaining items are off balance sheet and for some reporters might be more difficult to compile.

- Net future foreign currency income and expenses not yet accrued but already fully hedged—this element should be applied on a consistent basis. The *Guide* prefers to limit the expected income and expenses to those falling due in the short-term, that is, up to a year, as the reliability of the projections is likely to be diminished further into the future. However, it is understood that the Basel Accord applies no such time restriction.
- Foreign currency guarantees and similar instruments that are certain to be called and are likely to be irrecoverable are a subset of guarantees as defined in paragraphs 3.14 to 3.17.

6.35 Depending upon national accounting practice, any remaining items representing gain/loss in foreign currencies should be included under the other exposures item.

6.36 To calculate the overall net open position, the net position for each foreign currency and gold is first converted into a single unit of account (the reporting currency) using the spot rate,¹⁸³ and then summed, as shown in Table 6.2 below.¹⁸⁴

Table 6.2. Example of Measuring the Net Open Position in Foreign Exchange

| Yen | Euro | Pound sterling | U.S. dollar | Gold | Net Open Position |
|------------|-------------|-----------------------|--------------------|-------------|--------------------------|
| +50 | +100 | +150 | -180 | -35 | +85 |

6.37 For calculating this FSI, the numerator of the ratio is either the net open position in foreign exchange for on-balance-sheet items (line 49) or the total net open position in foreign exchange (line 50), depending upon the availability of data for all deposit-takers. If data are available, the total net open position is preferred. In disseminating data, it should be made clear which measure of the net open position is being employed. Capital is measured as

¹⁸³ Where a deposit-taker is assessing foreign exchange risk on a cross-border consolidated basis, it may be technically impractical in the case of some marginal operations to include the currency positions of a foreign branch or subsidiary of the deposit-taker. In line with BCBS guidance, in such cases the internal limit in each currency may be used as a proxy for the positions.

¹⁸⁴ As under the BCBS's so-called "shorthand method," this approach treats all currencies equally. For calculating regulatory capital charges, the sum for all currencies in net short positions or the sum for all currencies in net long positions, whichever is larger, is used, together with the net position in gold.

capital and reserves, and, for cross-border consolidated data, also Tier 1 capital. In the absence of data on Tier 1 capital, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be identified.

6.38 While a matched currency position will protect a deposit-taker against loss from movements in exchange rates, it will not necessarily protect its capital adequacy ratio. If a deposit-taker has its capital denominated in its domestic currency and has a portfolio of foreign currency assets and liabilities that is completely matched, its capital/asset ratio will fall if the domestic currency depreciates. By running a short position in the domestic currency, the deposit-taker can protect its capital adequacy ratio, even though the position would lead to a loss if the domestic currency were to appreciate.

(viii) Gross asset and liability positions in financial derivatives to capital

6.39 These FSIs are intended to provide an indication of the exposure of deposit-takers' financial derivative positions relative to capital. While a net matched position might suggest that the exposure is limited, counterparty risk is particularly relevant in the financial derivatives market, and thus it is important to monitor the magnitude of the gross positions.

6.40 There are two FSIs under this heading. The first is calculated by using the market value of financial derivative assets (line 21) as the numerator and the second is calculated by using the market value of financial derivative liabilities (line 29) as the numerator. Both FSIs take capital as the denominator. Capital is measured as capital and reserves, and, for cross-border consolidated data, also Tier 1 capital. In the absence of data on Tier 1 capital, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be used. Financial derivatives are defined in paragraphs 4.56 to 4.58.

(ix) Net open position in equities to capital

6.41 This FSI is intended to identify deposit-takers' equity risk exposure compared with capital. Even if the sector as a whole does not have an exposed equity position, this might not be true for individual deposit-takers or groups of deposit-takers.

6.42 Equity risk exposure is the risk that equity price changes will affect the value of a deposit-taker's portfolio, and hence, affect the capital position. It has a specific and a general component: a specific one, which is associated with movements in the price of an individual stock; and a general one, which is related to movements of the stock market as a whole. As this FSI takes data on the net position, the focus is on the general market risk.

6.43 This FSI is calculated by taking deposit-takers' open position in equities (line 48) as the numerator, and capital as the denominator. The open position should be calculated as the sum of on-balance-sheet holdings of equities and notional positions in equity derivatives. The net position is positive if it is a long position, and negative if it is a short position. The positions in the market must be calculated on a market value basis. Own equity issued by the deposit-taker is excluded from the calculation, as is equity held in associates and unconsolidated subsidiaries (and reverse equity investments). The approach adopted is based

upon that recommended by the BCBS.¹⁸⁵ Capital is measured as capital and reserves, and, for cross-border consolidated data, also Tier 1 capital. In the absence of data on Tier 1 capital, funds contributed by owners and retained earnings (including those earnings appropriated to reserves) could be used.

6.44 Regarding the notional positions of equity derivatives (which some reporters may have difficulties to compile):

- The notional positions for futures and forward contracts relating to individual equities should in principle be reported using the current market prices for the individual equities.
- Futures relating to stock indices should be reported as the marked-to-market value of the notional underlying equity portfolio.
- Equity swaps are to be treated as two notional positions. For example, an equity swap in which a bank is receiving an amount based on the change in value of one particular equity or stock index and paying an amount on the basis of the change in the value of a different equity index will be treated as a long position in the former and a short position in the latter. If one side of the swap is interest-rate based, only the equity side of the swap should be included in the calculation.
- The market value of the equity positions underlying equity options can be employed. However, as with foreign exchange options discussed above, a more accurate measure of the option position is the “delta”-equivalent as calculated by multiplying the market value of the underlying by the “delta” of the option, which is the first-order or linear approximation of changes in the value of the option with respect to exchange rates.¹⁸⁶ If these data can be compiled, they are preferred (and any associated metadata provided along with the disseminated information should be clear as to which approach was adopted).¹⁸⁷

Asset-based FSIs

(x) Liquid assets to total assets (liquid asset ratio)

6.45 This FSI provides an indication of the liquidity available to meet expected and unexpected demands for cash. As noted in Chapter 4, assessing the extent to which an asset is liquid or not involves judgment, and particularly for securities, it depends on the liquidity of

¹⁸⁵ BCBS (1996), p. 19.

¹⁸⁶ For deposit-takers with large positions in equity options, a more accurate second order approximation, such as “gamma” may need to be used instead of the first order (“delta”) approximation.

¹⁸⁷ The BCBS also allows equity options together with the associated hedged underlying position to be excluded from the calculation.

secondary markets. The latter can be monitored using market-based indicators such as bid-ask spreads and turnover figures.

6.46 This FSI is calculated by using the core measure of liquid assets (line 39) as the numerator, and total assets (line 14) as the denominator. This ratio can also be calculated by taking the broad measure of liquid assets (line 40). Liquid assets are defined in paragraphs 4.78 to 4.81, and nonfinancial and financial assets are defined in paragraphs 4.37 and 4.38.

(xi) Liquid assets to short-term liabilities

6.47 This FSI is intended to capture the liquidity mismatch of assets and liabilities, and provides an indication of the extent to which deposit-takers could meet a short-term withdrawal of funds without facing liquidity problems.

6.48 This FSI is calculated by taking the core measure of liquid assets (line 39) as the numerator, and the short-term liabilities (line 41) as the denominator. This ratio can also be calculated by using the broad measure of liquid assets (line 40) as the numerator. Liquid assets are defined in paragraphs 4.78 to 4.81, and short-term liabilities are defined in paragraph 4.83.¹⁸⁸

¹⁸⁸ Short-term is defined as one year or less, but the denominator could be calculated for liabilities of three months or less. This possibility is discussed in Appendix III.

Table 6.3. Future Cash Flows arising from Financial Derivative Contracts by Maturity 1/
(In thousands of units of account; as end of xxxx)

| | First Month | | | Second Month | | | Third Month | | | Over Three Months and Up to 12 Months | | |
|----------------------------|---------------------------|------|------------|--------------|------|------------|-------------|-------|------------|---------------------------------------|-------|------------|
| | 1-15 days | | 16-31 days | 1-15 days | | 16-31 days | 1-15 days | | 16-31 days | 1-15 days | | 16-31 days |
| | US\$ | Euro | Other | Total | US\$ | Euro | Other | Total | US\$ | Euro | Other | Total |
| Derivatives | Interest-rate-based | | | | | | | | | | | |
| | Receive | | | | | | | | | | | |
| | Pay | | | | | | | | | | | |
| | Foreign-currency-based 2/ | | | | | | | | | | | |
| | Receive | | | | | | | | | | | |
| Other types | Receive | | | | | | | | | | | |
| | Pay | | | | | | | | | | | |
| Subtotal | Receive | | | | | | | | | | | |
| | Pay | | | | | | | | | | | |
| Unsettled spot transaction | Receive | | | | | | | | | | | |
| | Pay | | | | | | | | | | | |
| Total | Receive | | | | | | | | | | | |
| | Pay | | | | | | | | | | | |

1/ Amounts to be recorded are those expected to be paid and received in each of the time bucket columns. All the data in this table should be presented in the same unit of account (such as the domestic currency).

2/ These are derivatives that involve the payment and receipt of foreign currency and those on which payments and receipts are linked to a foreign currency.

6.49 To complement the agreed FSI, Table 6.3 offers a framework for providing information on the expected cash flows underlying financial derivatives, and from the settlement of foreign currency spot positions. Increasingly such positions are important to deposit-takers in their liquidity analysis. The table provides three risk categories of derivative instruments: interest-rate based, which trade single-currency interest rate risks; currency based, which involve risk exposures to more than one currency; and other, which are primarily those that trade credit, commodity, and equity risks. If reporters are uncertain as to where to classify multi-risk exposure derivatives they are asked to classify them in the following order of precedence: other, currency-based, and single currency interest rate-based.¹⁸⁹

(xii) Customer deposits to gross (noninterbank) loans

6.50 This FSI is a measure of liquidity, in that it compares the “stable” deposit base to gross loans (excluding interbank activity). When stable deposits are low relative to loans, there is a greater dependence on more volatile funds to cover the illiquid assets in deposit-takers’ portfolios. In such circumstances, if liquidity stresses arise, there is a greater risk of illiquidity than if a stable deposit base primarily funds the loans.¹⁹⁰

6.51 The FSI is calculated by taking customer deposits (line 24 (i)) as the numerator, and noninterbank loans (line 18 (i.ii)) as the denominator. Customer deposits are defined in paragraph 4.42 to 4.44, and loans are defined in paragraphs 4.45 to 4.48.

(xiii) Return on assets (net income to average total assets)

6.52 This FSI is intended to measure deposit-takers’ efficiency in using their assets. It may be interpreted in combination with the FSI on return on equity described above.

6.53 The return on assets is calculated by dividing net income by the average value of total assets (line 14) over the same period. As a minimum, the denominator can be calculated by taking the average of the beginning and end-period positions (e.g., at the beginning and at the end of the month), but compilers are encouraged to use the most frequent observations available to calculate the average. The preferred definition of net income is net income before extraordinary items and taxes (line 8), which is defined in paragraphs 4.17 to 4.34. However, net income after extraordinary items and taxes (line 11, defined in paragraph 4.35) might be used in its stead, or additionally to it.¹⁹¹ Total assets (nonfinancial and financial) are defined in paragraphs 4.37 and 4.38.

¹⁸⁹ This ranking is consistent with that used by the BIS in its surveys of over-the-counter derivative markets.

¹⁹⁰ For instance, see Dziobek, Hobbs, and Marston (2000).

¹⁹¹ See also paragraph 6.26.

(xiv) Nonperforming loans to total gross loans

6.54 This FSI is intended to identify problems with asset quality in the loan portfolio. It may be interpreted in combination with the NPLs less specific provisions to capital ratio described above. An increasing ratio may signal deterioration in the quality of the credit portfolio, although this is typically a backward looking indicator in that NPLs are identified when problems emerge. Appropriate recognition of NPLs is essential for this ratio to be meaningful. The indicator can be viewed side-by-side with those for the nonfinancial corporate sector, as a deteriorating financial position for nonfinancial corporations in particular might well be mirrored in this ratio.

6.55 This FSI is calculated by taking the value of NPLs as the numerator and the total value of the loan portfolio, (including NPLs, and before the deduction of specific loan-loss provisions) as the denominator. NPLs (line 42) and loans (18(i)) are defined in paragraphs 4.84, and 4.45 to 4.48, respectively.

(xv) Sectoral distribution of loans to total loans

6.56 This FSI provides information on the distribution of loans (including NPLs, and before the deduction of specific loan-loss provisions)¹⁹² to resident sectors, and to nonresidents. A large concentration of aggregate credit in a specific resident economic sector or activity, may signal an important vulnerability of the deposit-taking sector to the level of activity, prices, and profitability in that sector or activity.

6.57 The numerators and denominator for this FSI are respectively lending to each of the institutional sectors (line 18 (i.i) and 18 (i.ii)),¹⁹³ and gross loans (line 18 (i)). As all sectors are covered, the sum of the sectoral ratios should be unity. The resident sectors are defined primarily in Chapter 2: deposit-takers (see paragraphs 2.4 to 2.7), central bank (2.13), general government (2.18), other financial corporations (2.14), nonfinancial corporations (2.15),¹⁹⁴ other domestic sectors (households (2.16) and NPISHs (2.17)), and nonresidents (3.35-3.36). Loans are defined in paragraphs 4.45 to 4.48.

(xvi) Residential real estate loans to total loans

6.58 This FSI is intended to identify deposit-takers' exposure to the residential real estate sector, with the focus on household borrowers. Experience has shown that in many instances, a real estate boom characterized by a rapid rise in real estate prices, has been preceded or accompanied by a boom in banking credit to the private sector, perhaps encouraged by expansionary monetary policies. Following a subsequent tightening of these policies, and/or

¹⁹² It is recognized that for some countries, data are only available on loans after specific provisions.

¹⁹³ When compiling data on the sectoral distribution of loans, lending to nonresident deposit-takers (i.i.ii) should be excluded from interbank lending and included in lending to nonresidents.

¹⁹⁴ As described more fully in Appendix III, the nonfinancial sector could be disaggregated by type of industry.

a collapse in market prices, there have been episodes of financial sector problems—usually debtors having difficulty to meet their payments. Moreover, the fall in the value of the residential real estate collateral, especially if it falls beneath the value of the loans, worsens the situation. To determine the exposure of the deposit-taking sector to the residential real estate market, it is important to have information on the size of the credit exposures secured by residential real estate, and to monitor the riskiness of the exposure, by, for example, tracking real estate prices.

6.59 The FSI is calculated by taking residential real estate loans as the numerator (line 43 in Table 4.1), and gross loans (line 18 (i)) as the denominator. Residential real estate loans are defined in paragraph 4.88 and loans are defined in paragraphs 4.45 to 4.48.

6.60 Household debt collateralized by real estate can be used as the numerator (line 25 in Table 4.4). While not all real estate lending to households is collateralized by residential real estate, such collateralized debt predominates.

(xvii) Commercial real estate loans to total loans

6.61 This FSI measures banks' exposure to the commercial real estate market. Many of the same considerations described above for residential real estate apply for commercial real estate, although the economic impact of booms and busts in commercial real estate can be different in that the range of borrowers is fewer than for households. On the other hand, the conditions that encourage booms in residential real estate borrowing may also encourage excessive commercial real estate borrowing.

6.62 This FSI is calculated by using as the numerator loans that are collateralized by commercial real estate, loans to construction companies, and loans to companies active in the development of real estate (line 44). Gross loans (line 18 (i)) is used as the denominator. Commercial real estate includes buildings, structures, and associated land used by enterprises for retail, wholesale, manufacturing or other such purposes (paragraph 4.88). Lending to those companies involved in the development of multi-household dwellings is included in the numerator. Loans are defined in paragraphs 4.45 to 4.48.

(xviii) Geographical distribution of loans to total loans

6.63 This FSI provides information on the geographical distribution of gross loans, by regional grouping of countries. It allows the monitoring of credit risk arising from exposures to a group of countries, and can help in an assessment of the impact of adverse events in these countries on the domestic financial system. If lending to any individual countries or specific sub-region of countries is particularly significant, further disaggregation—and identification of the country—is welcome.¹⁹⁵ The geographic distribution of claims is

¹⁹⁵ The BIS collects and publishes international banking statistics on both a locational (residence) and consolidated basis from a group of economies with significant international banking activities. The intention is that the definitions and institutional coverage in the *Guide* are consistent with those of the BIS. For countries meeting BIS data needs, such data serve the purpose of this FSI.

defined in paragraph 3.36. Gross loans (line 18 (i)) are defined in paragraphs 4.45 to 4.48. The suggested regional grouping of countries in the dissemination tables in Chapter 12 is based on the approach in the IMF's *World Economic Outlook*.

6.64 For cross-border consolidated data, lending is attributed on the basis of the residence of the domestic reporting entity. So, lending by any foreign branches and/or deposit-taking subsidiaries of the reporting entity to residents of the local economy in which they are located (including any local currency denominated lending) is classified as lending to nonresidents and allocated to the appropriate region of the world, while lending to residents of the economy for which the FSI data are being compiled is classified as lending to the domestic economy.

(xix) Foreign-currency-denominated loans to total loans

6.65 This FSI measures the relative size of the foreign currency loans within gross loans. Particularly in countries where domestic lending in foreign currency is permitted, it is important to monitor the ratio of foreign-currency-denominated loans to gross loans for residents because of the increased credit risk associated with the ability of the local borrowers to service their foreign-currency-denominated liabilities, particularly in the context of large devaluations or a lack of foreign currency earnings.¹⁹⁶

6.66 The FSI is calculated by using the foreign currency and foreign-currency-linked¹⁹⁷ element of gross loans (line 46) to residents and nonresidents as the numerator, and gross loans (line 18 (i)) as the denominator. Foreign currency, foreign currency instruments, unit of account, and exchange rate conversion are defined in paragraphs 3.44 to 3.48. Foreign currency loans are defined in paragraph 4.90. Total loans are defined in paragraphs 4.45 to 4.48. For cross-border consolidated data, the determination of what constitutes a foreign currency is determined by the residence of the domestic reporting entity.

(xx) Foreign-currency-denominated liabilities to total liabilities

6.67 This FSI measures the relative importance of foreign currency funding within total liabilities. The level of this ratio should be viewed along with the previous FSI: foreign currency loans to total loans. Extensive foreign currency lending funded by foreign currency borrowing in the same currency can help reduce the deposit-takers' foreign exchange exposure (although if the lending is to domestic borrowers and they have difficulty servicing the loans, in practice the deposit-taker would remain exposed). But a high reliance on foreign currency borrowing (particularly of short-term maturity) may signal that deposit-takers are

¹⁹⁶ In the special case where an economy uses as its only legal tender a foreign currency, this ratio could be compiled excluding borrowing in, and linked to, this currency.

¹⁹⁷ As with foreign-currency-denominated loans, devaluation of the domestic currency will increase the value, in domestic currency terms, of foreign-currency-linked loans.

taking greater risks, by increasing their exposure to exchange rate movements and foreign currency funding reversals.¹⁹⁸

6.68 The FSI is calculated by using the foreign currency liabilities (line 47) as the numerator, and total debt (line 28) plus financial derivative liabilities (line 29) less financial derivative assets (line 21)¹⁹⁹ as the denominator. Foreign currency liabilities are defined in paragraph 4.90. Foreign currency, foreign currency instruments, unit of account, and exchange rate conversion are defined in paragraphs 3.44 to 3.48. Total debt is defined in paragraph 4.61 and financial derivatives are defined in paragraphs 4.56 to 4.58.

Income and expense-based FSIs

(xxi) Interest margin to gross income

6.69 This FSI is a measure of the relative share of net interest earnings—interest earned less interest expenses—within gross income. This ratio may be affected by the deposit-takers' capital to asset ratio: For a given level of assets, higher capital results in lower borrowing needs, thus lowering interest expenses and increasing net interest income.

6.70 This FSI is calculated by using net interest income (line 3) as the numerator, and gross income (line 5) as the denominator. Net interest income and its components are defined in paragraphs 4.17 to 4.19, while gross income is defined in paragraph 4.20.

(xxii) Trading and foreign exchange gains (losses) to gross income

6.71 This FSI is intended to capture the share of deposit-takers' income from financial market activities, including currency trading, and so help in assessing the sustainability of profitability.

6.72 This FSI is calculated by using gains or losses on financial instruments (line 4 (ii)) as the numerator, and gross income (line 5) as the denominator. Gains and losses on financial instruments are defined in paragraphs 4.22 to 4.27, and gross income is defined in paragraph 4.20.

(xxiii) Noninterest expenses to gross income

6.73 This FSI measures the size of administrative expenses to gross income (interest margin plus noninterest income).

¹⁹⁸ In the special case where an economy uses as its only legal tender a foreign currency, this ratio could be compiled excluding borrowing in, and linked to, this currency.

¹⁹⁹ For financial derivative liabilities, it is recommended that the net market value position (liabilities less assets) be included rather than the gross liability position because of the market practice of creating offsetting contracts, and the possibility of forward-type instruments switching between asset and liability positions from one period to the next.

6.74 The FSI is calculated by using noninterest expenses (line 6) as the numerator, and gross income (line 5) as the denominator. Noninterest expenses are defined in paragraph 4.30, and gross income is defined in paragraph 4.20.

(xxiv) Personnel expenses to noninterest expenses

6.75 This FSI measures the incidence of personnel costs in total administrative costs.

6.76 This FSI is calculated by using personnel costs (line 6 (i)) as the numerator, and noninterest expenses (line 6) (i.e., not including provisions) as the denominator. Noninterest expenses and personnel costs are defined in paragraphs 4.30 and 4.31.