FOR AGENDA

SM/03/175

May 14, 2003

To: Members of the Executive Board

From: The Secretary

Subject: **Financial Soundness Indicators**

Attached for consideration by the Executive Directors is a paper on financial soundness indicators, which will be brought to the agenda for discussion **on a date to be announced**. Issues for discussion appear on pages 42 and 43.

The staff proposes the publication of this paper after the Executive Board completes its discussion together with a PIN summarizing the Executive Board's discussion.

Questions may be referred to Mr. Enoch, STA (ext. 35372) and Mr. Sundararajan, MFD (ext. 38573).

Att: (1)

Other Distribution:
Department Heads

INTERNATIONAL MONETARY FUND

Financial Soundness Indicators

Prepared by the Staff of the Monetary and Financial Systems and Statistics Departments

Approved by Carol S. Carson and Stefan Ingves

May 14, 2003

Executive Summary

- Following Board endorsement of a core and encouraged set of Financial Soundness Indicators (FSIs) in June 2001, the IMF work has promoted the compilation and use of these FSIs as a key tool of policy makers for macro-prudential surveillance.

- Consistent with Board guidance, this work has proceeded along several dimensions: the development of an FSI *Compilation Guide* to encourage national authorities to compile and disseminate FSIs; analytic work to enhance and clarify the role of FSIs in macro-prudential evaluation; and, development of the role of FSIs in Fund surveillance.

- In March 2003, the draft *Guide* was posted on the web with a request for public comment through June 20, 2003. The *Guide* is designed to provide guidance on the concepts and definitions, data sources, and techniques for the compilation and dissemination of the core and encouraged FSIs, as well as explaining the nature and types of structural information on a country's financial system that is relevant for analysis of FSIs. The intention is to finalize the *Guide* by around the end of 2003.

- The analytic work has sought to integrate FSIs more into the framework for financial stability analysis and enhance the usefulness of FSIs as a surveillance tool. Work has also focused on developing FSIs for the insurance and corporate sectors, clarifying the linkages among FSIs, and identifying how information on supervision and financial structure can help interpret FSIs.

Key proposals and work priorities

- Establishing a provisional target date for including the core FSIs, or a subset of the core FSIs, as required items in the SDDS by end-2008, and possibly as encouraged items by end-2006.

- Conducting a coordinated compilation exercise under Fund auspices for about 60 countries, after finalizing the *Guide*. A common reference date for the exercise of sometime in the second half of 2005 is provisionally envisaged.

- Strengthening our capacity to use FSIs with other surveillance tools in the framework for financial stability analysis based on analytic work that will be presented in a conference on financial stability analysis. Development of FSIs for the insurance and corporate sectors together with a review of how they should be reflected in the core and encouraged set of FSIs involving widespread consultation with member countries.

- Enhancing the role of FSIs in Fund surveillance by development of an FSI guidance note and through greater reliance on an operational FSI database, and by expanding the contribution of FSIs to the *Global Financial Stability Report* and other Fund surveillance products.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
BCBS	Basel Committee on Banking Supervision
BCP	Basel Core Principles for Effective Banking Supervision
BIS	Bank for International Settlements
BP	Background Paper on Financial Soundness Indicators
CPSS	Committee on Payment and Settlement Systems
ECB	European Central Bank
FSA	Financial Sector Assessment
FSAP	Financial Sector Assessment Program
FSIs	Financial Soundness Indicators
FSSA	Financial System Stability Assessment
FX	Foreign Exchange
GDDS	General Data Dissemination System
GFSR	Global Financial Stability Report
IAIS	International Association of Insurance Supervisors
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
MFD	Monetary and Financial Systems Department
NPLs	Nonperforming Loans
OECD	Organization for Economic Cooperation and Development
OTC	Over the Counter
ROE	Return on Equity
ROSC	Reports on Observance of Standards and Codes
SDDS	Special Data Dissemination Standard
SR/REDs	Staff Report/Recent Economic Developments
STA	Statistics Department
TA	Technical assistance
UFR	Use of Fund Resources

I. INTRODUCTION

1. **IMF work to strengthen financial system stability has involved efforts to promote the compilation and use of Financial Soundness Indicators (FSIs) as a key tool for macro-prudential surveillance.** The Financial Sector Assessment Program (FSAP) and ongoing surveillance use FSIs, along with other economic and financial indicators, to assess the financial strength and vulnerabilities of a country's financial sector. The compilation and dissemination of FSIs also support the important goal of increasing the transparency of the international financial system and strengthening market discipline.

2. **In its June 2001 discussion of FSIs, the Board welcomed the preparation of an FSI *Compilation Guide* and further analytic work on FSIs.** The *Guide* was to clarify the statistical and conceptual underpinnings of the core and encouraged FSIs endorsed by the Board (Table 1). The Board also supported further analytic work to strengthen our capacity to use FSIs as a surveillance tool to assess financial system soundness and stability and work to develop the role of FSIs in Fund surveillance. It agreed that development work should focus on the core set of banking sector FSIs, given the sector's central role in most financial systems. For the encouraged set, which contains additional banking sector FSIs and FSIs for nonbank sectors, the Board agreed that further conceptual and empirical work was needed. Within this set, many Directors thought that the compilation of FSIs for the corporate and real estate sectors should be promoted, partly because of their potential to serve as early warning indicators of risks to the banking sector. Finally, the Board indicated that IMF staff should report on this work—which is the purpose of this Board paper.

3. **Since the 2001 Board meeting on FSIs, data development work has focused on the preparation of an FSI *Compilation Guide*.** This work in a new field of economic statistics has been informed by consultation with experts from other international agencies, standard setting bodies, and IMF member countries. Analytic work has focused on developing tools for macro-prudential surveillance, improving our capacity to analyze and interpret FSIs, and clarifying the role of this surveillance using FSIs within the broader framework for financial stability analysis. It has also sought to develop the role of FSIs in Fund surveillance.

4. **This paper offers proposals for taking forward the work so as to contribute to more widespread compilation, dissemination, and analysis of FSIs by member countries and the Fund.** The objective is to enhance member country and Fund macro-prudential surveillance using FSIs. The following steps are proposed:

- Support country efforts toward more widespread compilation and dissemination of FSIs through the finalization of the *Compilation Guide*, an outreach effort built around the *Guide*, planning for a coordinated compilation exercise, hosting a conference on real estate prices, and establishing a provisional target date for including FSIs in the SDDS. This work is likely to involve some future research and continued liaison with standard setters and country authorities.

Table 1. Financial Soundness Indicators: Core and Encouraged Sets

	Core Set
Deposit-taking institutions	
Capital adequacy	Regulatory capital to risk-weighted assets
	Regulatory Tier I capital to risk-weighted assets
Asset quality	Nonperforming loans to total gross loans
	Nonperforming loans net of provisions to capital
	Sectoral distribution of loans to total loans
	Large exposures to capital
Earnings and profitability	Return on assets
	Return on equity
	Interest margin to gross income
	Noninterest expenses to gross income
Liquidity	Liquid assets to total assets (liquid asset ratio)
	Liquid assets to short-term liabilities
Sensitivity to market risk	Duration of assets
	Duration of liabilities
	Net open position in foreign exchange to capital
	Encouraged Set
Deposit-taking institutions	Capital to assets
	Geographical distribution of loans to total loans
	Gross asset position in financial derivatives to capital
	Gross liability position in financial derivatives to capital
	Trading income to total income
	Personnel expenses to noninterest expenses
	Spread between reference lending and deposit rates
	Spread between highest and lowest interbank rate
	Customer deposits to total (non-interbank) loans
	Foreign currency-denominated loans to total loans
	Foreign currency-denominated liabilities to total liabilities
	Net open position in equities to capital
Market liquidity	Average bid-ask spread in the securities market 1/
	Average daily turnover ratio in the securities market 1/
Nonbank financial institutions	Assets to total financial system assets
	Assets to GDP
Corporate sector	Total debt to equity
	Return on equity
	Earnings to interest and principal expenses
	Corporate net foreign exchange exposure to equity
	Number of applications for protection from creditors
Households	Household debt to GDP
	Household debt service and principal payments to income
Real estate markets	Real estate prices
	Residential real estate loans to total loans
	Commercial real estate loans to total loans

1/ Or in other markets that are most relevant to bank liquidity, such as foreign exchange markets.

- Further integration of FSIs into Fund surveillance as a tool to support analysis by staff of risks to financial stability, involving (i) preparation of a guidance note on using FSIs; and (ii) greater reliance on an operational FSI database to facilitate more ongoing surveillance of financial systems by staff.

- Continued development of FSIs, including a review of whether specific indicators, particularly from corporate and insurance sectors, should be added to either the core or encouraged sets, that will be based on analytic work, FSAP experiences, and consultations with member countries.

- Further analytic work aimed at enhancing our capacity to use FSIs as a surveillance tool in combination with other tools, such as stress testing and standards assessments, within the framework for financial stability analysis, and presentation of this work at a conference on financial stability analysis.

5. This paper is organized as follows: Section II briefly summarizes the work program endorsed by the IMF Executive Board in June 2001 and the work undertaken in response. Section III reviews the consultations to date on, and the main themes of, the *Compilation Guide*, as well as the next steps for finalizing the *Guide*. Section IV reviews lessons from the compilation and use of FSIs. Section V outlines recent analytic work on FSIs and how it can be used to strengthen macro-prudential surveillance. Section VI indicates how stress testing can support analysis of FSIs. Sections VII and VIII outline how information from standards assessments and on financial structure can help interpret FSIs. Section IX provides proposals for encouraging compilation and dissemination of FSIs. Section X outlines a number of proposals for strengthening macro-prudential surveillance using FSIs. Section XI outlines priorities and resource requirements. A Background Paper (BP) reports on analysis and research underlying the analytic work on FSIs presented in this paper.

II. Review of the Work Program on FSIs Endorsed by the IMF Board

6. **In its June 2001 discussion on FSIs, the Board endorsed further work on FSIs in two key areas**: the development of an FSI *Compilation Guide* to encourage national authorities to compile and disseminate FSIs; and, analytic work to enhance the role of FSIs in macro-prudential analysis.

A. Development of an FSI *Compilation Guide*

7. **In June 2001, Directors welcomed the preparation of a *Compilation Guide* to assist compilers as well as official and private users of FSIs.**[1] Since the Board discussion, STA's work on FSIs has focused on the preparation of a draft *Guide*. As described more fully in Section III, the *Guide* is intended to serve as a standard reference covering the concepts and definitions, data sources, and compilation techniques for the core and encouraged FSIs.

[1] *Concluding Remarks by the Acting Chairman: Macroprudential Indicators*. July 6, 2001 (BUFF/01/94).

To help countries prioritize work in this area, the *Guide* makes clear that the encouraged FSIs are to be compiled as country circumstances require, while the core FSIs are considered relevant for all countries. The *Guide* aims to provide a coherent conceptual framework for compiling internally consistent indicators, which rely as far as possible on existing data sources. The detailed definitions are formulated to be flexible to accommodate different types of data drawn from diverse sources. In March 2003, the draft *Guide* was posted on the web with a deadline for public comments of June 20, 2003. The draft *Guide* is an accompanying document to this report.

8. **Promoting comparability of FSIs between countries is an important goal of the *Guide* that would be supported by countries' adoption of internationally agreed accounting, supervisory, and statistical standards.** Consistent with Board guidance, staff have collaborated actively with relevant international standard setting organizations to promote harmonized standards and practices that will improve the reliability and comparability of FSIs across countries.

9. **In preparing the *Guide*, staff drew extensively from the experience gained in the FSAP and consultations with member countries and international organizations**. The process of consultation, review, and drafting, leading to the completion of the draft *Guide,* is described in Section III.

10. **Staff have disseminated information about FSIs to all member countries**. This information included the Concluding Remarks of the Chairman on the June 2001 Board meeting and the Occasional Paper 212 *Financial Soundness Indicators: Analytical Aspects and Country Practices.* Also, STA has introduced a specialized lecture on FSIs in its regular monetary and financial statistics training programs at the Fund headquarters and regional training centers.

11. **Regional seminars for IMF member countries on the *Compilation Guide* have begun.** The first offerings were in April 2003 at the Joint Vienna Institute and the European Central Bank (ECB). Additional offerings are scheduled in other regional training centers. A joint conference with the BIS on real estate indicators is scheduled for October 2003.

B. Analytic Work Using the FSIs

12. **In its discussion, the Board endorsed a core set of banking sector FSIs based on the criteria that they are highly relevant in a wide range of countries, that data are available, and that there is a clear understanding of how they should be used.** It indicated that analytic work should focus on developing the role of these FSIs as a surveillance tool within the broader framework for vulnerability assessment. With respect to the encouraged set, the Board endorsed analytic work to clarify the specification and use of these FSIs, especially for the corporate and real estate sectors, given their potential to detect risks to the financial sector at an early stage, and for nonbank financial sectors. Finally, the Board endorsed the development of an FSI database to support macro-prudential surveillance

using FSIs by Fund staff. Much of the analytic work presented in this Board paper is reported in greater depth in the attached Background Paper (BP).

13. **Analytic work has sought to enhance the usefulness of FSIs as a surveillance tool by clarifying the linkages among them based on accounting and lending relationships.** This helps assess, for example, how shocks to the corporate sector can influence asset quality and, ultimately, the capital ratio. It has aimed to strengthen macro-prudential surveillance by integrating the analysis of FSIs with other surveillance tools, such as stress testing. It has also sought to define how FSIs can contribute to country surveillance through analysis of macro-financial linkages (BP, Chapter 1). In parallel, work has proceeded on developing the role of FSIs in Fund surveillance, partly through the development of an operational FSI database.

14. **Consistent with Board guidance, work on encouraged FSIs has focused on developing FSIs for the insurance and corporate sectors (BP, Chapter 3 and 5).** It has sought to clarify how shocks to these sectors can pose a risk to financial stability and when these risks are likely to be significant enough to warrant monitoring. Corporate sector FSIs have proven especially important in FSAPs for assessing indirect credit risk to the banking sector from the exchange rate exposure of the corporate sector. Analytic work has sought to develop the role of corporate sector FSIs as early warning indicators to detect risks to the financial sector at an early stage. This analytic work and experience with FSIs on FSAPs, provide a basis for considering whether corporate sector FSIs should be moved into the core set and a small number of essential insurance FSIs should be added to the encouraged sets initially, and considered for the core set at a later stage. This flexibility is consistent with the goal of ensuring that the specification of the two sets continues to reflect our evolving surveillance priorities and needs. Any changes to the two sets, however, should be made only after extensive consultation with member countries.

15. **An analysis of how FSIs were used in 52 FSAPs highlighted how stress testing and FSIs were used as complementary surveillance tools.** Specifically, in the assessment of market risk, interest rate and exchange rate stress tests were sometimes used in place of FSIs of duration and the net open position in foreign exchange relative to capital. Analytic work shows that these FSIs and stress tests are closely related at the analytic level and serve as alternative approaches to assessing essentially the same risk in FSAPs (BP, Chapter 4). This suggests that going forward, there is considerable scope to integrate the analysis of FSIs and stress testing in macro-prudential surveillance.

16. **Another avenue of analytic work has focused on identifying information to help interpret FSIs derived from other FSAP tools for strengthening financial stability, such as standards assessments.** These assess and help strengthen other dimensions of financial system stability—effective financial sector supervision and a robust financial sector infrastructure (BP, Chapter 6)—but can be used to support macro-prudential surveillance (the third dimension). Conversely, the analysis of FSIs can contribute to the effectiveness of these other tool by identifying areas of weakness in the financial system on which they need to focus.

III. COMPILATION GUIDE

17. This section describes the consultations on the *Compilation Guide on Financial Soundness Indicators (Guide),* outlines the *Guide's* main themes, and sets out the way forward. The *Guide* is intended to be a tool to facilitate compilation of FSIs by national authorities for use in their policy making and for Fund surveillance. Also, the *Guide* is intended to promote cross-country comparability of FSI data and to assist compilers and users of FSI data.

A. Consultations on the *Guide*

18. Staff have collaborated with the International Accounting Standards Board (IASB), the Bank for International Settlements (BIS), the Basel Committee on Banking Supervision (BCBS), and other international and regional organizations in drafting the *Guide*. Such consultations served the purpose of encouraging further international harmonization of standards and to harmonize the FSIs with these contemporary accounting and supervisory standards (see Box 1). A distinct challenge to this process is the ongoing evolution of both financial accounting and supervisory standards.

19. **In March 2003, the draft *Guide* was posted on the Fund's external website to elicit further comments.** A call for public comment was also issued to central banks, Ministries of Finance, bank supervisory agencies, and statistical agencies of IMF-member countries, as well as to academics, financial market participants, and other interested users in the private sector. Staff will prepare for the Board meeting a note summarizing the comments received by mid-May.

B. Major Themes of the *Guide*

20. The *Guide* starts from the presumption that, as far as possible, the conceptual framework from which data series are drawn is consistent both internally and with other related international statistical and accounting guidance. Such an approach reduces the burden on compilers and respondents, promotes synergies with other economic data series, and through well-established accounting inter-linkages enhances the analytical usefulness of the indicators.

Overview

21. The *Guide* is designed to provide guidance on the concepts and definitions, data sources, and techniques for the compilation and dissemination of the core and encouraged FSIs endorsed by the Executive Board at its meeting in June 2001. The draft *Guide* is a comprehensive document that relies as far as possible on existing data sources and concepts. It develops a conceptual framework focused on income and expense and balance sheet statements that promotes a coherent approach in the classification and coverage of

Box 1. The Consultative Process on the *Guide*

- **June 2002**: Wide consultation began with a meeting of experts 1/ held at Fund headquarters to discuss conceptual and practical issues related to the compilation of FSIs. A short paper on the major issues that the *Guide* needed to address was prepared by Fund staff and discussed by the experts. The meeting concluded that the *Guide* should aim at providing a set of best practices, but noted that countries are initially likely to rely on existing data sources. They emphasized the numerous difficulties that would be faced in compiling consistent FSIs.

- **September 2002**: A consultative meeting was held at Fund headquarters to review a preliminary draft of the *Guide*. Participants in the June meeting were invited again, and each Executive Director was invited to nominate an expert from his or her constituency. The meeting endorsed the general approach taken in the preliminary draft, and made numerous technical comments that are reflected in the draft version of the *Guide* attached to this paper. The experts from member countries expressed particular interest in knowing what data are likely to be required by the Fund.

- **December 2001 and October 2002**: Fund staff visited the ECB, BIS, and Organisation for Economic Co-operation and Development (OECD) to discuss the Fund's work on FSIs and to gain a greater understanding of work being undertaken by others. Staff recognize the importance of achieving broad ownership within the international community of this initiative. The agencies visited shared these views, as did member countries.

- **October 2002:** Fund staff conducted bilateral discussions with the secretariat of the Basel Committee on Banking Supervision (BCBS) and in October 2002 made a presentation on the draft *Guide* to the BCBS's Accounting Task Force.

1/ Attendees included representatives of the Asian Development Bank (ADB), Association of Supervisors of Banks of the Americas, Bank for International Settlements, OECD Working Party on Financial Statistics, East and Southern African Banking Supervisors Group, European Central Bank, International Accounting Standards Board, World Bank, and U.S. Federal Reserve System.

transactions and positions to derive internally consistent data series for use in calculating FSIs. Guidance is also provided on measurement issues new at the international, or even national level, such as for real estate prices and certain financial market information. The experts at the September meeting endorsed this general approach to the development of the *Guide*.

22. **The *Guide* also explains the nature and types of structural information on a country's financial system that is relevant for analysis of FSIs.** While not required to calculate FSIs, as noted by Directors in the discussion in June 2001, information on the degree of foreign and government ownership, the concentration of assets in the deposit-taking sector, and other structural features of a country's financial system could enrich the analytic value of FSIs by helping to indicate specific country circumstances.

23. **Further, the *Guide* discusses dispersion and peer group analysis as a valuable supplement to the analysis of FSIs**. Reflecting the Board discussion in June 2001, The *Guide* recognizes that the aggregation process can sometimes hide useful information, and covers how the aggregate FSIs can be supplemented by peer group analysis and measures of dispersion and concentration.

24. **The *Guide* focuses on deposit-takers (banks), but many of the underlying compilation principles can be applied to other sectors.** The conceptual framework is described in Chapters 2 through 5 of the *Guide*, while Chapters 6 and 7 explain how the data so compiled are used to calculate the individual FSI ratios. In addition, Chapters 8 and 9 provide advice on compiling other market-related indicators. Chapters 10 through 12 cover compilation and dissemination issues, while Chapter 13 covers peer group and dispersion analysis. The *Guide* has several appendices including one that for ease of reference sets out one page summaries of the advice for each FSI.

Conceptual framework

25. **Financial soundness indicators are a new branch of economic statistics that straddles several measurement disciplines.** FSI data have a prudential aspect that draws on the supervisory and financial accounting concepts developed to monitor the condition of individual financial institutions, and a macro aspect that looks at information on the sector as a whole drawing on economic statistical measures. Thus, in developing its conceptual framework staff has taken account of developments in related international accounting, regulatory, and national accounting systems, and, whenever possible, has drawn on existing data definitions, concepts, and systems.

26. **The draft *Guide,* in line with supervisory and financial accounting, promotes the idea of compiling sector data for corporations, including deposit-takers, on a consolidated group basis.**[2] This approach eliminates double counting (gearing) of capital, and of income and assets arising from the intra-group activity—that is, activity that rests on the same pool of capital. For similar reasons, the *Guide* recommends that intra-sector equity investments be deducted from the sector-level capital, and gains and losses arising from the intra-sector claims and intra-sector transactions be excluded from the sector's net income or capital and reserves. On the other hand, to monitor risk exposures and the potential for contagion, for gross assets (and liabilities), the *Guide* recommends as a general principle the inclusion of gross interbank claims and liabilities in the sector-level data.

27. **Consistent with the concept of home country banking supervision, the *Guide* requires that data be compiled on a cross-border basis for domestically incorporated deposit takers that are domestically controlled**. Further, the *Guide* encourages the compilation of data for all domestically located deposit-takers (domestic and foreign

[2] The *Guide* recommends that only group entities that meet the sector definition be included in sector data.

controlled),[3] an approach that promotes understanding of the relationship between the financial system and the macroeconomy.[4] Whether to compile separate information on domestically located foreign controlled deposit-takers is a judgment the *Guide* leaves to the national authorities based on their own national situation.

28. **As measures of capital for deposit-takers, the draft *Guide* focuses on regulatory capital and Tier 1 capital in particular.** Tier 1 is a core measure of capital widely used in countries' banking systems and is the basis on which market and supervisory judgments of capital adequacy are made. The *Guide* also provides a total measure of capital as recorded in the balance sheet, which can be used for gauging the total capital resources available to the sector but is typically more volatile than Tier 1 capital.

29. **The appropriate approach to valuation of financial instruments has been subject of particular debate.** At the September meeting, no consensus was reached on whether the *Guide* should recommend the use of market or fair valuation (approximation of market value) as a general principle, although the representative of the IASB noted that the accounting profession is moving toward full fair value accounting. As currently drafted, 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. When an instrument is tradable, the expectation is that it should be valued at market or fair value. For nontradable instruments, the *Guide* acknowledges that nominal value[5] (supported by appropriate provisioning policies) may provide a more realistic assessment of value, but as markets and valuation techniques develop, the likelihood could increase of estimating fair values for nontraded instruments.

30. **Regarding nonperforming loans, there was consensus among experts at the September meeting that these loans should be defined as those with overdue payments of interest or principal of 90 days**, with some latitude for special situations. On provisioning policies, the divergence of situations is such that the draft *Guide* proposes reliance on national practices in determining loan loss provisions but recommends that such practices be clearly documented. Further work is envisaged in identifying best practices.

31. **The *Guide* allows some flexibility in the application of detailed definitions, such as for liquid assets and large exposures**. While recognizing the importance of cross-country comparisons, such an approach may be important in helping countries meet new financial sector data needs for Article IV consultations and for FSAPs in the short-term by accommodating the different types of data that are currently used and variations in national

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[3] Including government-controlled deposit-takers.

[4] The BIS' international banking statistics are also compiled on a cross-border domestically controlled and domestically located basis. During discussions with BIS, the potential synergies between FSI and international banking data if a consistent approach to institutional coverage is adopted was discussed.

[5] Nominal (or book) value reflects the value of the claim/liability at creation and any subsequent economic flows, including valuation changes other than market price changes.

practice. In the absence of fully harmonized national practices, the *Guide* encourages the preparation of metadata that describe the attributes of the underlying data and facilitate interpretation of FSIs.

32. **Also, there is limited international experience in constructing representative real estate price indices**. The diversity of real estate markets and lack of standardization contribute to high data collection costs. Thus, the *Guide* describes a range of techniques whose application can be based on local needs, conditions, and resources rather than recommending a single set of indices or compilation methods. Looking ahead, Fund and BIS staff intend to jointly conduct a conference of experts in real estate prices in October 2003 to support work to improve data availability in this important field.

33. **The *Guide* provides advice on the reporting of financial statement data by individual institutions on a basis that facilitates peer group and dispersion analysis**. However, in view of the additional data demands this can involve, it is recognized that peer group data might well be compiled on an approximate, best endeavor, basis so allowing the identification of trends.

34. **Further, the *Guide* recognizes that conditional or contingent items represent potential exposure to risks that should be monitored from a macroprudential viewpoint, and encourages the collection of data on such items**. Except for the off-balance sheet elements of risk-weighted assets, large exposures, and net open position in foreign exchange, monitoring such items however goes beyond the core and encouraged FSIs.

Issues for cross-country consistency of FSIs

35. **The *Guide* provides both general and specific compilation advice, while recognizing that practical experience in compiling FSI data is still relatively limited.** In the short-term compilers are likely to rely mainly on existing data sources based on accounting standards that may vary across country. But for the medium-term, Fund staff will encourage efforts to meet the requirements of the *Guide*, not least through the coordinated compilation exercise described ahead.

36. **Limited knowledge is available on countries' methods of collecting consolidated supervisory data and on how such data could be aggregated**. However, data collection for supervisory and regulatory purposes typically has a statutory basis, and experience suggests that these data may be more reliable than those collected for economic statistical purposes in economies with weak statistical systems.

37. **Further, while there are internationally agreed supervisory requirements, the methods by which these are implemented vary by country**. Also, the accounting standards that supervisors regard as a basis for relevant and reliable measures of income and expense and balance-sheet items, and of capital adequacy still vary across countries, although the IASB is working toward common international standards. Thus, whether and how much additional information would be needed to supplement supervisory sources to compile the FSI data for deposit-takers is likely to vary from country to country. Also, differences in

country accounting practices underscore the need for metadata to facilitate interpretation of national FSIs.

38. **For those countries relying on traditional macroeconomic data sources, additional data series will be required.** This is because many of the concepts underlying the list of FSIs, particularly for deposit-takers, are supervisory in nature. Examples include data series on nonperforming loans and provisions, with a full list provided in the *Guide*.

39. **The *Guide* makes clear that in determining the need to collect new data, and hence incur an increased resource cost, authorities must make a judgment as to the likely importance of the contribution of the additional data series to surveillance**. For instance, where an additional series, such as data covering any provisions on intra-sector loans, would have an insignificant impact on an FSI ratio, the case for collecting such data is diminished.

C. Completion of the *Guide*

40. **The intention is to finalize the *Guide* by around the end of 2003**. The intervening months are expected to include the following activities:

- Obtaining comments up to June 20 on the draft *Guide* posted on the Fund's website.
- Continue the series of regional outreach seminars that was initiated in April 2003.
- Conducting a seminar for Fund economists on the *Guide*.
- Undertaking further research as identified by the Board or during outreach and other consultations.
- Continuing contacts with international standard setters and other relevant international and regional agencies, and incorporating into the *Guide* the latest information on international accounting and supervisory standards.
- Updating the *Guide* with additional information gained from the FSAP, Basel core principles assessments, and Fund surveillance.
- Reconvening the expert group in the Fall of 2003 to review the revised draft *Guide* prior to presentation of a final version to the Executive Board for endorsement on a lapse of time basis.

41. **The completion of the draft *Guide* will need to take account of evolving International Accounting Standards, New Basel Capital Adequacy Accord, and other relevant international standards**. In this regard, staff will maintain contacts with relevant international standard setters, in particular with the IASB, bank supervisors, the BIS, and the OECD (on bank profitability information).

42. **Further, it is recognized that macro-prudential analysis is evolving.** Additional research is therefore anticipated on topics and institutions that affect macroprudential analysis, beyond that covered in the *Guide*. This includes areas such as statistics on real estate exposures, nonbank financial institutions (including insurance companies), and Islamic financial institutions. The results of such research can be promulgated perhaps through supplements to the *Guide*.

IV. Lessons on the Compilation and Use of FSIs

A. Survey of Data Availability and of Staff Reports

43. The results of the IMF *Survey on Macroprudential Indicators* provides information on practices in 100 countries in collecting, compiling, and disseminating FSIs. Additional work may have been undertaken in some countries since the survey was conducted in mid-2000, but the results provide a useful baseline for assessing how close IMF membership might be to collecting and disseminating data on the core and encouraged indicators.[6] A recently published detailed analysis of the results highlights the following key points:[7]

- Ninety percent of respondents collect data series needed to compile at least one indicator in the core FSI categories of capital adequacy, asset quality, earnings and profitability, and liquidity. Fewer respondents (61 percent) collect data series on at least one core market risk FSI. A large number of countries therefore appear to have an elementary data set for monitoring the soundness of the banking sector (BP, Chapter 2).

- Eighty percent or more of the survey respondents collect data on 10 of the 15 core indicators. Less widespread is the collection of data on large loans to own funds, nonperforming loans net of provisions to total assets, and net foreign currency position to own funds. Only 20 percent of respondents collect data on duration of assets and liabilities.

- There is widespread paucity of data for the encouraged indicators, particularly outside the advanced economies. Data on indicators of corporate and household sectors and real estate markets are particularly scarce, with a large number of countries compiling none of the indicators for these sectors.

- There is room for countries to increase their public dissemination of data collected on the core and encouraged indicators, especially outside the transition economies.

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[6] Because the survey was voluntary, it is likely that countries active in FSI-related work are more likely to have responded to the Survey, resulting in a (positive) self-selection bias in the results.

[7] Slack (2003), *Availability of Financial Soundness Indicators*, IMF Working Paper (WP/03/58).

- Countries do not always use the data they collect on the numerator and denominator of the FSI to compile FSI ratios, perhaps suggesting that FSIs are not fully integrated into countries' financial soundness analysis.

44. To ascertain current dissemination practices, staff reviewed in early 2002 the dissemination of FSIs through Staff Reports/Recent Economic Developments (SR/REDs)[8] and national data websites and publications.[9]

- For the SR/REDs, most emerging and developing economies disseminate data for the Basel Capital Adequacy Ratio, nonperforming loans relative to total assets, and for the spread between reference lending rates and deposit rates; data for market-risk FSIs and information related to real estate markets were not available in most cases.

- The review of member country websites revealed both a general lack of information and generally no centralized website to disseminate FSI data.[10] Where available, FSI data were scattered among websites maintained by different agencies, with FSIs often presented along with the full accounting statements from which they are derived. Dissemination of metadata tended to be perfunctory or absent, although there were some notable exceptions.

- A small number of countries publish Financial Stability Reports, generally on an annual basis. Some provide a range of FSIs for the entire banking sector or individual banks.

45. **In summary, the review revealed that users face considerable obstacles in finding FSI data and their associated metadata for virtually all member countries, and there is a lack of centralized dissemination.**

B. Experiences Using FSIs in FSAPs

46. **An analysis of experiences using FSIs in FSAPs drawing on an FSI database motivated much of the analytic work reported below.** This database contains FSIs that are monitored for the inter-departmental quarterly vulnerabilities exercise and used in the *Global Financial Stability Report (GFSR)*, and FSIs compiled on FSAPs. Its role in IMF country surveillance should expand with the broadening of its coverage as more countries start to compile and disseminate FSIs. This should allow it to also serve as an effective tool for

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[8] In the June 2001 discussion on FSIs, Directors supported the proposal for a more systematic compilation of FSI data in the context of the FSAP and in those Article IV consultations where in-depth financial sector assessments are undertaken. Further noted in the concluding remarks, FSIs will also be included in Article IV consultations reports where data are available.

[9] In total, 126 countries were covered in this review.

[10] The ADB maintains a website of FSIs for its member countries.

monitoring the financial sector in Article IV surveillance and enhance its contribution to the GSFR. The present coverage of FSAPs in the database reveals how frequently different FSIs were used on FSAPs. In the cases of FSIs that were compiled relatively infrequently, a follow-up survey of the economists who conducted the financial stability analysis on the FSAPs was used to better understand why this was the case (BP, Chapter 4).

47. **The database shows that core FSIs were compiled in the categories of *capital adequacy, asset quality, profitability and earnings* and *liquidity* on almost all FSAPs (Table 2).** Within each category, however, not all FSIs were compiled, partly because they were viewed as substitutes for one-another according to the survey. In contrast, FSIs of the sensitivity to market risk were not compiled on 43 percent of all FSAPs. A notable finding was that there were several core FSIs that were compiled infrequently on FSAPs: large exposures to capital (23 percent); and duration of assets and of liabilities (6 and 8 percent, respectively). Encouraged FSIs were compiled much less frequently, often due to lack of data.[11]

48. **The follow-up survey indicated that the large exposure FSI was compiled infrequently in countries with larger financial systems and a substantial number of banks.** The reason is that each bank tends to have a different set of large exposures, resulting in a very large number of counterparties for the banking sector as a whole. Thus, each FSI generated by aggregating banks' large exposure to an individual counterparty was often a very small percentage of the sector's total exposure that was not regarded as informative. Rather, respondents indicated that the FSI was likely to be informative in smaller or less developed financial systems with a small number of relatively large enterprises and banks. However, in these cases a consideration limiting compilation of this FSI was the need to keep the identity of individual counterparties confidential.

49. **FSIs of *sensitivity to market risk* were compiled on 57 percent of all FSAPs, but for developed economies the share was much lower, at roughly 40 percent. The follow-up survey provided some explanations for this**:

- In *developed and emerging market economies with sophisticated financial markets*, these FSIs were perceived as relatively rough indicators that provides a less accurate measure of risk of some off-balance sheet market exposures than stress tests.
- In *developing countries*, these FSIs were most often not compiled either because market risk was not regarded as important or due to a lack of data. For example, in economies where securities had very short maturities or variable interest rates, duration FSIs were not compiled because interest rate risk was viewed as negligible.

[11] This is the reason the real estate price FSI is almost never compiled, despite the key role of real estate price bubbles in many financial crises. To address this gap in data, a conference on compiling this FSI is proposed.

Table 2. Reporting of FSIs on FSAPs, 1999–2003
(Percentage of FSAPs reporting the FSI 1/)

Core FSIs		*Core FSIs*	
Capital adequacy 2/	98	*Liquidity* 2/	83
Regulatory capital to risk-weighted assets	98	Liquid assets to total assets	70
Regulatory tier 1 capital to risk-weighted assets	42	Liquid assets to short-term liabilities	55
Asset quality 2/	100	*Sensitivity to market risk* 2/	57
Nonperforming loans to total gross loans	100	Duration or repricing period of assets	6
Nonperforming loans net of provisions to capital	40	Duration or repricing period of liabilities	8
Sectoral distribution of loans to total loans	60	Net foreign exchange position to capital	55
Large exposures to capital	23		
Earnings and profitability 2/	98	***Selected Encouraged FSIs***	
Return on assets	94	Banks' capital to assets 3/	53
Return on equity	91	Market liquidity 4/	40
Net interest income to gross income	64	Corporate leverage and profitability 5/	28
Noninterest expenses to gross income	58	Household indebtedness 6/	11

Source: International Monetary Fund.

1/ Includes 53 FSAPs completed or near completion by end-February 2003.
2/ The percentage of FSAPs that reported at least one indicator in the group.
3/ An encouraged FSI, but used in place of capital adequacy ratios when these were not available.
4/ FSIs of average bid-ask spread and average daily turnover ratio in the securities market.
5/ FSIs of corporate sector's total debt to equity, return on equity, and earnings to interest and principal expenses.
6/ FSIs of household debt to GDP and household debt service and principal payments to income.

50. **The follow-up survey also revealed that when FSIs of sensitivity to market risk were not compiled on FSAPs, stress testing was often used to assess this risk instead.** Specifically, the exchange rate and interest rate stress tests was used instead of the corresponding FSIs on over 80 percent of the FSAPs where the FSIs were not compiled (Table 3). On the FSAPs where these FSIs were compiled, the corresponding stress tests were also generally conducted.

Table 3. Market Risk Stress Tests and FSIs on Sensitivity to Market Risk
(In percent of all FSAPs included in the survey)

	Duration (or repricing period) of		Net open position in
	assets	liabilities	foreign exchange
FSI reported	6	8	55
of which: stress test conducted	6	8	55
stress test not conducted	0	0	0
FSI not reported	94	92	45
of which: stress test conducted	83	81	36
stress test not conducted	11	11	9

Source: Survey on uses of FSIs on sensitivity to market risk (see the background paper).

51. **The reason given is that stress testing was perceived as offering advantages over FSIs as a surveillance tool for assessing sensitivity to market risk.** Stress testing provided a more easy to interpret measure of loss in the form of the impact of a plausible interest rate or exchange rate shock that can be implemented through individual banks' risk management models. In countries with more sophisticated financial markets, market risk stress tests were regarded as better able to capture the market risk associated with off-balance sheet derivative exposures. Market risk stress tests are now a standard part of many banks' risk management and can be aggregated for standardized shocks to obtain an estimate of loss for the financial sector as a whole that can be used as an indicator with, or even in place of, the FSIs on FSAPs.

52. **In some developing countries, stress testing was used because it provided flexibility to address data limitations.** This was the case, for example, in countries where data were only available on a contractual rather than a residual maturity basis. In some of these cases, FSAP missions were able to make adjustments to the available data to approximate residual maturity based on interviews with banks and the authorities, and use them in stress tests. The missions were not willing, however, to use these estimates to compile duration FSIs because they were not actual data.

53. **This review of FSAP experiences motivated some of the analytic work reported below by helping to identify ways in which the usefulness of FSIs could be enhanced.** Specifically, the finding that market risk was often assessed using stress testing instead of FSIs prompted analytic work showing that market risk FSIs and stress tests are closely related at the analytic level and, thus, provide different approaches to assessing essentially the same risk (BP, Chapter 4). It is important to recognize, however, that while stress testing can substitute for the market risk FSIs on FSAPs, it generally would not be practical to do this for ongoing surveillance.

V. Using FSIs within A Framework for Financial Stability Analysis

54. **Analytic work on a framework for financial stability analysis has sought to better integrate different dimensions of financial system surveillance to more effectively assess the impact of shocks to the financial system.** This involves, first, identifying the risk of a shock hitting the financial sector. Second, assessing the vulnerability of the financial sector to these shocks using FSIs and their potential impact on capital adequacy. And, third, analysis of macro-financial linkages to obtain an indication of the effect on macroeconomic conditions and debt sustainability if the intermediation capacity of the financial sector is impaired. It needs to be borne in mind that the improvements in macro-prudential surveillance deriving from this work will depend partly on the effectiveness of efforts to encourage widespread compilation and dissemination of FSIs by countries.

55. **This section outlines the contribution this work to financial sector surveillance, while the background paper provides the supporting analysis and research**. It first provides an overview of the framework for financial stability analysis and then presents specific aspects of this work clarifying how FSIs are used and the linkages among them, and

on the role of FSIs in the analysis of macro-financial linkages. Also considered is how this work could be reflected in the specification of the core and encouraged sets of FSIs. In Sections VI-VIII, work is also presented on how the analysis of FSIs can be integrated with other tools for strengthening financial stability, such as stress testing and standards assessments.

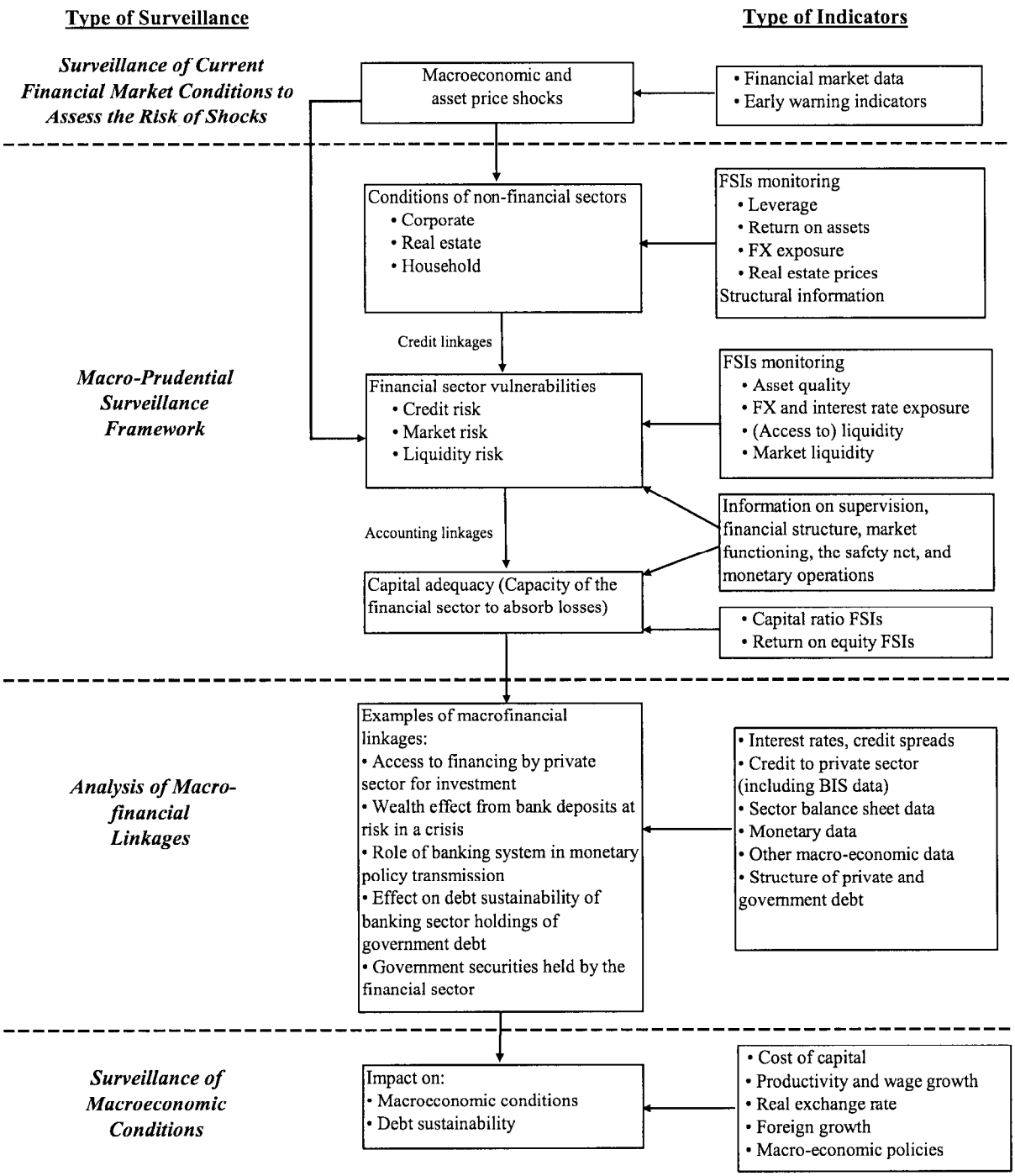
A. Framework for Financial Stability Analysis

56. **Figure 1 illustrates the role of macro-prudential in surveillance using FSIs within the framework for financial stability analysis.** This framework also encompasses surveillance of financial market conditions and the analysis of macro financial linkages. It, in turn, is part of the broader framework for vulnerability assessment, which includes the balance sheet approach, debt sustainability analysis and monitoring of macroeconomic conditions. The figure indicates that FSIs are part of a larger body of information used in this framework whose purpose is to monitor the vulnerabilities and capital adequacy of the financial sector. This information includes early warning indicators, a variety of data needed to assess macro-financial linkages, and qualitative information on financial structure and supervision that help interpret FSIs. The figure highlights the relationship between these different elements of the framework for financial stability analysis, where macro-prudential using FSIs monitors the impact of shocks on the financial sector but does not indicate how likely they are, while financial market surveillance indicates the likelihood of a shock. It also shows that to asses how a deterioration in the condition of the financial sector, detected using FSIs, will affect macroeconomic conditions, an analysis of macro-financial linkages is needed. Much of the analytic work reported in this paper has been aimed at understanding the linkages in this framework.

57. **The figure identifies three categories of FSIs with different roles:** assessing the condition of non-financial sectors; monitoring financial sector vulnerabilities arising from credit, liquidity and market risk; and, assessing the capacity of the financial sector to absorb losses, as measured by capital adequacy. The purpose of financial sector FSIs is to monitor the soundness of the financial sector, while the role of non-financial sector FSIs is largely to serve as a leading indicator to detect a deterioration in soundness at an early stage. Moreover, these vulnerabilities and capital adequacy should be monitored for both the sector as a whole and for key peer groups that are sources of risk to financial stability (see BP, Chapter 1 for discussion). The figure illustrates two ways in which shocks can affect the financial sector: through non-financial sectors; and, through the direct impact on the financial sector's balance sheet. For example, an exchange rate depreciation can impose losses directly on the banking sector but also has an indirect effect on asset quality by causing losses in the corporate sector.

58. **While FSIs are concerned with the assessing financial strengths and vulnerabilities, they can also be useful in the analysis of macro-financial linkages between the financial sector and macroeconomic conditions.** These linkages derive from the dependence of the real economy on financial intermediation and are typically analyzed in the context of the macroeconomic review of a country. FSIs support this analysis because they help detect the deterioration in financial sector soundness that impacts macroeconomic

Figure 1. Analytic Framework for Financial Stability



conditions through different linkages. While macro-financial linkages differ across countries, they are likely to include: the dependence of non-financial sectors on bank financing; deposits and wealth placed with the financial sector; the role of the banking system and financial markets in monetary policy transmission; and, the impact of financial sector developments on debt sustainability.

B. Analysis of Linkages Among FSIs

59. **While different FSIs monitor specific vulnerabilities and the capital adequacy of a financial sector, an analysis of the accounting and lending relationships between them should facilitate more effective monitoring of the channels through which shocks affect financial sector soundness.** Specifically, an analysis of the linkages deriving from credit relationship between the non-financial and banking sectors FSIs, allow FSIs for such as real estate prices or corporate leverage to be used as an early warning of a deterioration in asset quality FSIs. Similarly, analysis of the linkage through provisioning and loan classification accounting rules between FSIs of asset quality and capital adequacy can help predict how shocks affecting asset quality could eventually reduce the capital strength of the sector.

Asset quality and capital adequacy

60. **The linkages between FSIs of asset quality and capital adequacy derives from loan classification and provisioning rules that determine when, and how much, banks provision against NPLs.** Thus, these rules influence the size and timing of any reduction in capital that results from a deterioration in asset quality. Since these rules vary across countries, the linkages are likely to be different for each country. Especially when banks have significant discretion in classifying loans or there may be forbearance, close attention needs to be paid to these rules because of the greater scope for banks to under report the actual deterioration in credit quality by, for example, evergreening loans. Similarly, inadequate provisioning rules enable banks to delay addressing credit problems, which are likely to become more serious over time as a result.

61. **To assess the capacity of the financial sector to absorb losses using the capital adequacy FSIs, attention needs to be paid to the "quality" of the capital.** Specifically, greater protection against shocks is provided by capital that can be used to compensate creditors in a bank insolvency—shareholder equity, retained earnings and realized reserves—used in the **tier 1 capital ratio**. In contrast, other forms of capital—subordinated debt, tax arrears and unrealized capital gains—may not always be available for this purpose. Definitions of capital can vary significantly and need to be examined for each country. A valuable source of information on provisioning rules and how capital is defined are Basel Core Principles assessments (see Section VII and BP, Chapter 6).

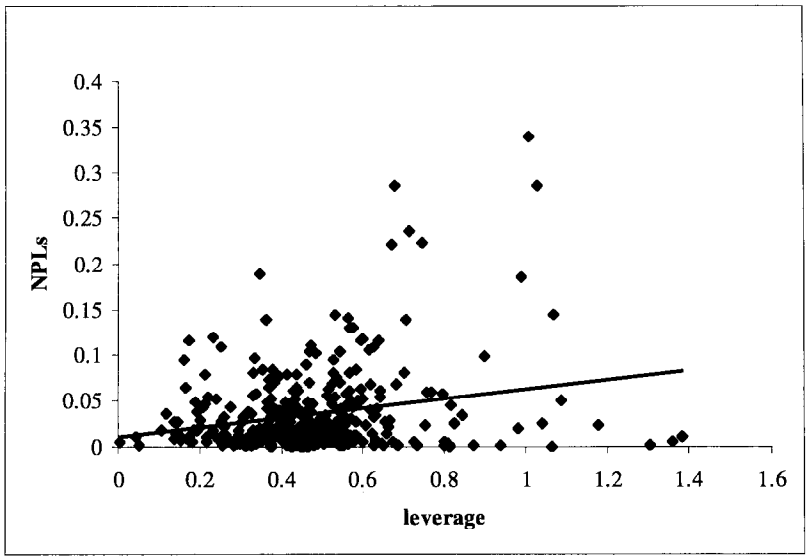
Corporate leverage and asset quality

62. **FSIs monitoring the financial condition of the corporate sector are useful because they can detect a deterioration in asset quality at an early stage before it is reflected in NPLs.** They help compensate for the fact that NPLs, the best available measure

of asset quality, is a lagging indicator, partly due to the lag (usually 90 days) that a loan needs to be in arrears before it is declared non-performing. The corporate **leverage ratio** can be used as an indicator of the vulnerability of the sector to shocks that could impair its loan repayment capacity. The linkage between this FSI and the FSI of asset quality, NPLs to total loans, that allows the leverage ratio to play a leading indicator role, derives from the banking sectors exposures to the corporate sector, which it is also a key channel through which shocks affect the banking sector.

63. **To use the corporate leverage FSI as a leading indicator of asset quality, the relationship between the two FSIs needs to be estimated.** There are a number of statistical approaches that can be used to estimate the relationship for individual countries, which have been applied on many FSAPs, using time series for the country. To complement this work, the relationship can be estimated across countries using panel data. An estimate of the relationship for a large sample of countries can serve as a "benchmark" estimate to complement individual country estimates. Figure 2 shows that the relationship between the corporate leverage ratio and asset quality (NPLs/loans) is positive for a sample of 47 countries over 10 years, as indicated by the regression line fitted to the scatter plot of these data.[12] Plots showing correlations between a number of other corporate and banking sector FSIs are presented in BP, Chapter 5.

Figure 2. Plot of NPLs to Loans Ratio and the Corporate Leverage Ratio



[12] The data were compiled from large private databases—Worldscope and Bankscope—that contain data from the audited financial statements of a large number of corporations and banks for many countries. They should not, however, be viewed as a substitute for data provided by country authorities, which typically will be of better quality. Each point in the figure corresponds to the value of the two FSIs for a country and a year.

64. **While this correlation showing that NPLs rise as corporate leverage increases is consistent with economic theory, an econometric model is needed to test that it is statistically significant and control for cross country differences in macroeconomic performance, financial structure and data definitions.** A model that can be estimated using either individual country or panel data is presented in Box 2. Estimation of this model on the panel data shown in Figure 2 found a statistically significant relationship between assets quality and the leverage ratio one year earlier, which indicated that 10 percentage point increase in the corporate leverage is associated with 1.8 percentage point rise in NPLs relative to loans after a one period lag (e.g., $\alpha_1 = 0.18$ on the variable lev_{t-1} in Box 1, see BP, Chapter 5 for the estimation results). The result that the leverage ratio has a significant impact on asset quality only after one year provides support for its role as a leading indicator.

C. Taking Account of Macro-Financial Linkages

65. **The monitoring of FSIs needs to be complemented with other data that can provide insights into the macro-financial linkages through which the financial sector affects macroeconomic conditions and debt sustainability (Figure 1).** These macro-financial linkages derive from the intermediation role of the financial sector, and include the reliance of non-financial sectors on credit from the financial sector, their deposits and wealth placed with the financial sector, the effect of a deterioration in banking sector soundness on monetary policy transmission, and the sector's holding of private and government debt.

66. **The exposures of non-financial sectors to the domestically-owned banking sector and foreign-owned banks active in the country, is a key source of macro-financial linkages.** These can be analyzed to assess the potential impact on the local economy of problems in the domestic or foreign banking sectors and monitored using FSIs compiled by local and foreign authorities. This analysis requires data on borrowing by the non-financial sectors from the domestic banking sector and from foreign banks with an important local presence by country. The latter exposures can be monitored using the BIS consolidated banking statistics, which gives the borrowing by every country's private and government sectors from the banks in each BIS reporting country (which account for almost all international banking activity). The potential for a banking crisis in another country whose banks are important locally can be monitored using FSIs compiled by that country and the possible impact can be assessed using the BIS data.[13] This highlights the benefit (or positive externality) provided by the FSIs compiled by authorities in countries with large internationally active banks for the authorities in countries that need to monitor these banks using FSIs because they have an important intermediation role.

[13] To assess this risk using FSIs, and for soundness analysis in general, the branches and subsidiaries of foreign banks in a country should be consolidated with their parent, rather than monitored separately, because branches share the capital of the parent while subsidiaries will generally have access to the capital and liquidity resources of the parent in a crisis (BP, Chapter 1).

Box 2. Modeling the Effect of Corporate Leverage on Asset Quality

A model of the effect of corporate leverage on asset quality needs to allow for the possibility that the leverage ratio, asset quality, and the cost of capital are simultaneously determined due to the following inter-relationships:

- As the corporate sector becomes more highly leveraged, it is also more vulnerable to macroeconomic shocks that could precipitate corporate defaults and raise NPLs;
- The capacity of the corporate sector to build up leverage by borrowing depends partly on banking sector soundness, which is negatively affected by a rise in NPLs;
- As the corporate sector becomes more leveraged, the risk premium it has to pay rises, increasing its cost of capital and reducing its incentive to take on more leverage.

To capture the interaction between these three effects, the model needs three equations, as shown below. Equation 1 gives the direct effect of leverage on asset quality. Equation 2 gives the indirect effect of a deterioration in financial sector soundness on the capacity of the corporate sector to build-up leverage. Equation 3 captures how an increase in leverage by the corporate sector can raise its real cost of capital. Each equation contains a different set of relevant exogenous variables, to control for the effects of changes in the real exchange rate, real growth, inflation, monetary policy and corporate sector profitability.*

$$npls = \alpha_0 + \alpha_1 lev + \alpha_2 rcc + \alpha_3 reer + \alpha_4 \hat{y} + \alpha_4 \hat{p} + \alpha_5 \hat{m} \quad (1)$$

$$lev = \beta_0 + \beta_1 npl + \beta_2 rcc + \beta_3 \hat{y} + \beta_4 \hat{p} + \beta_5 \hat{d} + \beta_6 roe \quad (2)$$

$$rcc = \gamma_0 + \gamma_1 lev + \gamma_2 \hat{y} + \gamma_3 \hat{m} \quad (3)$$

Variable Definitions

npls – ratio of non-performing loans to total loans
lev – corporate sector leverage ratio (ratio debt to equity plus retained earnings)
rcc – real cost of capital (weighted average of the real lending rate and cost of equity finance)
reer – real effective exchange rate
y-hat – real GDP growth rate
p-hat – inflation rate
m-hat – growth rate of M1
d-hat – growth rate of domestic credit
roe – return on equity

* The model is developed in more detail and estimated in BP, Chapter 5.

67. **Macro-financial linkages also derive from residents' deposits and wealth held with domestic and foreign banks, which makes them vulnerable to banking crises at home or abroad.** The role of FSIs in the assessment of this linkage is to monitor the risk of a banking crisis. The importance of this vulnerability depends on the size, location and currency of these deposits and wealth and will reflect institutional factors, such as the coverage of deposit insurance schemes and the extent to which a financial system is dollarized. Deposits in the latter case are likely to be more vulnerable because the capacity of the central bank to serve as a lender-of-last-resort is limited.[14] To assess this linkage, data are needed on residents' deposits (i) held within the country; and (ii) held abroad, either with domestic banks' branches and subsidiaries abroad or with foreign banks. Monetary statistics typically capture the first, while the second is captured to some extent in the international investment position and the BIS locational international banking statistics.

68. **Another linkage results from the impact of banking sector problems on the monetary policy transmission mechanism.** Both domestically-owned banks and branches and subsidiaries of foreign banks play a role in monetary transmission. Thus, FSIs can complement monetary data in the analysis of the impact of a deterioration in banking soundness on the effectiveness of monetary policy, This, for example, could make it more costly to tighten monetary policy, limiting the policy options of the central bank. Data on financial structure, including the relative importance of market and bank financing, on the involvement of foreign banks in the financial system and on central bank operations can also be useful in this analysis.

69. **Another potential source of macro-financial linkages arises from the financial sector's holdings of government and private sector debt.** Specifically, a shock to the sector that results in credit or market losses and a sharp fall in the capital ratio (monitored using FSIs), can lead to an adjustment in its holdings of this debt. When its balance sheet contains a significant share of outstanding government or private debt, this could affect the latter's borrowing costs and capacity to roll-over their debt, with possible implications for debt sustainability. In their role in assessing the risk of a banking crisis, FSIs can also be useful in the analysis of the macro-financial linkages that arise in a banking crisis when the government has to bail out the banking sector, which is a source of contingent liability. The resulting rise in government debt in such a crisis can also affect debt sustainability. To assess the significance of these linkages, it can be useful to monitor FSIs in combination with sector balance sheet data in the context of a debt sustainability analysis.

D. The Core and Encouraged Sets of FSIs

70. **Experiences using FSIs on FSAPs and by member countries has provided insights into how FSIs have been used in practice.** While these experiences reaffirm the relevance of the list of FSIs agreed by the Executive Board in June 2001, together with the

[14] An analysis of the particular vulnerabilities faced by dollarized economies is discussed in a recent Board paper *Financial Stability in Dollarized Economies* (April 2003), SM/03/112.

analytic work they provide an indication of how the core and encouraged sets of FSIs could be developed going forward. This is consistent with the need to allow flexibility in the specification of the two sets to accommodate experiences with financial crises and financial innovation that highlight additional sources of risk that need to be monitored. There are other indicators used for financial sector surveillance not included in the encouraged set that could be considered for inclusion if they prove to be particularly useful for surveillance and on FSAPs.

71. **This analytic work has involved the development of insurance sector FSIs** and an analysis of how the insurance sector can pose risks to financial stability (Box 3, and BP, Chapter 3). It indicates that they would need to be monitored primarily in countries where the insurance sector is relatively large and there are significant market and credit linkages among banking, insurance and securities markets. Only a small set of "essential" life insurance FSIs are being considered for inclusion in the encouraged set initially, and the core set eventually if experience, further analysis and consultation with member countries demonstrates they are essential in assessing the soundness in specific countries. However, surveillance of this sector could draw on a much broader range of indicators, that also cover non-life insurance (reported in BP, Chapter 3). These FSIs are being used on FSAPs on a provisional basis, and this experience, together with a consultation process, will provide a basis for deciding whether to add them initially to the encouraged set, in which case they will be described in a supplement to the *Compilation Guide.*

72. **The review of experiences with the use of FSIs on FSAPs (Section III) showed that the large exposures and duration measures were rarely compiled.** The follow-up survey indicated that the large exposure FSIs were not compiled because it was not regarded as particularly informative in countries with larger or more developed financial systems. If further investigation and consultation confirms this, it may be appropriate to consider moving it into the encouraged set. In the case of the finding that market risk FSIs were compiled on a limited number of FSAPs, the follow-up survey, supported by analytic work, suggests that this may be partly due to the close analytic relationship between market risk FSIs and stress tests. This suggests that a flexible approach to using the core FSIs for monitoring market risk on FSAPs may be needed to allow stress tests to be used to assess this risk when the two surveillance tools convey essentially the same information. It is important to recognize, however, that while it may be practical to use stress testing as a substitute for the market risk FSIs on FSAPs, is unlikely to be feasible for ongoing surveillance, for which market risk FSIs will be needed. Overall, this suggests that further analytic work is needed to clarify the roles of market risk FSIs. Some work developing duration FSIs is presented in BP, Chapter 4 and in the *Guide*, which provides a "gap" analysis approach.

73. **The importance of corporate sector FSIs has become clear as they have played an increasingly central role in the financial stability analysis on FSAPs.** However, despite progress in our capacity to analyze these FSIs, further analytic and data development work is needed for them to achieve their full potential as a surveillance tool.

Box 3. Insurance FSIs

Insurance is an important and growing part of the financial sector in virtually all developed and many emerging economies. Insurers play an important role in optimizing the allocation of risks and mobilizing long-term savings. Furthermore, the importance of insurance for financial stability has increased recently due to intensified links between insurers and banks. In certain countries, these links can include cross ownership, credit risk transfers, and the assimilation of banking-type products by life insurers. 1/ Financial stability could be jeopardized particularly by the failure of life insurers. However, non-life (property and casualty) insurers also play a significant role in the economy and their failures can also disrupt the functioning of the economy.

The risk profiles of life insurers and banks differ. Both sectors face considerable market risks, but there exist substantial differences in the structure of assets and liabilities. In many markets, life insurers have significantly higher exposure to equities and real estate and lower exposure to direct lending to companies and households as compared to banks. These exposures can mean that volatile asset prices, particularly equities, can relatively quickly erode the capital base of systematically important insurance companies. 2/

The liabilities life insurers face, as well as their magnitude, are uncertain. A combination of protection and pension products can form a natural hedge for life insurers, but they still need to estimate mortality developments as precisely as possible, and design and price their product portfolio appropriately. In some countries, guaranteed returns on policies are required by regulations, exacerbating risks for life insurers. Reflecting an increased appetite of clients to save and invest in addition to buying protection, life insurers have increasingly diversified into banking-type products and asset management (unit-linked) products.

Assessing financial soundness of individual companies and particularly systemically important insurers as well as of the insurance sector as a whole is a complex task given the complexity of their risk profiles, and both quantitative and qualitative information needs to be used. Financial soundness indicators are an important quantitative tool, but there is little standardization in the definition and use by the authorities across countries. Starting from a relatively large number of potentially useful indicators, a few essential FSIs have been selected based on a preliminary analysis of their analytical significance, parsimony, availability of data for compilation, and relevance under the widest range of circumstances. 3/

The indicators in the essential set cover both the current financial soundness of life insurers, in terms of capital adequacy, earnings and profitability and the potential vulnerabilities, in the categories of asset quality, reinsurance and actuarial issues, management soundness, liquidity, and sensitivity to market risks. Table 4 provides an overview of these indicators.

Even in countries in which the insurance sector is not currently significant, many supervisors are likely to have much of the necessary data for the compilation of the most relevant of the proposed indicators, although disclosure of these data is much more limited due largely to confidentiality concerns. Nevertheless, supervisory resources are often limited and need to be focused on the key financial stability questions. Therefore, the current size and growth of the insurance sector, as well as structural considerations, including the linkages with the banking sector and the existence of any banking-type products offered by the insurers, are the main criteria for countries to consider in selecting the appropriate indicators and the frequency of compilation of the insurance FSIs.

1/ See recent IAIS Paper on Credit Risk Transfer between Insurance, Banking and Other Financial Sectors for more information on credit risk transfers.
2/ The June 2002 issue of the *Global Financial Stability Report* has highlighted some of the asset side risks insurers face and their role in the global financial markets.
3/ A more detailed discussion of insurance FSIs can be found in the forthcoming Working Paper *Insurance and Issues in Financial Soundness*, by Udaibir S. Das, Nigel Davies, and Richard Podpiera.

The need for additional analytic work is suggested by the fact that they have been compiled on only 30 percent of FSAPs so far (Table 2). In view of this, they could be kept in the encouraged set at this stage but the importance of compiling and using them whenever possible could be emphasized. As further analytic work, experiences using these FSIs and consultation with member countries clarifies their role and contribution to macro-prudential surveillance, an assessment can be made regarding whether it would be appropriate to move them in the core set.

Table 4. Essential FSIs for the Life Insurance Sector

Category of FSI	FSI	Interpretation of FSI
Capital Adequacy	Capital/total assets	Indicate the capacity of the sector to absorb losses relative to risk exposures; exposures measured by asset size, reserves, regulatory capital or risk models.
	Return on equity (ROE)	Indicates the scope for earnings to offset losses relative to capital.
Sensitivity to market risk	Equities/total assets	Measures the exposure of the sector to equity price and currency risk.
	Net open position in foreign exchange/capital	
Liquidity	Liquid assets/current liabilities	Identifies the vulnerability to loss resulting from the forced sale of illiquid assets.

VI. Using Stress Testing to Support the Analysis of FSIs

74. **Analytic work has also focused on how aggregate stress testing can be used in combination with FSIs to enhance their usefulness.** Aggregate stress testing involve applying standardized shocks to bank balance sheets and then aggregating the results across banks, to obtain the impact on the sector as a whole. It represents a "bottom-up" approach where the starting point is a shock to individual banks' balance sheets or risk management models, that complements the more "top-down" perspective of FSIs that look at aggregate data for the sector as whole and key peer groups. Stress testing also provides a way to assess certain types of risks that are hard to measure precisely using FSIs, including from derivatives and off-balance sheet exposures.

75. **The relationship between FSIs and stress testing derives from the fact that changes in FSIs are typically an output of stress tests and also an "intermediate" input in some cases.** Specifically, in stress testing the impact of a macroeconomic shock is usually measured by its impact on the capital ratio FSIs. Moreover, some shocks are fed through NPLs and thus provide a direct measure of the linkage between changes in the NPL-based FSIs and the capital ratio for the banking sector. In this way, stress testing helps

"benchmark" the NPL-based FSIs by providing another indication of the impact of a change in these FSIs on capital adequacy.[15]

76. **Stress testing and FSIs are different but complementary approaches to assessing risks to financial stability.** FSIs allow more continuous monitoring of specific vulnerabilities, while the stress test give an estimate of the losses (typically reported as a change in the capital ratio FSI) associated with these vulnerabilities from a one-time, plausible shock to the relevant macroeconomic risk factor. In the case of market risk, some countries have used this measure of loss from stress tests, repeated at periodic intervals, as a soundness indicator along with, or even in place of, the FSI. This approach is becoming more feasible because many banks have risk management systems that make market risk stress tests based on standardized shocks relatively easy to implement. This option could represent an acceptable alternative to monitoring market risk FSIs because, as noted above, these FSIs and stress tests are closely related at the analytic level and, thus, can provide essentially the same information (BP, Chapter 4).

77. **Another example of where stress testing can play a valuable complementary role to FSIs is in the assessment of systemic risk arising from interbank exposures.** This source of risk can be monitored by the sectoral distribution of lending FSI that gives the aggregated exposure of domestically owned banks to other banks and, thus, provides an indication of the scale of interbank lending relative to total lending. The accuracy with which this FSI can capture this risk is limited by the fact that, as aggregated measure, it does not take into account the structure of bilateral interbank exposures within the banking sector. In contrast, stress testing can use information on the distribution of interbank exposures within the banking sector to assess more precisely the risk of a systemic crisis triggered by the failure of a systemically important bank could precipitate the failure of other banks by defaulting on its bilateral interbank loans (Box 4).

VII. Contribution of Standards Assessments to the Analysis of FSIs

78. **This analysis of FSIs can be strengthened by using information from assessments of the two other key dimensions of financial stability—effective financial sector supervision and a robust financial system infrastructure.**[16] Analytic work has focused on identifying information derived from the Basel Core Principles (BCPs) given the importance of the banking sector in most countries. The similarity between the different sets of core principles for banking, insurance and securities market sectors, make it relatively straightforward to adapt the analysis of the BCPs to these other core principles assessments.

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[15] The relationship can also be "benchmarked" using accounting relationships, as described above.

[16] Comprising payment systems, financial market infrastructure and systemic liquidity arrangements, accounting and disclosure, insolvency regimes, and financial safety nets.

Box 4. Using Interbank Stress Testing to Assess Systemic Risk*

Interbank stress testing can be used to assess the systemic risk deriving from the potential of a shock to trigger contagion through interbank market exposures between banks. It estimates the potential for the failure of one, or a few banks, triggered by a shock, to cause other banks to fail. This exercise has two stages: first, a standard stress test applied to (or by) individual banks is used to identify the bank (or banks) that are at the greatest risk of failure. Second, an interbank stress test based on data on bilateral interbank exposures is used to assess whether failure of this bank (or banks) could trigger the failure of other banks in the system (who will have already been weakened by the shock) due to the interbank exposures between them. The interbank stress test then identifies those banks (if any) with exposure to the failed bank(s) that are large enough such that they also would be force into insolvency. The interbank exposure data takes the form of a matrix with the cells containing the net bilateral interbank exposures between banks, as illustrated in the figure below where each row in the matrix gives the interbank exposures of a bank to every other bank in the matrix (Figure 2). In effect, it compares these exposures to the bank's capital to ascertain if the losses incurred due to a default on its interbank loan (or several loans in a crisis) would reduce its capital sufficiently to cause it to fail also. This stress test, which has already been conducted on several FSAPs. It is important not to view it as representative of any kind of plausible scenario, but rather as providing an indicator of the extent of systemic risk in a banking sector deriving from interbank exposures (as measured by the default frequency, for example).

Figure 2: Illustrative Matrix of Net Bilateral Interbank Exposures

	Bank 1	Bank 2	...	Bank n
Bank 1	-- --	Interbank exposure of bank 1 to bank 2	...	Interbank exposure of bank 1 to bank n
Bank 2	Interbank exposure of bank 2 to bank 1	-- --	...	Interbank exposure of bank 2 to bank n
. . .	. . .	. . .	-- --	. . .

* Interbank stress tests are reported in the Luxembourg FSAPs, reported in the May 2002 FSSA (SM/02/130) and in an Austrian National Bank Working paper, *Risk Assessment for Banking Systems*, August 2002, by H. Elsinger, A Lehar and M. Summer.

79. **The information provided by the BCPs assessments can be used to help interpret FSIs in a number of ways.** First, they can clarify the definition of data being used to compile FSIs by, for example, indicating the quality of capital. Second, they can help establish the underlying cause of observed movements in FSIs when there are competing explanations, such as whether a fall in the capital ratio might be supervisory action rather than rapid balance sheet expansion. Third, they provide information on risks that cannot be captured adequately using FSIs, such as operational and legal risk. Fourth, they provide information on the effectiveness of banks' risk management and, thus, how effectively the banking system is likely to respond to the risk associated with particular values for FSIs. Finally, they indicate the responsiveness of the supervisory system to emerging financial sector problems, which reveals how quickly vulnerabilities identified by FSIs are likely to be corrected. (BP, Chapter 6 discusses these uses of BCPs in depth).[17]

80. **The mapping between FSIs and BCPs in Section III of Table 5 shows how information from BCPs assessments can be used to support the analysis of FSIs.**[18] Section I and II identify information from the BCPs relevant to assessing other dimensions of financial stability—the financial infrastructure and the effectiveness of supervision—rather than surveillance. A lack of compliance with specific BCPs would suggest that banking sector vulnerabilities detected using FSIs may be more serious than in a financial system with good compliance. For example, lack of compliance with the capital adequacy BCP could mean that the reported capital ratio may underestimate actual capital available to absorb losses and indicate that a more in-depth analysis may be warranted. Another benefit of this mapping is that it allows the analysis of FSIs to help focus the BCP assessment on financial sector weaknesses.

VIII. Role of Information on the Financial Infrastructure

81. **Information on the financial system infrastructure draws from standards assessments and other sources can also help interpret FSIs.** The financial market infrastructure is made up of payment and settlement systems and a broad range of different markets that banks rely on as funding sources and for trading. It also includes central bank operations and other systemic liquidity arrangements and government foreign exchange reserve and debt management practices.[19] The financial system infrastructure affects financial institutions' capacity to access and manage liquidity. This includes both their

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[17] A more detailed discussion can also be found in the paper *Using FSIs to Assess Risks to Financial Stability* by R. Sean Craig and V. Sundararajan, forthcoming in the conference volume from the conference on "Challenges to Central Banks from Globalized Financial Systems".

[18] Table 5 summarizes a much more detailed mapping in the Appendix to the background paper.

[19] In Tables 8.1 and 8.2 the draft *Guide* provides a framework for disseminating some information on the financial system infrastructure.

Table 5. BCPs Containing Information Relevant to the Interpretation of FSIs

Information Relevant To Macro-Prudential Surveillance	BCPs Providing Relevant Information to Macro-Prudential Surveillance	
	BCP Number	Information Content of BCP
I. Robust Financial Infrastructure		
Sound and stable macro-economic policies	Precondition 1	Soundness of macro-economic policies
Well-developed public infrastructure	Precondition 2	Judicial system, accounting principles and auditing systems, payment and clearing system
Efficient bank resolution procedures	Precondition 4	Bank resolution procedures
Appropriate public safety nets	Precondition 5	Bank safety nets
II. Effective Supervision		
Autonomy, power and resources of supervisory authority	BCP 1(2)	Independence
	BCP 1(4)	Enforcement powers
	BCP 1(5)	Legal protection
Capacity to take prompt remedial actions in response to identified weaknesses	BCP 22	Remedial measures
Capacity to collect necessary information	BCP 16-19	On- and Off-site supervision
Capacity to verify data provided by banks	BCP 21	Accounting standards
Capacity to collect and verify information on cross-border activities	BCPs 1(6)	Information sharing
	BCP 23-25	Cross-border information sharing
III. Macro-Prudential Surveillance		
Surveillance of FSIs of capital adequacy	BCP 6	Capital adequacy
	BCP 8	Loan evaluation and loan loss provisioning
	BCP 20	Consolidated supervision
	BCP 23	Globally consolidated supervision
Surveillance of FSIs of asset quality	BCP 7	Credit policies
	BCP 8	Loan evaluation and loan loss provisioning
	BCP 9	Large exposure limits
	BCP 10	Connected lending
	BCP 20	Consolidated supervision
	BCP 23	Globally consolidated supervision
Surveillance of FSIS of earnings and profitability	-	-
Surveillance of FSIs of liquidity	BCP 11	Country risk
	BCP 13	Other risks
Surveillance of FSIs of sensitivity to market risk	BCP 12	Market risk

capacity to access funding on the liabilities side of their balance sheet and their capacity to liquidate positions on the asset side of their balance sheet. Information on the robustness of market liquidity under conditions of stress is particularly useful, as it is not captured well by FSIs that only measure current liquidity conditions. This information can be derived from FSAPs, IOSCO, and CPSS core principles assessments and other sources.

82. **Information on market functioning can be useful in assessing how vulnerable the banking sector is to a loss of access to market funding in a crisis, which helps interpret the liquidity FSIs**. Take for example the unsecured interbank, repo and securities markets, which are typically the most important market sources of funding for banks. While the interbank market is generally the lowest cost source of funding, banks' lose access to funding if their credit quality deteriorates by a relatively small amount. In contrast, in repo markets and securities markets, access to liquidity is likely to be more robust to such a deterioration, as repo markets lend on a secured basis while securities markets price risk by charging lower quality borrowers a wider interest rate spread. This type of analysis of the robustness of market liquidity in different markets can be combined with information on central bank emergency liquidity polices and how banks have diversified their funding sources to assess how well the banking sector is likely to maintain access to funding in a crisis.

83. **Information on market microstructure, such as whether markets are over-the-counter (OTC) or exchanges, or rely on electronic trading systems, can provide insights into the robustness of market liquidity and help interpret market liquidity FSIs.** Specifically, the robustness of liquidity in securities and foreign exchange markets depend upon whether they are OTC markets or exchanges. For OTC markets, information on features affecting the capacity of market makers to make markets, such as the number of market makers and the size of the positions they take, could be useful. For exchanges, information on the trading systems, price transparency, margining rules, and capital committed by the exchange to support trading could be used. For electronic trading systems an indicator of liquidity is the standard transaction size. Also relevant is the extent to which closely related assets are traded on the different types of markets, which can substitute for each other if one market losses liquidity (e.g., some currencies are traded on OTC markets, exchanges and electronic trading systems).

84. **Information on the operation of the payment and settlement system is also useful for interpreting FSIs by providing insights into banks' access to liquidity in a crisis.** Specifically, very large/very short term (intraday) credit exposures can arise in some payment systems, which could make banks less willing to lend to one another in a crisis. Thus, it may be desirable to monitor indicators of payment system functioning such as on intra-day interbank exposures and daylight overdrafts. Also useful may be information on the settlement lags, loss sharing arrangements, reliance on collateral and which markets have Real Time Gross Settlement, which all provide an indication of the extent to which banks have succeeded in controlling this source of credit risk.

85. **Also relevant to interpreting liquidity FSIs, is information on the safety net and central banks' provision of liquidity to markets, which influence the extent to which**

banks can continue to access market liquidity in a crisis. The central bank's provision of emergency liquidity as part of the overall safety net can contribute to the perception that weak banks will be supported through lender-of-last-resort funding or in other ways, which is likely to make it easier for them to continue access liquidity. Central bank operating procedures, determine the day to day adjustments in the liquidity of interbank markets and, hence, is a key determinant of money market liquidity. Central banks' willingness to accept lower quality collateral influence how long weak banks can continue to obtain liquidity when under stress.

IX. Encouraging Compilation and Dissemination of FSIs

A. Compilation

86. **The effort to encourage member countries to compile and disseminate the core and relevant encouraged FSIs could be broadened and strengthened.** While some core FSIs can be compiled in many countries, a further effort is needed to encourage countries. This would involve clarifying for countries how the FSIs are valuable as a surveillance tool and how to compile them. The regional seminars being undertaken to promote awareness of the draft *Guide* is one means of achieving this end.

87. **Where a country has undergone an FSAP, a set of FSIs will normally have been compiled and analyzed, so the effort could rely on encouraging the authorities to compile these FSIs on a continuing basis.** In the short-term this may require reliance on existing data sources based on varying accounting standards. To encourage international compatibility of data, and to meet the needs of macro-prudential analysis as closely as possible, a more intensive effort may be needed to help authorities compile at least the core FSIs. Increasing the availability of FSIs beyond the core set will likely require additional data collection efforts in countries where these FSIs are perceived as necessary for surveillance. Much of this development work would depend on technical capabilities and data availability. The national authorities should be best placed to make calculations about the cost and benefits of compiling and disseminating encouraged FSIs, structural information, and related information. In addition to the *Guide*, countries' efforts to develop FSIs could be supported through technical assistance, seminars, and other forms of outreach.

88. **Staff propose that a coordinated compilation exercise involving both supervisors and statisticians be conducted under Fund auspices, after finalization of the *Guide*.** Such an exercise would aim to develop countries' practical experience in compiling FSIs and to promote international comparability of FSIs in the medium-term. Given staff resources, the exercise would involve a maximum of 60 countries working toward compiling and disseminating a set of FSI data for a common reference date; STA will draw upon its experience in conducting the Coordinated Portfolio Investment Survey. A common reference date of sometime in the second half of 2005 is provisionally envisaged, if the *Guide* is finalized around the end of 2003. Such a coordinated exercise would also help participating countries develop FSIs needed for surveillance and to improve staff understanding of FSI

data compilation procedures. A group of experts from international agencies could be constituted to oversee the implementation of the exercise.

B. Dissemination

89. **The evidence suggests that far more of the data needed to compile FSIs are collected than disseminated by member countries**. In the short-term, countries can be encouraged to increase the public availability of FSIs by disseminating data already collected. But these efforts need to be sensitive to concerns over the reliability of data, the lack of availability of time series data that may provide relevant context for interpretation of current period FSIs, and perhaps confidentiality of information.

90. **The draft *Guide* provides advice on the prerequisites for the dissemination of FSI data**. Among the key points are the designation by national authorities of lead responsibility to one national agency for compiling and disseminating FSI data so as to ensure clear lines of responsibility and accountability. Also important is the implementation of good practices set out in the *Guide* with respect to coverage, timeliness, periodicity, and technical aspects of compiling data. Especially in the absence of harmonization, the dissemination of metadata is essential to identify deviations from recommended practices. Both for the reliability of data and for interpretation, a trial period for undertaking compilation procedures is encouraged. In some cases, it may be helpful to explain how the confidentiality of supervisory data is protected by data aggregation.

91. **In the outreach programs for 2003, staff have started to discuss these prerequisites for disseminating data and will refine the text of the *Guide* in the light of these discussions.**

Possible dissemination strategies

92. Given the variety of country circumstances, and taking account of the lack of data presently disseminated, among the strategies for disseminating FSI data that Fund staff could encourage countries to adopt are the following:

- *Updating of FSIs initially compiled for FSAPs and/or Article IV consultation reports on a regular quarterly or monthly basis*. One advantage of this approach is that the descriptive material included in these reports can provide a benchmark for analysis of these series.

- *Dissemination of FSIs on national websites* with the possibility of establishing a Fund internet gateway to provide a single entry point for accessing FSIs for all countries.

- *Supporting efforts by regional monetary or supervisory authorities to promote compilation and dissemination of FSIs among their member countries.* Several regional organizations are now working on collection of FSIs and are considering their publication.

93. Regarding periodicity of release of data, the results of the *Survey on Macroprudential Indicators* showed that quarterly or more frequent compilation was overwhelmingly supported by users of FSIs,[20] and was also the preference expressed by the consultative meeting in September 2002. Some experts also felt that key indicators should be compiled monthly. Experts took the view that significant new information would be obtained from changes in quarterly series. However, some experts noted that dissemination of a full set of data, including important peer group disaggregations,[21] might not always be feasible.

94. At the time of the meeting in June 2001, Directors thought it premature to consider including FSIs as part of the SDDS and GDDS. Since then, substantive progress in the form of the draft *Guide* has been made in clarifying and documenting the conceptual and compilation issues related to FSIs. In addition, experience has been gained from FSAPs on using FSIs in surveillance work. With these developments in mind, Directors' views are sought on the merits of aiming for a target date for including FSIs in the SDDS to encourage country compilation efforts. Specifically, staff would benefit from Directors' views on the following strategy:

- Aim to include the core FSIs, or a subset of the core FSIs,[22] as required categories in the SDDS within 5 years (end-2008); the encouraged FSIs would be included in the SDDS as encouraged categories.

- In the interim, the core FSIs could possibly be included in the SDDS as encouraged items within 3 years (end-2006).

95. The target dates would be reviewed, and data specifications as well as other modalities for SDDS would be developed taking into account the experience from the coordinated compilation exercise, use of FSIs in ongoing surveillance work, and further consultation with IMF member countries. To support this goal, the coordinated compilation exercise (see paragraph 88) would be targeted toward SDDS subscribers and other countries that might be interested to volunteer.

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[20] *Financial Soundness Indicators: Analytical Aspects and Country Practices.* IMF Occasional Paper No. 212, 2002, p. 56.

[21] Dissemination of such data may be limited given the possibility of revealing information on individual institutions.

[22] The possibility of including a subset of the core FSIs in the SDDS would be determined in light of the coordinated compilation exercise. For instance, SDDS subscribers might be asked to disseminate a minimum of one core indicator from each core FSI category.

X. Proposals for Strengthening Surveillance Using FSIs—Next Steps

A. Analytic Work Developing FSIs

96. The proposals for developing FSIs involves both analytic work and work aimed at enhancing the role of FSIs in Fund surveillance. Analytic work will continue to focus strengthening macro-prudential surveillance by developing FSIs as a surveillance tools and our capacity to use them with other tools, including stress testing. It will also seek to clarify further the role of FSIs, within the framework for financial stability analysis. To highlight the contribution of this work to financial sector surveillance, and to assess how effectively FSIs identify financial sector vulnerabilities and risks, **staff proposes to hold a conference on financial stability analysis**, probably in the fall of 2004.

97. Analytic work, member countries' surveillance experiences, and experiences using FSIs on FSAPs, have reaffirmed the relevance of the core and encouraged sets of FSIs agreed by the Executive Board at its meeting in June 2001. However, this work also revealed areas where adjustments to the specification of the two sets could be considered to ensure they continue to correspond to evolving surveillance needs and priorities. Accordingly, **staff propose to undertake a process of international consultation and further analytic and data development work** to: first, assess whether it might be appropriate to move the large exposures FSI from the core to the encouraged list; second, enhance our capacity to assess of market risk using FSIs, including by better integrating the analysis of stress testing and FSIs on FSAPs; third, assess whether essential life insurance FSIs should be incorporated into the encouraged set initially, and possibly considered for inclusion in the core for some countries in the future; fourth, emphasize and develop further the role of corporate sectors FSIs as an essential surveillance tool, with a view to possibly moving them into the core set. For purely illustrative purposes, Table 6 shows what the core and encouraged sets would look like initially if these proposed adjustments were made. If a broad consensus that such adjustments should be made results from this process, they will be incorporated into a supplement to the *Compilation Guide* when the change is made.

B. Integrating FSIs into Fund Surveillance

98. **The work aimed at developing the role of FSIs as a surveillance tool in Fund surveillance will involve preparation of a guidance note on using FSIs[23] and continued development of an FSI database to facilitate more continuous surveillance of financial systems by staff.** It would function as an operational database whose content would be determined by Fund surveillance needs that would provide a common source of data on countries' financial sectors for Fund staff. It will also contain information needed to help

[23] This will update a 1998 guidance note *Guidance Note for the Monitoring of Financial Systems under Article IV Surveillance* (June 1998).

Table 6. Financial Soundness Indicators: Proposed Revision to Core and Encouraged Sets

	Core Set
Deposit-taking institutions	
Capital adequacy	Regulatory capital to risk-weighted assets
	Regulatory Tier I capital to risk-weighted assets
Asset quality	Nonperforming loans to total gross loans
	Nonperforming loans net of provisions to capital
	Sectoral distribution of loans to total loans
Earnings and profitability	Return on assets
	Return on equity
	Interest margin to gross income
	Noninterest expenses to gross income
Liquidity	Liquid assets to total assets (liquid asset ratio)
	Liquid assets to short-term liabilities
Sensitivity to market risk	Duration of assets
	Duration of liabilities
	Net open position in foreign exchange to capital
	Encouraged Set
Corporate sector	**Total debt to equity**
	Return on equity
	Earnings to interest and principal expenses
	Corporate net foreign exchange exposure to equity
	Number of applications for protection from creditors
Deposit-taking institutions	Capital to assets
	Geographical distribution of loans to total loans
	Gross asset position in financial derivatives to capital
	Gross liability position in financial derivatives to capital
	Large exposures to capital
	Trading income to total income
	Personnel expenses to noninterest expenses
	Spread between reference lending and deposit rates
	Spread between highest and lowest interbank rate
	Customer deposits to total (non-interbank) loans
	Foreign currency-denominated loans to total loans
	Foreign currency-denominated liabilities to total liabilities
	Net open position in equities to capital
Market liquidity	Average bid-ask spread in the securities market 1/
	Average daily turnover ratio in the securities market 1/
Insurance sector (life)	**Capital to assets**
	Return on equity
	Equity holding to assets
	Liquid assets to current
	Net open foreign exchange position/capital
Other financial corporations	Assets to total financial system assets
	Assets to GDP
Households	Household debt to GDP
	Household debt service and principal payments to income
Real estate markets	Real estate prices
	Residential real estate loans to total loans
	Commercial real estate loans to total loans

Note: illustrative changes relative to the current core and encouraged sets (Table 1) are shown in bold.
1/ Or in other markets that are most relevant to bank liquidity, such as foreign exchange markets.

interpret FSIs drawn partly from FSAPs, including metadata, data on financial structure and standards assessments. The database will have a number of uses, such as facilitating macro-prudential surveillance using FSIs at the regional level and supporting the presentation and analysis of FSIs in Article IV reports, in the *Global Financial Stability Report*, and in the Fund-wide quarterly vulnerability assessment.

99. Developing the surveillance role of FSIs will also involve efforts to encourage member countries to compile FSIs. The technical capacity of a country to compile FSIs and data availability will determine what role staff need to play to facilitate compilation. **The staff proposes to assess this capacity of countries to compile FSIs, and to encourage them to develop it through a variety of channels**, including FSAPs and focused FSAP updates, Article IV and UFR missions, the coordinated compilation exercise, technical assistance and workshops, and through cooperation with standard setters and other international and regional organizations.

100. A number of additional activities presented below could be undertaken to enhance the usefulness of FSIs in Fund surveillance:

- Deepen the experience of staff in compiling and using data on financial soundness, and incorporate the lessons gained from this experience into future technical assistance on FSIs. This could involve the undertaking of statistical technical assistance missions to countries to assist in the collection of relevant data and compilation of FSIs.

- Undertake with the BIS and other interested organizations further work on the measurement of financial sector risks related to real estate, including the conduct of a conference in the Fall of 2003.

- Reconstitute the group of experts from international agencies to promote adoption of FSIs, and perhaps initially to oversee a coordinated compilation exercise.

XI. Priorities and Resource Requirements

101. **No new resources are expected in FY2004 for the statistical work on FSIs, limiting activities mainly to the completion of the *Guide* and its directly related activities** (as discussed in section III.C). Some statistical resources could also be provided to technical support for FSAP or Article IV consultations during 2003, and to initiate work on real estate related issues. Once the *Guide* is finalized, planning for a coordinated compilation exercise (discussed in paragraph 88) could be undertaken using existing resources. It is not expected that other new projects, such as creating a statistical database[24] to complement the existing operational database, establishing an internet gateway, developing FSIs for nonbank

[24] For IMF statistical publications.

financial institutions, or undertaking substantial technical assistance, can be supported within existing resources during the next year.

102. **The proposed FSI work program involving analytic work and development of the role of FSIs in Fund surveillance is expected to be carried out within the existing resource envelope. Specifically, it will be conducted within the context of a reallocation of resources and staff into financial sector surveillance.** [25] The planned increase in support for financial sector surveillance on Article IV and UFR missions, as well as more frequent focused FSAP updates will contribute to the effort to encourage countries to compile and disseminate FSIs by countries. The expansion in the coverage of the FSI database will largely rely on data generated from this effort to encourage compilation of FSIs. Finally, the proposed conference on financial stability analysis can be part of an existing conference series.

103. It is envisaged that staff will report back to the Board on the FSI work-program toward end-2005 although some analytic work and work developing the role of FSIs in Fund surveillance will be reported on in the context of the assessment of surveillance in the FSAP Review and other Fund surveillance reviews.

XII. Issues for Discussion

- Do Directors agree with the work program for the completion of the *Compilation Guide* (paragraph 40)?
- Do Directors support the intention of conducting a coordinated compilation exercise to assist countries in compiling FSIs and to help refine advice on compilation procedures (paragraph 88)?
- What views do Directors have on setting a target date for including FSIs in the SDDS (paragraph 94)?
- What are Directors' views on the framework for financial stability analysis illustrated in Figure 1? And, the proposal for integrating macro-prudential surveillance using FSIs into this framework?
- What are Directors' views on how to ensure that the core and encouraged sets of FSI continue to reflect surveillance priorities and needs? What process should be followed in making adjustments to the specification of the two sets (paragraph 97), especially with respect to moving corporate sector FSIs into the core set and insurance FSIs into the encouraged set?

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[25] The proposed redeployment of resources for surveillance is discussed in detail in a recent Board paper *Financial Sector Assessment Program—Review, Lessons and Issues Going Forward*, February 2003, SM/03/77.

- What are Directors' views regarding the proposals for developing the role of FSIs as a surveillance tool in Fund surveillance (paragraphs 98-100)? And, more specifically, on the contributions of a revised guidance note and an operational FSI database?

- Do Directors agree with the staff's proposal to assess the capacity of countries to compile FSIs, and to encourage them to develop their capacity through the channels outlined in paragraph 99?