Appendix A

Financial Sector Assessment Program—Objectives, Procedures, and Overall Framework

A.1 History and Objectives

The Financial Sector Assessment Program (FSAP) was launched in May 1999 jointly by the managements of the World Bank and International Monetary Fund (IMF) on a pilot basis. It was a response to calls by the international community for more intense international cooperation (a) to reduce the likelihood, severity, or both of financial sector crises and cross-border contagion and (b) to foster growth by promoting financial system soundness and financial sector diversity. The program aims at contributing to those objectives through the preparation and delivery to national authorities of comprehensive assessments of their financial systems. Those assessments are intended to

- Identify strengths, vulnerabilities, and risks
- Ascertain the sector's development and technical assistance (TA) needs
- Assess observance and implementation of relevant international standards, codes, and good practices
- Determine whether this observance addresses the key sources of risks and vulnerabilities
- Provide a robust infrastructure for financial development
- Help design appropriate policy responses

This joint Bank-Fund program was seen as a vehicle to bring the linkages between financial sector soundness and performance, on the one hand, and macroeconomic and real sector developments, on the other hand, to the core of both institutions' work. This joint program, together with the involvement of experts from national authorities and standard-setting bodies, also was expected to optimize the use of scarce expert resources,

to avoid duplication of efforts, and to promote consistency of advice on financial sector issues through an integrated analysis of both development and stability issues. Although country participation in the FSAP is voluntary, the program has been structured from the outset as a means to strengthen the monitoring of financial systems in IMF's bilateral surveillance through Article IV consultations (which is mandatory) and as a means to promote economic development and to reduce poverty through the World Bank's development work to strengthen the financial sector.

After intensive discussions by both Bank and Fund Boards on the lessons from the pilot program, the program was made a regular feature of Bank and Fund operations in a comprehensive review of the program in December 2000 and January 2001. The program was further streamlined in the subsequent reviews of the program by both Boards in March/April 2003 and in February/March 2005. See box 1.1 of chapter 1 for a brief history of FSAP.

A.2 Operational Procedures for FSAP, FSAP Updates, Follow–Up Technical Assistance, and Relationship to Bank-Fund Operations

The operational procedures for carrying out financial sector assessments and updates under the joint Bank-Fund FSAP have been developed by the Bank-Fund Financial Sector Liaison Committee (FSLC). Those procedures have been designed to reflect the following considerations:

- To feed into the IMF's Article IV consultation process through close linkages with IMF's surveillance activities
- To serve as input into Bank's social and structural reviews, country assistance strategies, and other operations of the World Bank
- To serve as a program of peer review of observance of relevant international standards in the financial sector
- To ensure uniform and consistent treatment of countries and economies through adequate quality control and review
- To minimize duplication and overlap when moving from the joint team output of FSAP missions to the separate reporting and accountability requirements of each institution
- To balance the voluntary nature of participation in the FSAP with the need to give priority to some countries and to encourage the countries to participate on the basis of both stability and development considerations
- To ensure adequate consultations within the Fund and the Bank and with the authorities both in country selection and on the scope and focus of work
- To ensure confidentiality of data on individual financial institutions and other market sensitive information provided to the team by the authorities, while facilitating adequate transparency of policy analysis and assessments to the Bank and Fund Boards, as well as to the markets on a voluntary basis
- To facilitate documentation, contacts with authorities, internal review processes, appropriate mission staffing, and adequate Bank-Fund coordination in those areas

Table A.1. Institutions Cooperating in the FSAP

Country	*Cooperating official institution*
Argentina	Central Bank of the Republic of Argentina
Australia	Reserve Bank of Australia Australian Prudential Regulation Authority Australian Securities and Investment Commission
Austria	Austrian National Bank Financial Market Authority
Belgium	National Bank of Belgium Banking and Finance Commission
Brazil	Central Bank of Brazil
Canada	Bank of Canada Office of the Superintendent of Financial Institutions
Chile	Central Bank of Chile Superintendency of Banks and Financial Institutions
Colombia	Bank of the Republic
Czech Republic	Czech National Bank
Denmark	Denmark National Bank Danish Financial Supervisory Authority
Finland	Bank of Finland Financial Supervision Authority
France	Bank of France Banking Commission
Germany	Deutsche Bundesbank German Banking, Securities and Insurance Supervison Authority [BAFin]
Hong Kong (China)	Hong Kong Monetary Authority
Hungary	National Bank of Hungary Hungarian Financial Supervisory Authority
India	Reserve Bank of India
Ireland	Central Bank of Ireland
Israel	Bank of Israel
Italy	Bank of Italy Italian Securities Commission
Japan	Bank of Japan Financial Services Agency
Malaysia	Bank Negara Malaysia
Mexico	Bank of Mexico Banking and Securities Commission
Morocco	Central Bank of Morocco
Netherlands	Bank of Netherlands Securities Board of the Netherlands Netherlands Pension and Insurance Supervisory Authority
New Zealand	Reserve Bank of New Zealand Securities Commission of New Zealand
Nigeria	Nigerian Deposit Insurance Corporation
Norway	Bank of Norway Banking, Insurance and Securities Commission
Peru	Central Reserve Bank of Peru
Poland	National Bank of Poland

Table A.1. (continued)

Country	*Cooperating official institution*
Portugal	Bank of Portugal Portuguese Securities Market Commission
Saudi Arabia	Saudi Arabian Monetary Agency
Singapore	Monetary Authority of Singapore
South Africa	South African Reserve Bank Financial Services Board
Spain	Bank of Spain National Securities Commission
Sri Lanka	Central Bank of Sri Lanka
Sweden	Bank of Sweden Financial Supervisory Authority
Switzerland	Swiss National Bank Swiss Federal Banking Commission
Thailand	Bank of Thailand
Tunisia	Central Bank of Tunisia
Turkey	Central Bank of the Republic of Turkey
United Kingdom	Bank of England Financial Services Authority Financial Supervision Commission, Isle of Man
United States	Federal Reserve System Office of the Comptroller of the Currency Federal Deposit Insurance Corporation
ECB	European Central Bank Standard Setting Bodies
BCBS	Basel Committee on Banking Supervision
CPSS	Committee on Payment and Settlement Systems
IASB	International Accounting Standards Board
IAIS	International Association of Insurance Supervisors
IOSCO	International Organization of Securities Commissions Other Institutions
AfDB	African Development Bank
BIS	Bank for International Settlements
IADB	Inter-American Development Bank
COBAC	Banking Commission of Central African States (COBAC).
BEAC	Central Bank of Central African States (BEAC)
BCEAO	Central Bank of West African States (BCEAO)

Source: Documents for 2005 Board review of FSAP, available on the web sites of the IMF and the World Bank.

The principle of joint Bank-Fund missions in which the mission members work as a team remains integral to the program regardless of the type of assessment—assessments for the first time, reassessments, or FSAP updates—and regardless of whether it is Bank led or Fund led. However, for countries that are not Bank clients, the Fund will be solely responsible for both the leadership and output of the FSAP missions, whereas the Bank may provide staff members to cover specific areas of those missions' work.

The *FSAP Procedures Guide* developed by the FSLC reflects the considerations mentioned here. It is intended for use by Bank and Fund staff and other FSAP team members and also is of interest to countries participating in FSAP. The *FSAP Procedures Guide* covers the following:

- Country selection and scheduling process
- Selection of team leaders, formation of teams (including selection of experts from cooperating official institutions), and preparation of mission terms of reference (including its review, clearance, and distribution)
- Contacts with the authorities
- Preparatory work at headquarters
- Confidentiality protocol
- FSAP documentation and its preparation, review and clearance, transmission and distribution, and related publication policies
- Links to follow-up activities—TA, ongoing surveillance, and Article IV follow-up

Some key elements of those procedures are highlighted in the following paragraphs. Guidance on some of the follow-up activities—for example, TA, ongoing surveillance, and Article IV missions—are at various stages of development, and an overview of those activities is provided in this section.

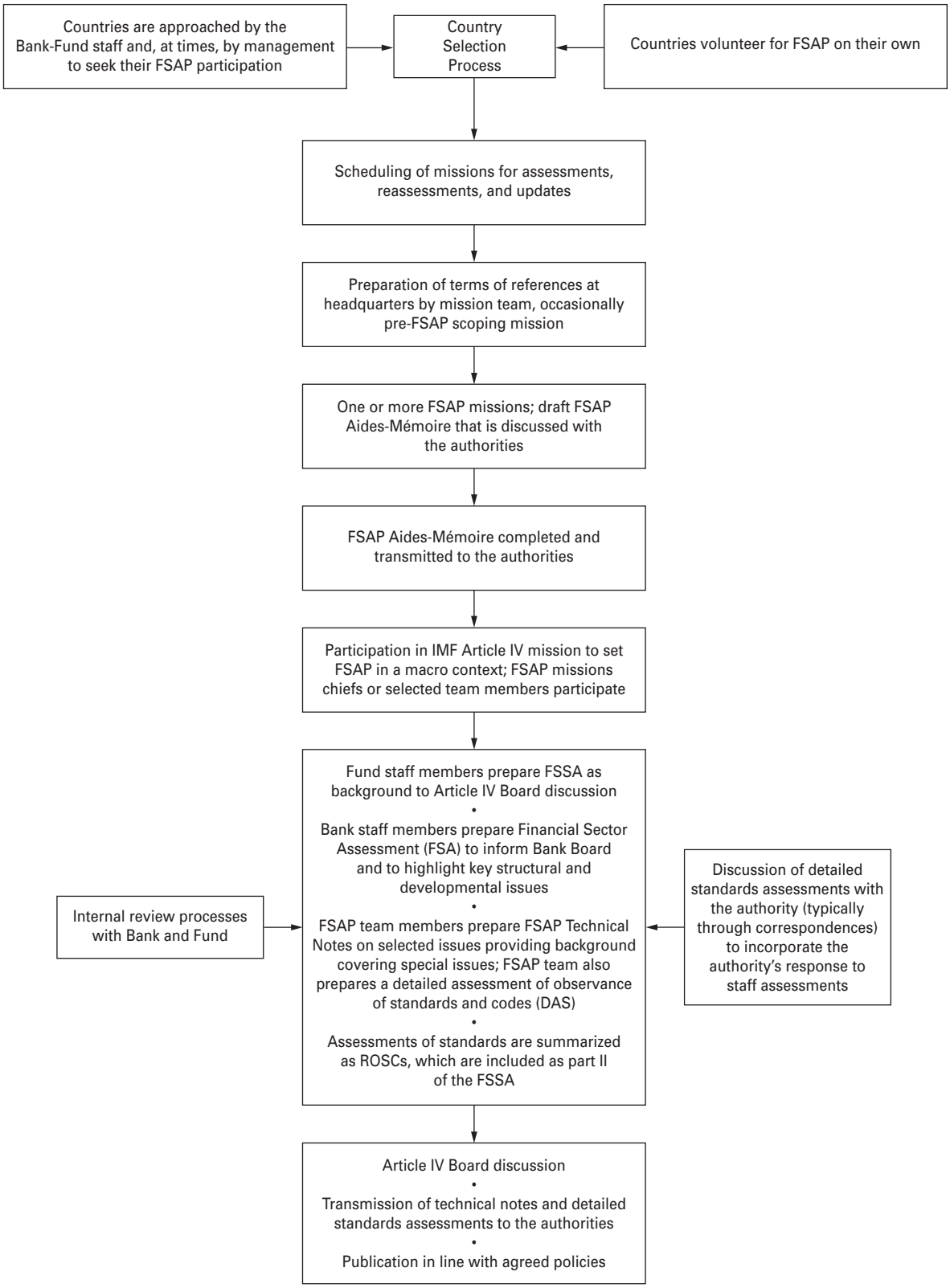
FSAP is an international cooperative effort that involves a number of cooperating official institutions and all major standard setting bodies. The cooperating institutions provide experts to conduct the assessments (particularly assessment of observance of standards and codes) and the standard-setting bodies develop the methodologies for the assessments, in part drawing on the FSAP experience. Some standard setters also facilitate the expert selection process. The list of cooperating official institutions as of June 30, 2004, is shown in table A.1.

A.2.1 Country Selection Process—Selection Criteria

The participation in the FSAP is voluntary, and countries routinely volunteer to participate. In addition, Bank and Fund staff and management select countries for participation in FSAP (new assessment or an update) on the basis of a set of criteria and procedures (summarized here) and seek their participation in the FSAP. When warranted, the Boards of the IMF (and World Bank) may remark—in the context of the consideration of relevant country report—on the desirability of the country participating in the FSAP. The country selection criteria were discussed and agreed on by both Boards. The criteria include systemic importance of the country (regionally and globally); its external sector weakness or vulnerability; the nature of its exchange rate and monetary regime; the likelihood, or ongoing implementation, of major reform programs with bearing on financial stability and development; and the desire to achieve a geographic balance in the countries covered.

Within any given year, higher priority is accorded to countries judged to be systemically important; the length of time elapsed since the country volunteered for an FSAP is also a factor in the scheduling of FSAP work in any specific year. However, countries that face imminent financial crisis or that are in the midst of crisis are not eligible for

Figure A.1. FSAP Process: Key Steps and Outputs



A

Table A.2. FSAP Confidentiality and Publication Policy at a Glance

Document	*Confidentiality*	*Publication*
Aide-Mémoire	Confidential	No
FSSA/FSA	Confidential or not for public use	Voluntary in the case of FSSA
ROSCs	Confidential or not for public use	Voluntary publication
FSAP Technical Notes	• Confidential • Exception: Notes that contain sensitive institution-specific information (e.g., stress tests results) must be classified "strictly confidential"	• If part of Article IV background material, it follows publication policy on article IV and related reports (i.e., voluntary publication). • Stress tests and individual institution information are omitted. • If not part of Article IV background material, it follows practice applied to TA reports.
FSAP Standard and Codes Appendices	Confidential or not for public use	• Voluntary • Follows TA publications policy

Note: All FSAP documents prepared for countries that participated in the pilot phase of the program cannot be published.

FSAP, which is focused on crisis prevention as a purpose and is diagnostic in its approach. Country selection typically strives to achieve a balance in coverage between systemically important countries and developing countries so that development issues are adequately addressed in the program.

Key steps in country selection process are as follows:

- Bank regions and Fund area departments, in collaboration with Fund's Monetary and Financial Systems Department and the World Bank's Financial Sector Vice Presidency, prepare a country list that indicates priorities for participation in FSAP (high, medium, low) on the basis of agreed-upon criteria. The country list takes into account the existing pipeline of countries awaiting FSAP participation.
- FSLC coordinates the priorities between Bank and Fund and proposes a scheduling of missions.
- Bank-Fund management approves the country priority list.
- Countries are contacted, and their participation—if not yet volunteered—is sought.
- Mission schedule is periodically adjusted to take into account the response of the authorities to Bank-Fund requests for FSAP participation and the inflow of new volunteers. When a country volunteers for an update or new assessment, the relevant Bank region and Fund area department are consulted on priorities.

The structure of FSAP documentation, the mission procedures, and the publication policies—all facilitate the link to Article IV surveillance and World Bank operations; they also provide sufficient technical details to the authorities to help formulate priorities within the financial sector policy. The main steps of the FSAP process and the key documents produced at each step are shown in figure A.1. The associated publication policies in the Fund and Bank and the related confidentiality classification of documents are summarized in table A.2.

A.2.2 Publication Policies

The publication and distribution policies for FSAP documents are based on decisions of the Bank and Fund Boards after the 2003 review of the FSAP by both Boards, and after the Fund Board's review of transparency policy. The current publication policy for FSAP documents—summarized in table A.2—is as follows.

- Publication of Aides-Mémoires left by FSAP teams with the authorities is not permitted.
- Financial System Stability Assessment (FSSA) [and Reports on Observance of Standards and Codes (ROSCs)] publication remains *voluntary*. ROSCs may be published even when the authorities decide not to publish the FSSA, but not vice versa. Publication is by the Fund on the Fund's external Web site.
- FSAP technical notes that raise issues of sufficient relevance to surveillance can be included in the background material (selected issues paper) for Article IV consultations. In this (to date rare) circumstance, the documents would then be subject to the Fund's circulation and publication policy for Article IV and related publications (i.e., publication is voluntary, but with a presumption of publication, unless indicated otherwise by the authorities). Publication is by the Fund on the Fund's external Web site. Whenever such notes are prepared jointly with the World Bank staff, their circulation and publication are coordinated with the World Bank.
- Technical notes that are not circulated to the Fund Board as background documentation for Article IV consultations, as well as detailed assessments of financial sector standards and codes, fall under the publication policy applied to staff technical documents (which are not Board documents).
- Publication is voluntary by the authorities and is undertaken by them. However, the approval of Fund and Bank management (or only Fund management, if FSAP was for an industrial country) is required. Management approval is normally automatic.
- If authorities request publication of such documents and if management consents, then the FSAP technical notes are circulated to the Fund Board for information before publication. They may also, but are not required to, be published on the Fund's external Web site.
- Requested deletions by the authorities, or partial publishing of some technical notes and not others or of some detailed standards assessments and not others, need to be reviewed internally by concerned Bank-Fund departments before a staff member can make a recommendation for management decision.

A.2.3 Confidentiality and Other Distribution

Assessment of financial system vulnerabilities necessarily involves discussion with the authorities of sensitive information on prudential policies and financial soundness. To ensure that sensitive information that is provided by national authorities to FSAP teams is appropriately protected, the Fund and Bank have drawn up a confidentiality protocol (see 2000 FSAP review documents and Fund-Bank documents on records and information security). This protocol brings together the already-existing confidentiality policies

in the two institutions in one document to facilitate understanding by national authorities, the Bank-Fund staff members, and the experts who may be FSAP team members from cooperating institutions. All such experts are required to certify that they are familiar with the policies set out in the protocol.

The protocol outlines the levels of classification for sensitive information—not for public use, confidential, and strictly confidential—and the procedures for handling each classification. The main elements of the protocol are summarized in the following discussion, and each FSAP document's classification is presented in table A.2. FSAP team leaders are responsible for the confidentiality classification of FSAP information. The confidentiality classification is decided in consultation with the provider of the sensitive information.

Documents that contain sensitive information must be marked with the same security classification as the original information. The presumption is that FSAP documents are classified *Confidential*, although in some cases they may be classified *Not for Public Use*, which is the least strict of the three classifications available. However, certain elements of data and information (e.g., stress tests results, information on specific institutions, and highly market-sensitive information) must be classified as *Strictly Confidential*. Strictly confidential information is restricted solely to persons with a specific need to know and is not circulated for review, except as prescribed in the confidentiality protocol.

The basic principle followed in determining confidentiality classifications, as well as circulation of documents within the Bank and Fund, is that of "need to know." Staff members who have a legitimate interest in specific FSAP documents or in groups of documents, as part of their work responsibilities should be permitted access. For example, Bank and Fund staff members and experts working on the country should be permitted access, if they request it through proper channels, to all FSAP documents with the only exception being any highly sensitive information that they do not specifically need to know.

Similarly, a staff member undertaking research in connection with Bank and Fund operations, such as preparing a Board paper by reviewing detailed assessments of one or more financial sector standards, should be given access to the relevant documents. In general, it would be expected that individual countries' experiences would not be identified by name in any such documents unless the authorities have agreed or the information is available in published documents. The staff members to whom documents are made available should be informed at the time as to the confidentiality classification of those documents and, further, that they should not provide the documents—or copies of them—to any other third parties in the Fund or outside without appropriate authorization. Guidance to the Bank-Fund staff on how to apply the confidentiality protocol and the related review and clearance procedures are contained in various internal memoranda (see FSAP intranet sites of the Bank and Fund).

A.2.4 Review and Clearance of FSAP Documents

All FSAP documents are subject to rigorous internal review and clearance processes within the Bank and the Fund on the basis of guidance and procedures that are specific to each institution. The purposes of the review process are to ensure uniform and consistent treatment of countries in assessments and to exercise quality control on the scope and

content of policy analysis with the view toward ensuring that it draws on international good practices and on the available institutional experiences on key issues.

For FSAP documents for the Fund Board, the review process combines an internal expert review within the MFD with the review by Fund's area departments and the Policy Development and Review Department. The FSAP documents for the World Bank Board are similarly subject to a peer review process. All other documents are subject to expert review that is organized differently within each institution to reflect the respective organizational structure. Often, input from selected experts from cooperating official institutions is sought to ensure effective quality control of standards assessments.

This review of country documents is complemented by periodic expert meetings to review cross-country experience with standards assessment process and periodic analysis of the results and lessons of FSAP assessments of different standards, as further explained in section A.4.

A.3 Selectivity and Tailoring of Assessments

One of the key messages of the 2003 FSAP review by Bank and Fund Boards was to exercise greater selectivity in the numbers of standards and topics assessed in detail so as to reduce the average resource costs while tailoring the assessments to country-specific circumstances. The detailed principle-by-principle assessments of international standards and codes is resource intensive for both staff members and authorities. The number and types of standards assessed requires careful consideration of country circumstances, while taking into account their relevance for stability and development concerns and seeking to minimize the risk of missing key vulnerabilities. It was acknowledged that FSAP should remain comprehensive in the coverage of topics spanning both stability and development aspects, but the exercise of selectivity was related to the number of detailed assessments of standards or to the scope of detailed analysis of specific development and stability topics. One idea was to spread out the assessments over time so that some of the standards or topics not initially assessed in the first FSAP engagement could be taken up as part of future FSAP updates. Those assessments could be scheduled as part of a medium-term surveillance program or other work program with the country. Some of the considerations in exercising selectivity of topics and standards in FSAP, drawing on FSAP experience, are outlined as follows:

- When the relevant sector, market, or infrastructure is nascent, or when a high degree of noncompliance is expected, a detailed assessment of the corresponding standard may not be needed. Similarly, when the legal and institutional framework is in its very early stages of being built or implemented, the corresponding standard can be assessed at a later stage—after some experience is gained in implementation.
- In more complex financial systems, a set of interrelated standards may need to be assessed together owing to synergies in the assessment process and interlinkages among the sectors. In such circumstances, the scope for distributing the work on some topics and standards over time, including in the context of either planned future FSAP updates or other Bank-Fund operations, should be considered.

Box A.1. Assessing Observance of Financial Sector Standards When There Are Supranational Authorities

The spirit of the standards assessment under FSAP is to evaluate the quality and resilience of supervision in a country. Because supranational authorities, by definition, cover more than one country, such an approach cannot involve assessment of observance only from the perspective of the supranational authority. In each case, therefore, how supervision works in the country must be evaluated regardless of the institutional arrangement. This evaluation becomes all the more important if consideration is given to the fact that even when supranational arrangements exist, several aspects of implementation and enforcement remain with the individual countries.

Against this background, the following procedures should be adopted:

- The first FSAP undertaken within a grouping should commence a detailed assessment of the supranational authority, along with the implementation aspects in the country concerned.
- Before the assessment, the mission should approach the supranational authority, outline the proposed strategy, and obtain its agreement to participate in the assessment. If the supranational authority does not agree to participate, a detailed assessment of observation of that standard cannot be undertaken.
- The detailed assessment of the relevant standard should be included in the FSAP volume on "Detailed Assessment of Standards," and a ROSC module relating to observance of that standard in that particular country should be produced.
- Subsequent FSAP assessments in other countries within the grouping should use the work already done in the earlier FSAP and should only review and update the assessment of the supranational authority. Each successive FSAP within the grouping will presumably require less involvement of the supranational authority, although, in each case, the supranational authority should be contacted and kept informed. When material institutional, legal, or regulatory changes have taken place in the intervening period, a detailed reassessment may become necessary. In any case, the assessment will continue to be in the context of the country that is going through the FSAP.
- If for any reason the supranational authority does not wish to undergo a detailed assessment, the assessment outputs mentioned here will not be produced. There will, therefore, be no detailed assessment write-up in the FSAP "Detailed Assessment of Standards," and no ROSC module will be prepared.

An overall assessment of the country-specific regulatory and supervisory issues in the relevant area would still be undertaken, using the relevant standard as a guide only. The qualitative evaluation would then be brought out in the main FSAP/FSSA/FSA or in the form of an attachment wherever the issues are evaluated as being of significance and needing to be detailed.

For an assessment to qualify as applicable to the grouping as a whole, the following considerations are important:

- Assessors must make a judgment on compliance with relevant supervisory preconditions, as well as the supervisory and enforcement infrastructure within all the members of the grouping.
- Assessors must take into account the size, structure, and risks of the relevant parts of the financial system within the grouping in which the regulated entities operate.
- Assessments must involve the supranational authority and all relevant national authorities.

- Although the choice of topics should reflect their macroeconomic significance or significance for real economic growth or poverty reduction, insofar as selected development and stability topics can be covered in other Bank-Fund operations (e.g., TA, Article IV) ahead of FSAP or in future FSAP updates, such coordination of work over time can greatly facilitate the effectiveness and value of FSAP assessments.

- Standards such as corporate governance, accounting and auditing, and insolvency regime, which have a much broader application than in the financial sector, will not normally be covered in detail in an FSAP assessment.
- Following the recent Board guidance, anti-money-laundering and countering the financing of terrorism (AML–CFT) issues will be assessed in all countries participating in the FSAP (and in offshore financial center [OFC] assessments). Given the large scope of those assessments—covering financial supervision, legal and institutional frameworks, and law enforcement and criminal justice system, which often require three or more assessors—those assessments are typically undertaken separately ahead of, or following, the main FSAP assessment work. Where feasible, such assessment could be undertaken by a financial action task force (FATF) style regional body.
- The selecting and tailoring of assessments and topics to country-specific circumstances will also depend on the state of financial development and the specifics of financial structure. Features such as extent of dollarization, systemic importance, size (smallness) of the system, links to currency union, prevalence of institutional types, extent of offshore/cross-border banking, extent of financial stress, and so forth will clearly influence both the scope and content of FSAP assessments (see box 1.2 in chapter 1 for a discussion of tailoring assessments to the structural features of the countries). Also, assessments of countries in a currency union, sharing a supranational monetary or supervisory authority, pose special issues that call for adaptations in FSAP procedures (see box A.1).

A.4 Relationship to Standards and Codes Initiative—Role of Standards Assessments in FSAP

The initiative dealing with International Standards and Codes is one of a series of reforms initiated by the international financial community, including, among other things, the introduction of FSAP, to promote a more stable financial system in the aftermath of the crises of the late 1990s. The initiative aims to promote sound regulation; greater transparency; more efficient and robust markets, institutions, and infrastructure; better informed investment and lending decisions; improved market integrity; accountability and policy credibility; and reduced vulnerability to crises. It seeks to achieve this goal by

- Encouraging the development of internationally recognized standards in the areas enclosed by the Executive Boards of the Fund and Bank as useful to their work
- Encouraging members' adoption and implementation of standards, including through TA
- Assessing members' observance of those standards and, with their consent, producing and publishing ROSCs

The Boards of the Fund and Bank have endorsed a list of 12 areas of international standards and codes as useful to their operational work and for which assessments, using ROSCs as the principal tool, will be undertaken as appropriate. The 12 standards are listed in box A.2, and they are grouped into three categories: (a) transparency standards,

Box A.2. List of Standards and Codes and Core Principles Useful for Bank and Fund Operational Work and for Which ROSCs Are Produced

Transparency Standards

- Data Transparency: the Fund's *Special Data Dissemination Standard/General Data Dissemination System* (SDDS/GDDS)
- Fiscal Transparency: the Fund's *Code of Good Practices on Fiscal Transparency*
- Monetary and Financial Policy Transparency: the Fund's *Code of Good Practices on Transparency in Monetary and Financial Policies* (usually assessed by the Fund and the Bank under the Joint Fund-Bank FSAP)[a]

Financial Sector and Financial Integrity Standards[b]

- Banking Supervision: Basel Committee's *Core Principles for Effective Banking Supervision* (BCP)[a]
- Securities: International Organization of Securities Commissions' (IOSCO) *Objectives and Principles for Securities Regulation*[a]
- Insurance: International Association of Insurance Supervisor's (IAIS) *Insurance Supervisory Principles*[a]
- Payments and Settlement Systems: Committee on Payment and Settlement Systems' (CPSS) *Core Principles for Systemically Important Payments Systems and the Committee on Payments and Settlements Systems and IOSCO's Recommendations for Securities Settlements Systems*[a,c]
- Anti-Money Laundering and Combating the Financing of Terrorism: Financial Action Task Force's (FATF's) *40+8 Recommendations*[a]

Financial Infrastructure Standards[d]

- Corporate Governance: OECD's *Principles of Corporate Governance*
- Accounting: International Accounting Standards Board's *International Accounting Standards* (IAS), currently called *International Financial Reporting Standards* (IFRS)
- Auditing: International Federation of Accountants' *International Standards on Auditing*
- Insolvency and Creditor Rights: World Bank's *Principles and Guidelines for Insolvency and Creditor Rights System* and United Nations Commission on International Trade Law's (UNCITRAL) *Legislative Guide on Insolvency Law*

a. These standards are assessed mainly under the FSAP.
b. Sometimes the term financial integrity is used in a broad sense to cover both AML and CFT, as well as corporate governance, transparency, accounting and insolvency regime, and the like. In this Handbook, integrity is used in a narrow sense of avoidance of financial crime, particularly money laundering, and financing of terrorism.
c. The payment and securities settlements standard covers supervisory elements, as well as design of payment settlement system, and may well be placed under financial infrastructure grouping.
d. These infrastructure standards are mainly assessed by the Bank.

(b) financial supervision and financial integrity standards, and (c) financial infrastructure standards.

ROSCs summarize the extent to which countries observe certain internationally recognized standards and codes. ROSCs are typically summaries of the detailed principle-by-principle assessments undertaken on the basis of agreed methodology. ROSCs covering the financial sector and integrity and the monetary and financial policy transparency are usually prepared within the framework of the FSAP. Under the FSAP, detailed assessments of observance of relevant standards are undertaken jointly by Bank and Fund (Fund alone, with staff or expert participation from World Bank as needed, in countries that are not eligible to borrow from the World Bank), and detailed assessment reports (DARs) are given to the authorities. Summaries of those assessments (ROSCs) are included as part of the FSSAs that are presented to the IMF Board in the context of Fund surveillance,

Box A.3. Assessing Offshore Financial Centers

In view of the large financial claims on OFCs and the potential vulnerabilities stemming from weaknesses in the financial system of offshore centers, Fund initiated in June 2000 a program to assess—on a voluntary basis—44 jurisdictions known to have significant cross-border business or those with separate offshore financial legislation.[a] The OFC program sought to assess the risks that OFCs could pose to the international financial system when one considers the weaknesses in prudential supervision and financial integrity concerns. The OFC program offers a set of uniform assessment options.

In addition to providing TA to conduct self-assessments by the jurisdictions themselves (module 1 assessments), the program offers stand-alone assessments by a team of specialized supervisors of jurisdictions' compliance with supervisory and regulatory standards (module 2 assessments). This program includes a review and assessment of AML–CFT practices. The third option (module 3 assessments) is simply an FSAP for OFCs that are Fund members or a comprehensive vulnerability assessment including standards assessments for nonmembers. Such assessments are complemented by TA to improve compliance with standards. Given the OFC's links to major "offshore" financial centers, where major banks and conglomerates maintain balance sheet and operational exposures in OFCs, the FSAP work in many countries has to pay particular attention to such exposures and to consider aspects of the supervisory process—consolidated supervision, supervisory cooperation, and information sharing—relevant to mitigating the associated risks. Among the 44 OFC jurisdictions, assessments have been completed or are ongoing in 33 jurisdictions, of which 8 were done as part of the FSAP. In addition, the FSAPs in countries with important bank representation in OFCs have examined closely the home country's consolidated supervision and supervisory cooperation issues.

a. An OFC is a location where the bulk of financial activity is offshore on both sides of the balance sheet (i.e., the counterparties of the majority of financial institutions' liabilities and assets are nonresidents), where the transactions are initiated elsewhere, and where the majority of the institutions involved are controlled by nonresidents.

A

and they are issued as ROSCs. This procedure is designed to help set the standard assessments in a broader context of risks and vulnerabilities that affect the financial system, to assess the extent to which standards compliance contributes to mitigating the risks, and to formulate an overall stability assessment. Gaps in compliance with standards also provide an input into identifying development needs and desired structural reforms to strengthen institutions, markets, and infrastructure. For those reasons, standards assessments are an integral part of the FSAP.

Detailed assessments of financial sector standards are undertaken outside the FSAP only occasionally as part of technical cooperation and assistance programs. However, standard assessments are routinely undertaken as part of IMF's Offshore Financial Centers Assessments Program (see box A.3). Such detailed assessments are designed to assist countries in identifying areas of institutional reforms and related TA needs and are not issued as ROSCs that feed into surveillance. They are, however issued as detailed assessment reports (DARs) and can be published voluntarily by the authorities with the concurrence of Fund and Bank management. The DARs prepared under OFC's program have been routinely published (see http://www.imf.org/external/np/ofca/ofca.asp). Several countries that serve as major international financial centers or that operate separate offshore financial centers have chosen to be assessed under the FSAP (in those countries), instead of under the OFC program whose objectives are more narrowly focused on strengthening

and harmonizing supervision and regulation and on fostering cross-border cooperation among supervisors.

Standards for the financial system infrastructure are typically assessed on a stand-alone basis by the World Bank, and, when appropriate, one or more of those assessments may be conducted in the context of FSAP. When stand-alone assessments of infrastructure standards are available, FSAP work will draw on them, but it will generally focus on financial sector aspects of corporate governance, accounting and auditing, and insolvency regime, as part of the assessment of preconditions for effective supervision.

Following the recent pilot program for conducting AML–CFT assessments, assessments of AML–CFT are considered a regular part of the Bank-Fund work and are included as part of all FSAP and OFC assessments. In addition to assessments done jointly by Bank and Fund (Fund alone in the case of OFCs and selected other countries), financial action task force (FATF) and FATF-style regional bodies (FSRBs) also conduct assessments that are based on the commonly agreed methodology; ROSCs are prepared on the basis of those outside assessments. Therefore, country assessments have required close collaboration and coordination with the FATF and FSRBs on assessment schedules.

FSAP and the standards and codes initiative have reinforced each other to achieve the shared objectives. The experience with the assessment of standards under the FSAP has been periodically reviewed at a technical level, as well as at a broader policy context,

Box A.4. Periodic Review of Standards Assessment Process

1. Coordinating meetings of experts from cooperating official institutions, representatives of standard setters, and concerned Bank and Fund staff members and experts were held on various dates (as listed below) to review assessment experience in individual standards and to provide feedback to standard setters.

   - Technical reviews of BCP/ Core Principles of Systemically Important Payment Systems (CPSIPS), and IOSCO with assessors and standard setters in November 2001
   - Technical review of BCP in May 2003

   In addition to their streamlining the operational processes in conducting the assessments, the reviews highlighted components of various standards where additional guidance was needed from standard setters.

2. In addition, financial sector standards assessments conducted in FSAP were periodically reviewed to identify key areas of weak or strong compliance, as well as lessons for the assessment methodology and for the core principles that constitute the standard. These reviews were reported to the Fund Board, and all are available on the IMF external Web site. The list of the Board documents includes the following:

   - Experience with the Assessment of Systemically Important Payment Systems (April 19, 2002)
   - Experience with the Assessments of the IOSCO Objectives and Principles of Securities Regulation (April 18, 2002)
   - Implementation of the Basel Core Principles for Effective Banking Supervision, Experience, Influences and Perspectives (October 4, 2002)
   - Experience with Basel Core Principles Assessments (April 28, 2000)
   - Experience with the Insurance Core Principles Assessments Under the Financial Sector Assessment Program (August 21, 2001)
   - Assessments of the IMF code of Good Practices on Transparency in Monetary and Financial Policies–Review of Experience. (December 23, 2003)
   - Financial Sector Regulation—Issues and Gaps (August 5, 2004) and Financial Sector Regulation—Issues and Gaps—Background paper (August 18, 2004)

to strengthen the consistency of the assessment process and to inform standard setters on the lessons of assessment experience for both the content of the standards and for its assessment methodology. Box A.4 contains the list of technical and policy reviews of the standards assessment process conducted in the FSAP context. The policy reviews also served to inform the periodic Board reviews of the standards and codes initiative.

A.5 Selected Organizational Issues

The *FSAP Procedures Guide* covers both assessments and updates. In addition, assessments (countries and economies that have not yet participated in the program) and reassessments (when the passage of time or the pace of the reform process in a country indicates that comprehensive updating of the initial FSAP assessment is desirable) are complemented by focused updates (including updating of stability and standards and codes assessments). More detailed guidelines to implement specific aspects of the procedures—confidentiality, country selection, mission formation and scheduling, contacts with authorities, contacts with cooperating official institutions, document preparation, review process, publication, and the like—have been issued within the Fund and Bank in line with the respective internal procedures of each institution.

This section highlights certain aspects of the internal guidelines and of the procedures designed to facilitate appropriate tailoring of assessments to country circumstances, to ensure consistency of assessments, and to increase efficiency of the assessment process. Certain considerations in the organization and design of FSAP teams are important for appropriate coverage and for tailoring the development and stability assessments. The composition of a FSAP team should reflect the scope of work, which, in turn, is governed by the level of development of the sector, as well as by specific structural features (as outlined in box 1.2 in chapter 1). Those considerations are further explained in the following sections.

A.5.1 Organization and Team-Design: Issues for the Development Assessment

Because of the diversity of issues and the multiplicity of topics that need to be considered, staffing of the development component of the assessment needs to be designed with great care.

A first challenge is the choice of sectors and infrastructural aspects to be examined in detail. Here the balance that needs to be struck is between (a) the need to assess performance in relation to services and sectors that are already well established in the country and (b) the exploration of the reasons for gaps and missing markets. For example, an extensive study of securities markets may not be appropriate if only a handful of securities are listed on the stock exchange, yet the scope for improving corporate access to equity may need to be evaluated. Likewise, in many cases, it proves impracticable to carry out full accounting, auditing, or corporate governance assessments in the context of a financial sector review, yet those issues are important for the legal and information infrastructure assessments.

A second challenge is ensuring that the cross-cutting issues are adequately addressed from a developmental perspective. This challenge calls for very clear terms of reference to be given to sectoral assessors. The sectoral assessors will need to generate some of the input for the infrastructural reviews and other cross-cutting aspects (e.g., legal and informational deficiencies, problems with the payments system, specific taxation problems, and so forth). Much can be obtained in this context from the corporate sector assessment (if one is scheduled).

It will normally be advisable to include in the team a lawyer who is specifically charged with assembling and collating the legal infrastructural review of the development assessment. Because there is no agreed-on standard for assessing the legal infrastructure, specific detailed terms of reference for the lawyer's work need to be elaborated. In addition, it will be important to ensure that the legal infrastructural review remains focused on the development issues, plus supporting the Basel Core Principles (BCP) for effective banking supervision and other aspects of the stability assessment.

A.5.2 Multitasking for the Sectoral Reviews

Having separate experts for sectoral stability and development analysis will overburden the country and impose excessive administrative costs. It will also result in a team that is too large to allow for adequate synthesis of what are indeed overlapping issues. Therefore, there seems little merit in including a large team of "development specialists" alongside prudential specialists. In the case of many sectors, such as insurance and capital markets, the same expert who analyzes stability aspects should also be able to assess developmental aspects. This arrangement will not only avoid duplication but also guarantee consistency across the two dimensions. Staffing the assessment of the sectors should be designed with this multitasking in mind.

In the case of banking, always the most important sector, FSAP missions have typically included two BCP assessors and one or two persons working on stress testing. Teams for low-income countries also should include banking specialists who can provide adequate analysis of the competitive structure of banking, the range of services provided, and the cost and efficiency of their provision.

A.5.3 Organization and Team Design for Stability Assessments

The issues are broadly similar to the case of development assessment discussed earlier. Exercising selectivity in the standards and sectors to be assessed in detail should be based on both the size of the sector and its likely systemic effect over the medium term. Often, even if the overall size of a sector (e.g., securities markets) is not significant, its linkages to key institutions, as well as its critical role in overall financial sector reform, may warrant a detailed assessment of the sector from a developmental perspective and may require a close attention to volatility and liquidity of the markets. The concern is to ensure medium-term stability in the course of financial market development, even though the size of the sector does not pose a threat to short-term stability.

Once a set of supervisory standards for detailed assessment has been chosen, some of the preconditions for effective supervision may be covered as part of detailed assessments

of infrastructure standards either by other specialists or by the sectoral assessors themselves, who should look into key elements of the infrastructure affecting the effectiveness of supervision and risks management. For example, instead of conducting detailed assessment of financial policy transparency, the sectoral expert could be asked to cover transparency practices of regulatory authorities dealing with that sector at a high level of aggregation. If, however, a decision were made to conduct a detailed assessment of monetary and financial policy (MFP) transparency, a separate staff member or expert should be assigned to work with the sectoral supervision experts to put together the detailed MFP transparency assessment.

It will normally be advisable to include in the team a financial economist—or a financial policy specialist with some quantitative background—to conduct macroprudential analysis and stress testing. It is important that sectoral supervision experts work closely with the economist in this exercise so that the risk profile is used to guide the depth of supervisory standards assessment and so that information from standards assessment helps to shape the design of macroprudential analysis.

For example, in systems with significant exposure to a specific risk factor (e.g., cross-border lending or borrowing that produces vulnerability to external shocks), the supervisory guidance on sovereign risk management and foreign exchange exposure management should be examined in depth. Similarly, when compliance with a particular supervisory core principle (e.g., connected lending) is weak, macroprudential analysis should pay particular attention to the level and distribution of loans to single customers and to "insider" loans and their evolution over time. Such close coordination of vulnerability assessment with standards assessment is critical to deriving a proper overall stability assessment.

A.6 Follow-Up Issues—FSAP Updates, On-Going Surveillance, and TA

Although comprehensive FSAP assessments and reassessments can take place once in 8 to 9 years, additional tools are used to monitor the financial sector on a more continuous basis, to update FSAP findings in a more selective way, and to provide needed TA. In the Fund, efforts have been under way to develop and promote compilation of financial soundness indicators. Monitoring those indicators on a regular basis—along with other information, particularly market-based indicators—can be used as input in ongoing financial sector surveillance.

In many cases, FSAP updates have been used to focus on key development and stability issues and to update the assessments of one or two selected standards to update the ROSCs. On some occasions, factual updates of developments in implementation of standards have been prepared in the context of Article IV missions, pending the completion of FSAP reassessments, updates, or both. The scope and content of FSAP updates have varied, but they primarily reflect the scope of reforms undertaken by the authorities since the previous FSAP assessments. In some cases, areas of standards that were not assessed in detail in the previous assessment (e.g., AML–CFT) were assessed. In all cases, the macroprudential analysis was updated, with occasional updating of stress tests and with selective updates of previously assessed standards. The updates help to show the extent to which the overall stability has improved or weakened.

TA is a key tool to assist countries to follow up on FSAP recommendations and to strengthen financial stability policies and implement orderly development programs. Both the Bank and Fund have stressed the importance of effective and systemic follow-up to support countries in implementing key FSAP and ROSC recommendations. Both the Bank and Fund have collaborated with a group of bilateral donors to establish a multidonor facility called Financial Sector Reform and Strengthening Initiative (FIRST). FIRST is a joint initiative that provides grants to low- and middle-income countries for financial sector projects with the key objectives of facilitating systematic follow-up of the recommendations from the Bank-Fund FSAP and ROSCs. In addition, FIRST supports eligible countries in strengthening their financial systems and implementing recognized standards and codes in advance of participation in FSAP and ROSC programs.

Appendix B

Illustrative Data Questionnaires for Comprehensive Financial Sector Assessment

This appendix complements chapter 2 and provides some additional guidance on the sort of quantitative data that should be collected to facilitate the analysis of different aspects of financial stability and of financial structure and development. The precise scope and content of data needed will be country specific to reflect its structural and institutional circumstances. Nevertheless, the appendix seeks to present a generally useful set of indicators and tabular formats and to present the sort of additional indicators that could be useful to capture differences in financial structure and in the state of financial development. The sequence in which the questionnaire—or list of data needed—is presented reflects the organization and coverage of the Handbook. The broad coverage of the questionnaire is as follows:

- General data on the financial system, covering financial structure and its development
- Data and tables for financial system stability assessments
- Data on ownership structure, concentration, exposures, profitability, and costs of banking system in the aggregate and for different peer groups of banks
- Data on the structure and operation of insurance companies, security markets, pension funds, and other financial institutions
- Data on the functioning of money, exchange and government debt markets, payment settlement systems, financial safety nets, insolvency regime, and corporate governance arrangements
- Country-specific data on specific subsectors, markets, or issues for in-depth analysis (taxation of financial services and assessing adequacy of access are presented as examples)

Qualitative information on legal institutional and operational arrangements for financial sector supervision and financial system infrastructure are covered mostly as part of the templates for assessing observance of standards and are not covered in this appendix.

The general questionnaire on the financial system seeks to compile data on the structure, composition, and interrelationships in the financial system, and on the key components of aggregate balance sheet and income statements of major categories of institutions, including various peer groups of banks and banks in the aggregate. Tables B.1, B.2, and B.3 illustrate the data sets typically presented to characterize the recent evolution of financial structure (such as the number of institutions, shares in total assets, or share of assets to GDP) and key balance sheet and performance indicators for the banking system as a whole.

Table B.4 provides measures of financial system interconnectedness.

Table B.5 shows financial soundness indicators for banking—both core and encouraged sets—as defined in the International Monetary Fund's *Compilation Guide on Financial Soundness Indicators*.

Additional data on ownership, concentration, exposures, profitability, and costs are compiled as needed, depending on relevance to country circumstances. Such data are listed in table B.6.

Data needed for stress testing, as characterized in table B.7, will vary widely, depending upon the scope and depth of the exercise, as well as on the stress testing approaches used (see the technical note on stress testing that accompanies chapter 3). These data will generally depend on the size and complexity of the financial system and on the types of risks it is facing. For small systems with few sophisticated financial tools, rudimentary stress tests can be carried out with bank-by-bank data about financial soundness indicators. For most systems, however, additional data may be needed, for example, on the maturity and repricing structure of assets and liabilities. Data needs will generally be much higher in complex financial systems. Having financial institutions carry out the actual calculations that are based on common scenarios and methodologies may help reduce the data that need to be collected and processed in one place. In most systems, the input data will need to cover the basic types of risk (such as credit risk); however, in some systems, additional data on specific risks may be needed (e.g., commodity price risk in systems where the preliminary analysis suggests that this may be an important issue). Construction of scenarios for stress testing and the analysis of financial soundness indicators typically require a range of macroeconomic, as well as financial markets data.

Data to assess the structure and performance of insurance companies (table B.8) are provided separately for life insurance and non–life insurance business. They cover major balance-sheet items, which are classified by type of instruments and maturity, key components of incomes and expenditures, and information on the structure of the industry in terms of the following: number of companies, their distribution by asset size, or their premium income (or gross written premiums, for non–life insurance businesses) and related indicators of performance, solvency, and concentration.

Data needed to formulate an overview of capital markets, as well as the structure performance and efficiency of the markets, including its stocks exchanges, are indicated in table B.9. Such data are also needed in the context of both corporate governance

assessments, as well as assessments of *International Organization of Securities Commissions Objectives and Principles* for the regulation of securities markets.

Data needed to assess the structure and performance of pension funds and mutual funds make up table B.10.

Data needed for the analysis of other financial institutions, including nonbank financial institutions (other than security firms, insurance, and pension funds) and specialized finance companies, make up table B.11.

Data on systematic liquidity infrastructure, including money, exchange, and government debt markets and operations, plus payment settlement systems, make up tables B.12 and B.13.

Data on legal, governance, and information infrastructure, including financial safety nets and insolvency regime, make up table B.14.

Data to assess financial sector taxation and access to financial services are shown in tables B.15 and B.16, respectively.

Table B.1. Financial System Structure

	Annual data for recent period		
	Number	*Assets billion local currency)*	*Percent of total assets*
A. Depository institutions			
Commercial banks—total			
Large domestic banks			
Major foreign banks			
Other banks			
Development banks			
Credit unions and cooperative			
Microfinance institutions			
Building societies			
Other non-bank depository institutions			
B. Non-depository intermediaries			
Insurance companies			
Life and retirement			
Non-life			
Pension funds			
Collective investment schemes			
Money market mutual funds			
Finance companies (including leasing and venture capital)			
Securities firms			
Other (specify)			
C. Total financial system			
Memorandum items:			
Banks that are more than 50 percent owned by government			
Banks that are foreign owned or controlled			
Subsidiaries of foreign banks in country Y			
Branches of foreign banks in country Y			
Subsidiaries of country Y's banks abroad			
Branches of country Y's banks abroad			

B

Table B.2. Aggregate Balance Sheet for the Banking System

		Annual data for recent periods
A. Assets		
1.	Cash (domestic notes and coins)	
2.	Balances at central bank and other banks	
3.	Placements (including overnight lending)	
4.	Government securities	
5.	Investments	
6.	a) Local currency advances (gross)	
	b) Foreign currency advances (gross)	
	c) Total advances (gross)	
	d) Less the provision for bad debts	
	e) Advances (net)	
7.	Other foreign assets	
8.	Fixed assets	
9.	Other assets	
10.	Total assets	
B. Liabilities		
11.	Local currency deposits (including interbank borrowing)	
12.	Foreign currency deposits (including interbank borrowing)	
13.	Accrued interest	
14.	Other foreign liabilities	
15.	Other liabilities	
16.	Total liabilities	
17.	*Net assets and liabilities*	
C. Capital and reserves		
18.	Paid up or assigned capital	
19.	Shareholders' loans	
20.	Revaluation reserves	
21.	Other reserves	
22.	Profit and loss account	
23.	Less additional provisions recommended	
24.	**Total shareholders' funds**	
	Other items	
25.	Contingent liabilities (off-balance sheet items)	
26.	NPLs	
27.	Core capital	
28.	Supplementary capital	
29.	Total capital	
30.	TRWA	
31.	Other nonperforming assets	
32.	Investments in subsidiaries	
33.	TEAs	
	Average net advances	

Table B.1. (continued)

		Annual data for recent periods
	Average placements	
	Average government securities	
	Average investments	
	Average other earning assets	
	Average net earning assets	
	Average deposits	
	Average other liabilities	
	Average capital	
D. Performance indicators		
	Measures of capital adequacy	
34.	Gearing ratio: [(24 – 32 – 75 percent of 20) / (11 + 12 + 13)][a]	
35.	Core capital / total deposits [27 / (11 + 12 + 13)]	
36.	Core capital / TRWA (27 / 30)	
37.	Total capital / TRWA (29 / 30)	
	Measure of liquidity	
38.	Liquidity ratio (per liquidity statement)	
39.	Cash ratio	
	Measure of asset quality	
40.	NPLs and gross advances (26 / 6c)	
41.	(NPLs – provisions for bad debts) / gross advances [(26 – 6d) / 6c]	
42.	Provisions for bad debts / NPLs (6d / 26)	
43.	Advances / deposits [6c / (11 + 12 + 13)]	
44.	NPAs / assets ratio [(26 + 31/10 + 6d)]	

Note: NPLs = nonperforming loans; TRWA = total risk weighted assets; TEAs = total earnings assets; NPAs = nonperforming assets.
a. Numbers indicate line numbers in the table.

Table B.3. Profit and Loss Analysis for the Banking System

		Annual data for recent periods
A. Income		
51.	Interest on advances	
52.	Interest on placement	
53.	Dividend income	
54.	Interest on government securities	
55.	Foreign exchange gain (loss)	
56.	Other interest income	
57.	Other income	
58.	Total income	
B. Expenses		
59.	Interest on deposits	
60.	Other interest expenses	
61.	Occupancy expenses	
62.	Director's emoluments	
63.	Bad debts charge	
64.	Salaries and wages	
65.	Other expenses	
66.	Total expenses	
67.	Profit before taxation	
68.	Number of employees	
69.	Number of branches	
C. Performance indicators		
70.	Yield on earning assets [(51 + 52 + 53 + 54 + 56) / 33][a]	
71.	Cost of funding earning assets [(59 + 60) / 33]	
72.	Interest margin on earning assets	
73.	Yield on gross advances (51 / 6c)	
74.	Cost of deposits (59 + 60) / (11 + 12)	
75.	Return on assets (including contingencies) 67 / (10 + 6d + 25)	
76.	Return on shareholders funds (67 / 24)	
77.	Overheads (noninterest expenses) / total income (61 + 62 + 63 + 64 + 65) / 58	
78.	Bad debts charge / total earnings (63 / 58)	

a. Numbers indicate line numbers in the table.

Table B.4. Measures of Financial System Interconnectedness

(units in local currency)

	Annual data for recent periods
Banking system lending (exposure) to shareholders[a]	
On-balance sheet	
Off-balance sheet	
Banking system lending (exposure) to	
Insurance companies	
Finance companies	
Securities firms	
Pension funds	
Banking system equity investments in	
Insurance companies	
Finance companies	
Securities firms	
Pension funds	
Gross interbank lending (exposure) to[b]	
Domestic banks	
Foreign banks—parent or related company	
Foreign banks—unrelated	

a. Banking system is defined here to include banks and all quasi-banks formally classified as nonbank financial institutions.
b. For these data, domestic banks are defined as all banks operating in the country (i.e., including foreign-owned banks).

Table B.5. Financial Soundness Indicators for the Banking Sector

(in percent, unless otherwise indicated)

	Annual (or quarterly) data for recent periods
Capital adequacy	
Regulatory capital to risk-weighted assets[a]	
Regulatory tier I capital to risk-weighted assets[a]	
Capital (net worth) to assets	
Asset composition and quality	
Sectoral distribution of loans to total loans[a]	
Sector A—please list the 5 to 10 most important sectors	
Sector B	
Sector C	
Sector D	
Sector E	
Geographical distribution of loans to total loans	
Country A—please list three most important countries	
Country B	
Country C	
FX loans to total loans	
NPLs to gross loans[a]	
NPLs net of provisions to capital[a]	
Large exposures to capital[a]	
Gross asset position in derivatives to capital	
Gross liability position in derivatives to capital	
Sector E	
Earnings and profitability	
ROA[a]	
ROE[a]	
Interest margin to gross income[a]	
Noninterest expenses to gross income[a]	
Personnel expenses to noninterest expenses	
Trading and fee income to total income	
Spread between reference loan and deposit rates	
Liquidity	
Liquid assets to total assets[a]	
Liquid assets to total short-term liabilities[a]	
Customer deposits to total (noninterbank) loans	
FX liabilities to total liabilities	
Sensitivity to market risk	
Net open positions in FX to capital[a]	
Net open positions in equities to capital[a]	

Note: FX = foreign exchange; NPL = nonperforming loans; ROA = return on assets; ROE = return on equity.

a. Included in the "core set" of financial soundness indicators.

Table B.6. Data on Ownership, Exposures, Profitability, and Costs in Banking

(in percent, unless otherwise indicated)

	Annual data for a recent period
Share in total assets, or in the assets of the 10 largest banks of state-owned financial institutions	
Share in the capital of all banks or of 10 largest banks of industrial or financial agglomerates	
Classification of assets into normal, precautionary substandard, doubtful, and loss and the associated provisioning amounts	
Value of connected lending for banks in the aggregate and for peers groups	
Value of loans to large customers (regulatory definition that is based on specified thresholds for each bank)	
Holdings of real estate by financial institutions—not related to provision of banking services	
Deposits and claims of all banks held abroad classified by country; deposits in related banks by foreign owned banks	
Unused lines of credit and guarantees provided by banks against different types of counterparties:	
Domestic nonfinancial firms	
Foreign banks	
Foreign nonfinancial firms	
Domestic government and states	
Off-balance-sheet exposures to various types of derivative contracts in domestic and foreign currency units	
Sources of revenue for all banks and peer groups of banks:	
Lending	
ATM/Deposit account services	
Trust	
Security underwriting and market making	
Proprietary trading	
Fees on investment and other traditional off-balance sheet activities	
Data on interest rate spread (average yield on loans minus average cost of deposit) for both dollar and domestic currency intermediation by various peer groups of banks	

Note: ATM = automated teller machine.

Table B.7. Stress Testing of Banking Systems: Overview of Input Data[a]

(all data should be bank-by-bank)

	Annual data for recent periods
General	
Basic balance sheet and income statement data, in particular capital, assets, risk-weighted assets, profits, net interest income	
Credit risk	
Breakdown of total loans by classification categories	
Loan loss provisions (total or by the above classification groups)	
Breakdown of loans by currency of denomination (and by classification)	
Breakdown of loans by sectors (and by classification)[b]	
Interest rate risk[c]	
Maturity or repricing structure of assets and liabilities and off–balance sheet positions	
Holdings of debt securities by banks, duration of these holdings	
Exchange rate risk[d]	
Currency breakdown of assets, liabilities, and off-balance-sheet positions	
If substantial off-balance-sheet positions, other information (such as deltas of FX options) may be needed	
Interbank contagion risk	
Uncollaterized lending (and similar) exposures between bank *i* and *j*, for all pairs of banks	
Other risks	
Depending on the features of the financial system, may include more detailed data on exposures such as equity holdings, real estate exposures (including collateral), commodity exposures	
Other data	
Selected macroeconomic indicators (e.g., interest rates, exchange rates, output growth rates)	
Selected data on borrowers (e.g., corporate sector leverage, by economic sector)	

Note: FX = foreign exchange.

a. The input data shown here are for a simple stress test in a small, noncomplex system with a large role of banks facing a standard set of interest rate, exchange rate, and credit risks. The data requirements will generally be much higher for complex financial systems. They also may be different for systems in which preliminary analysis suggests substantial exposures to specific risks, such as commodity price risk or real estate price risk. In systems with substantial role of nonbank financial institutions, additional data may be included for those.
b. The sectors may be defined by main activity (e.g., agriculture, manufacturing) or by residency or legal form (e.g., residents or nonresidents, households/firms).
c. These items are only direct interest rate and exchange rate risks, respectively. Data on indirect risks (i.e., interest or exchange rate induced changes in credit risk) are under credit risk.

Table B.8. Statistics on Structure and Performance of Insurance Companies

	Annual data for recent periods
Structure and concentration	
Number and total assets of insurance companies by type of ownership:	
Joint stock	
Mutual	
State-owned	
Foreign-owned or controlled	
Number and total assets of branches and subsidiaries of different types of insurance companies operating domestically and abroad	
Number and total assets of domestic and foreign reinsurance companies operating domestically	
Frequency distribution of asset size or premium incomes or new business of insurance companies and concentration indicators such as the shares of three or five largest insurance companies in terms of the chosen indicator	
Ownership structure of insurance sector, such as the share of capital of all insurers or largest insurers, held by government, overseas insurance group, mutual, bank, other financial services or industrial group, and the like	
Operation and performance	
Gross and net (of reinsurance) domestic premium income reported (earned for nonlife insurance)—in currency and as percentage of GDP	
Domestic policy holder liabilities (as a percentage of GDP) and as a percentage of domestic commercial and savings bank deposits	
Capital and surplus (life) or net assets (non-life) as a percentage of net policy holder liabilities	
Net nondomestic premium income reported (earned for nonlife insurance)	
Investment portfolio net of investment in subsidiaries	
Percentage of gross written and net written premium for each main type of insurance product	
Number of insurer new entrants and exits in the past 10–15 years	
Distribution costs, operating expenses, commissions, and reinsurance premiums for major insurance products and lines of business as a percentage of sales (new business for life, gross written for nonlife insurance)	
Surplus or profit—before and after tax—as a percentage of beginning capital and surplus or shareholder's funds, as a percentage of annual premiums and of average total assets	
Gross rate of return on investment and total assets	
Asset composition and investment policy of different insurers (e.g., life, property, casualty, which is based on amounts [and shares] invested in various asset classes [e.g., short-term paper, long-term paper government bonds, corporate bonds, corporate equities (listed and unlisted), real estate, loans to private sector] foreign assets also classified by type of securities, and currency of denomination	
Liability composition in terms of various asset classes, including insurance reserves and own funds, both domestic and foreign	
Contingent and off-balance-sheet accounts, including derivatives and asset swaps.	
Actual solvency margins, required minimum solvency margins, separately for life and nonlife business, and for large insurance groups on a consolidated basis.	

Note: GDP = gross domestic product.

Table B.9. Capital Markets Overview and Their Structure and Performance Selected

	Annual data for recent periods
Overview and structure security of markets	
Number of stock exchanges (list of country's stock exchanges and other regulated markets, including junior and OTC markets)	
Number of listed companies (official lists of publicly traded companies)	
Ownership ratios of domestic and foreign investors in listed companies	
Share of most actively traded (top three to five equities) shares in total traded value	
Market capitalization of listed companies	
as percentage of GDP	
as percentage of all companies including privately held and state owned	
Number and value of transactions in each major market and for companies in major indices	
Turnover ratio	
Total Number of shares outstanding	
Percentage of closely held stocks and "float"	
Value and number new issues	
Value as a percentage of total fixed capital formation	
Number of delistings and their value	
Number and size of merger transactions	
Classification of number and market capitalization of listed companies by industrial sectors (according to SIC codes)	
Number of companies in each sector	
Market capitalization of the sector	
Maximum, minimum, and medium market capitalization in each sector	
Average price earnings ratio in each sector	
Return on equity (over 3 years, assuming dividends are reinvested)	
Assets under management (bonds and equity separately of pension funds, mutual funds, banks, insurance companies, retail investors, foreign)	
Number and total assets held and total capital of market markers, primary dealers, and brokers in the bond and equity markets	
Number and list of credit rating agencies and their range of services	
Number and list of clearing and settlement facilities, including securities depositories and the range of their services	
Cost of new issues, cost of trading, including settlement cost, in secondary markets, including OTC markets	
Fixed income securities	
Government bond holdings and trading volume of different classes of investors (e.g., pension funds, primary dealers, retail investors, banks)	
Maturity profile of outstanding government debt and non-government debt separately.	
Outstanding amounts and new sales of government bonds by type of instruments, selling techniques (auction, and on tap), and frequency or timing of issues	
Market value, interest rate, face value, and new issues of nongovernment bonds by type and maturity	
Cost of new issues and cost of trading non-government debt	
Outstanding volume by rating category (AAA, AA+, AA, BB), average (or maximum and minimum) size of capital of the issuer in each rating grade, total number of issuers, average maturity, percentage of face value that is guaranteed (if applicable)	
Trading volume, average number of trades per trading day (for most active and least active issues), average quote size, bid–ask spreads, and quarterly standard deviation of price or yield change	

Table B.9. (continued)

	Annual data for recent periods
Holdings of corporate bonds by various classes of financial institutions	
Outstanding amount and issuance of various types of securitized assets, by maturity, and type of issuing institutions; holdings of securitized assets by different types of financial institutions	
Derivatives	
Number and types of guaranteed derivative contracts	
Annual and daily average volume of trading in guaranteed derivative contracts and their notional and market values	
Volume of trading in derivatives classified by type of investor	
Number and types of OTC contracts; annual and daily average turnover in OTC contracts and their notional and market values	

Note: OTC = over the counter; GDP = gross domestic product; SIC = standard industrial classification.

Table B.10. Structure and Performance of Pension and Investment Funds

(annual data for selected periods)

	Annual data for recent periods
Mandatory pension schemes	
Number and total assets of pension funds	
Holdings by categories of assets (e.g., government bonds, equities, loans, deposits) and an indication of applicable investment rules for each category	
Value of derivatives and asset swaps in the portfolio	
Capitalization and amount of deposited funds in each pension fund	
Returns on pension fund assets and return on pension fund deposits, and other financial performance indicators	
Disclosure requirements and related data	
Occupational pension schemes	
Number and total assets of pension funds	
Holdings by categories of assets (e.g., government bonds, equities, loans, and deposits) and an indication of applicable investment rules for each category	
Value of derivatives and asset swaps in the portfolio	
Capitalization and amount of deposited funds in each pension fund	
Returns on pension fund assets and return on pension fund deposits, and other financial performance indicators	
Disclosure requirements and related data	
Investment funds	
Number and total assets of all licensed investment and mutual funds	
Number and total assets of different types or classes of mutual funds (e.g., bonds, equity, mixed, money market)	
Number of mutual fund families and types of sponsors (foreign owned or connected with foreign financial institutions and domestically sponsored)	
Size distribution of mutual and investment funds (and mutual fund families) including the share of total net assets of the three largest mutual funds and the largest three fund families	
Data on composition of assets (distinguished between short-term paper, longer-term instruments, overseas securities, and loans to private sector) of all mutual funds	
Data on total foreign assets of mutual fund and investment companies	
Data on volume of purchases and redemptions of mutual funds	
Data on returns, entry (or exit) commissions, management fees of different types of mutual funds	

Table B.11. Structure and Performance of Other Financial Institutions[a]

	Annual data for recent periods
Number and total assets of	
Nonbank, non–deposit-taking financial institutions	
Leasing companies providing financial leasing facilities[b]	
Leasing companies providing operating leasing facilities[c]	
Factoring companies	
Institutions providing SME or microfinance	
Government-owned or joint (public–private) specialized banks or financial institutions	
Institution that specialize in primary housing loans	
Primary sources of funds (e.g., private or public equity, bond issues) for	
Nonbank non–deposit-taking financial institutions generally	
Leasing companies	
Factoring	
SME and microfinance providers	
Specialized institutions	

Note: SME = small and medium enterprise

a. See definition in chapter 6. It includes non-bank financial institutions—other than security market intermediaries, insurance firms, and pension funds—that are both deposit taking, and non–deposit-taking banks that provide a range of specialized financial services.
b. Financial leasing can be defined as a leasing arrangement wherein the lessee takes on most of the benefit and burden of ownership of the leased asset—lease payments make up a large part, if not all, of the leased asset's cost, and the title to the asset will most likely pass on to the lessee at the end of the lease.
c. Operating leasing is generally defined as a leasing arrangement wherein the lessor retains many of the benefits and burdens of ownership of the leased asset, such as the right to claim depreciation or other tax benefits of ownership. The term of the lease generally lasts for only a portion of the working life of the asset, and title is retained by the lessor.

Table B.12. Systemic Liquidity Infrastructure—Money, Exchange, and Debt Market

	Annual or higher frequency data for a recent period
Inter-bank money market[a]	
Average daily volume of the transactions and the bid and offer interest rates (or average, maximum, and minimum interest rates) broken down by maturity (e.g., overnight, 1 week, 2 week) and by instruments (e.g., unsecured inter-bank loans, repos, and so forth)	
Aggregate data on financial institution's exposure to the interbank money market by type of financial institution and by maturity (quarterly)	
Average daily volume or end period volume and yield to maturity of central bank bills (if any), treasury bills, and commercial bank bills, and negotiable certificate of deposits sold on the primary issue market (by maturity)	
Average daily volume (or total during a period) and yield to maturity of central bank bills, treasury bills, and bank bills, plus NCDs (of different residual maturities) transacted in the secondary markets	
Ownership structure (e.g., domestic versus foreign, banks, nonbanks, public, private) of key money market instruments	
Interbank foreign exchange markets	
Average (or end of period) domestic currency or USD exchange rate on the spot market, bid, and offer spot exchange rates, and average daily volume of transactions (number and value) on the spot market	
Average domestic currency or USD exchange rate and average and total volume (number and value) of forward transactions (by maturity)	
Distribution of foreign exchange transactions by type of investor	
Volume of central bank operations in the spot—and forward FX market	
Central bank or monetary authority, liquidity management operations (excludes emergency lending)	
Value and frequency of liquidity management operations (open market operations in specified money market or other market instruments) by the central bank	
Aggregate (end of period stock) liquidity provided to or withdrawn from the banking system as a result of OMOs	
LOLR activities (outstanding stock and rates) broken down by type of instrument, types of borrower, and currency, including standing and discretionary loan facilities, access limit per institution (average), and interest rates charged (by maturity structure and type of loan collateral)	
Number of institutions that account for 50 percent or 70 percent of total liquidity provided through discount window or other liquidity adjustment facilities	
Data on liquidity ratios (if any) imposed by Central Bank by type of authorized financial institutions	
Foreign exchange SWAP arrangements with foreign central banks, monetary authorities, and commercial banks	
Required reserves, excess reserves, and free reserves, and selected liquidity ratios	
Public debt management and government bond markets	
Public sector debt that is outstanding, broken down by issuer (central government, central bank, state-owned entities, state local governments), by instrument, by type of investor, and by maturity	
Public sector holdings of liquid financial assets	
Average duration or term to maturity of government debt outstanding	

Note: NCDs = negotiable certificates of deposit; USD = U.S. dollars; FX = foreign exchange; OMOs = open market operations; LOLR = lender of last resort.

Table B.13. Systemic Liquidity Infrastructure—Payments and Securities Settlement Systems

	Annual or higher frequency data for a recent period
Volume and value of transactions processed in specified payment settlement systems, including	
Number of participants	
Daily average volume and value processed	
Projected trends in volume or value	
Breakdown of payment transactions by financial market transactions, commercial transactions, and consumer transactions	
Frequency distribution of number of participants by value groupings	
Netting ratio	
Concentration ratio	
Overnight or intraday credit—size and rates	
Volume and type of transactions returned or not processed at the completion of clearing and settlement process	
Average time to settle—for recent months and for 3 peak days—after payments enter the system for testing through the day for payment by size; number and value of payments in various "time to settle" bands	
Average number and value of queued payments in recent months and on peak days	
Total notes and coins issues, transferable deposits, narrow money supply, transferable deposits in foreign currency and broad money	
Required reserves, portion of required reserves available for settlement, excess reserves, transferable interbank deposits, central bank credit to banks (both in domestic and foreign currency)	
Volume and value of transactions by payment instrument: • checks (domestic, foreign currency) and payment by cards (credit, debit, and stored value) • Paper-based credit transfers (customer initiated, interbank large value) • Paperless credit transfers (customer initiated, interbank or large value, direct debits, e-money, other)	
Number of checking accounts, ATMs, POS, ATM-debit cards, credit cards.	
Total volume and value (annual) of transactions in various interbank transfer systems (low-value systems, large-value systems, domestic and foreign currency transaction)	
Volume and value of instructions handled by various securities settlement systems (government, securities, corporate shares, corporate debt, other)	

Note: ATMs = automated teller machines; POS = point of sale.

Table B.14. Legal, Governance, and Information Infrastructure

	Annual data for recent periods
Safety net and emergency	
Size distribution of deposits for the banking system and for major banks, and the percentage of total deposits (and depositors) that is insured	
Depositor payouts—amounts and number of depositors—by deposit protection fund	
Timing, number of banks, value of assets, and duration of the operation for various types of bank intervention operation (e.g., statutory management, bank license withdrawals, liquidation, purchase and assumption, government takeover)	
Size of operations and their timing for policy holder and investment protection funds	
Volume and terms of emergency lending operations and their rationale	
Insolvency regime and creditor rights	
Volume and percentage of total of different types of lending (e.g., corporate, personal, real estate, automobile), connected lending, and large exposures in banks, NBFIs, and DFIs	
Percentage of corporate loans that is securitized, classified by type of security	
Level and percentage of NPL in banks, NBFIs, and DFIs, classified by type of lending and by industry; value and percentage of classified loans in each classification category	
Number of credits, amounts, and percentages (as a percentage of total credit under collection or recovery) in each of the following: • Sale of credit to a third party • Debt rescheduling • Informal workout • Nonjudicial foreclosure or execution • Judicial foreclosure (immoveable assets) • Judicial proceedings and execution (moveable assets) • Liquidation proceedings (bankruptcy) • Rehabilitation proceedings (e.g., formal, court supervised) debt to-equity conversion • Other (describe, country specific)	
For each of the above categories of debt resolution, annual data on • Average recovery rates (as a percentage of total credit, plus interest due) • Average recovery rate (as a percentage of nominal value of credit) • Average duration of recovery • Average costs incurred in trying to collect the loans (e.g., costs of litigation, costs for external lawyers)	
Corporate governance	
Overview of capital markets (see table B.9)	
Number, number of employees, sales, assets of companies by types of ownership and incorporation (e.g., proprietorship, partnership, limited liability company), and by listed and nonlisted separately	
Percentage of the listed sector owned by state, foreign, domestic; institutional investors, holding companies, families, and so forth and items such as indicators of ownerships concentration and pyramid structures	

Note: NBFI = nonbank financial institution; DFI = development finance institution.

Table B.15. Financial Sector Taxation

	Annual data for recent periods
Tax treatment—rate, withholding, deductions and exemptions if any—of incomes (interest, dividend, capital gain) from different categories of financial assets (e.g., deposits, stocks, bonds)	
Tax treatment—rate, deductible items such as loan loss provisions and other exclusion—of incomes, transactions or gross receipts (or other VAT and sales tax) of various classes of financial institutions	
Tax treatment of transactions in different financial markets	
Tax treatment of pension funds and life insurance—tax rates on premia or contributions—on earnings on the fund while invested and on withdrawals or pensions	
Remuneration of required reserves and excess reserves	

Note: VAT = value added tax.

Table B.16. Indicators of Access to Financial Services

	Annual or higher frequency data for a recent period
Financial institutions	
Number of branches, or other banking service outlets, for each bank, NBFI, and DFI and for each province (state and local jurisdictions)	
Number of ATMs for each bank, NBFI, and DFI and for each province	
Size distribution of loans for banks, NBFIs, and DFIs; similar distribution data for deposits	
Number of employees for each bank, NBFI, and DFI and for each province	
Payments[a]	
Percentages of households with transaction accounts, payment cards; total number of transaction accounts, payment cards in the system	
Savings[a]	
Percentages of households with savings accounts; total number of savings and time deposit accounts	
Allocation of funds[a]	
Percentage of households with residential mortgage; with other borrowings in last year (stock or flow)	
Percentage of enterprises (including unincorporated) with borrowing from formal financial intermediaries	
Percentages of enterprises reporting credit refusal in past year or discouraged borrowers	
Monitoring users[a]	
Number and percentage of loans covered by various credit registries	
Risk transformation[a]	
Percentage of households with life, motor, and household insurance	
Cost of financial services (banking charges)[a]	
Average or lowest quintile of the cost of maintaining standard transactions accounts (all inclusive cost) for financial intermediaries	
Cost of standard internal retail payment; cost of standard international remittance from a specified source country	
Percentage of households with more than 1 hour traveling distance from a bank branch by public transport	

Note: NBFI = nonbank financial institution; DFI = development finance institution; ATMs = automated teller machines.

a. These data were proposed by Honohan (2004) as basic national access indicators. Compilation of data will typically require surveys of households, financial service providers, and experts with knowledge of the field. Further breakdown of the proposed access information by socioeconomic classes of households or types of enterprises (e.g., microenterprises) would increase the value of available information for policy and research purposes. Such information can be combined with data on holdings of various financial assets and liabilities by households, nonfinancial corporates, and financial institutions for a more detailed assessment.

Appendix C

Data Sources for Financial Sector Assessments

C.1 Overview

Data sources for financial sector assessments can be broadly divided into national sources and commercial databases. National sources use supervisory and national accounts data, whereas commercial databases rely primarily on published financial statements. Data from national sources are usually made available through the bank supervisors' Web sites and publications, as well as through databases of international organizations, such as the Organisation for Economic Co-operation and Development (OECD) and Asia Regional Information Center (ARIC).

Data from national sources are usually aggregated for the entire banking system, although some supervisors also publish bank-level data. The databases usually include indicators of financial stability such as bank capital adequacy, asset quality, profitability, and liquidity, as well as indicators of financial system structure and development such as total financial assets and ratios of monetary aggregates to the gross domestic product (GDP). The main advantage of data obtained from national sources is that they cover the banking system in its entirety and often have higher frequency and better timeliness than commercial data providers. However, financial sector authorities in many countries do not disclose all available data to the public, especially when the data relate to financial sector soundness and stability. In addition, national supervisory data are not standardized across countries, and the data come in different formats and definitions. The OECD publishes standardized databases with annual bank, insurance, and institutional investors' soundness indicators and financial system structure data for 31 countries compiled from national sources, but data standardization requirements lead to delays in the processing and publishing of the data.

Commercial databases providing bank-level indicators draw mainly on published bank financial reports. Databases such as Bankscope and Thomson One Banker contain a large number of nonaggregated annual financial statements. Bankscope transforms the original data reported by the banking institutions into a standardized format that is used for the computation of bank-level soundness indicators. The database has the capacity to aggregate those indicators on a country basis. However, the availability of the underlying data for computing indicators and the coverage of the banking systems may vary by country and, if inadequate, may produce misleading results. In addition, the public reporting definitions of some of the indicators may differ from the definitions used by bank supervisors.

The Banker's Almanac database has a comprehensive coverage of the financial systems, including both banks and nonbank financial companies, but the number of published indicators is limited. Corporate-level soundness and development indicators for publicly traded companies not limited to banks, but including also nonbank financial and nonfinancial corporations, are available from Thomson One Banker, which also publishes company stock performance data. Other commercial databases, such as CEIC Asia and Haver Analytics, which specialize in economic statistics, tap into national sources and provide more timely and higher frequency aggregate-level bank indicators for some countries as well as country-level, market-based indicators, such as stock exchange capitalization, turnover, number of listed companies, and stock market indices. CEIC Asia provides some data on real estate prices. Information on bonds, equities, commodities, and derivative instruments (e.g., options, futures, swaps)—including prices, yields, spreads, market indices, and the like—are available from commercial data providers such as Bloomberg, Datastream, and Global Insight. In addition, Bloomberg provides some company-level financial statements and performance information for developed countries and for some emerging market countries. Thomson One Banker's company data are retrievable through Datastream.

The rating agencies that publish financial information on rated banks on their Web sites are another source of bank-level indicators. Moody's Investor Services compiles banking system statistical supplements for developed and emerging market countries. Fitch Research publishes special country reports on major banks' performance, banking system structure, and prudential regulations, which contain selected soundness indicators. Both Moody's and Fitch Research focus their attention on the larger banks in a country, and their coverage of the banking systems is not comprehensive. The indicators are more often not aggregated and may have a lag from 6 months to 1 year, depending on when the reports were issued. Along with the financial information, Moody's publishes the financial strength ratings of individual banks and aggregates the information into an overall banking system financial strength rating. Fitch rates individual banks in terms of potential support the banks may get in a crisis situation.

Additional details on those data sources are presented in the following sections.

C.2 National Data Sources

National bank supervisors publish on their Web sites some of the financial soundness indicators (FSIs) that they collect, either in the statistics section or as part of their bank

supervision publications. Availability varies by country, and for some countries, disclosure is limited to monetary balance sheet data. Published supervisory data are updated more frequently than commercial sources—often quarterly—and cover the banking sector in its entirety. In some countries with large banking sectors, there is still a lag in the collection, aggregation, and reporting of the indicators. In countries where the bank supervisor is not the central bank but another stand-alone agency (e.g., many countries in Latin America where the bank supervisor is usually the banking commission), the Web sites contain more comprehensive banking sector data. In some cases, only the underlying data used for the FSIs computation are published and are in a raw data format.

Some of the countries publishing FSIs on their Web sites are as follows:

- Europe: Austria, Belgium, Iceland, Italy, Luxembourg
- Latin America: Argentina, Bolivia, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, República Bolivariana de Venezuela
- Emerging Europe: Bulgaria, Croatia, the Czech Republic, Estonia, Israel, Poland, Slovakia, Slovenia, Turkey, Ukraine
- Asia: Bangladesh, India, the Republic of Korea, Malaysia, Pakistan, Philippines, Thailand
- Middle East: the Arab Republic of Egypt
- Africa: Kenya, South Africa, Zimbabwe
- Other: Australia, Canada, New Zealand, United States

C.3 International Organizations

C.3.1 OECD Databases

The OECD Bank Profitability Statistics Database has three main components: (a) income statement and balance sheet statistics, (b) structure of financial system, and (c) classification of banks assets and liabilities.

Income statement and balance sheet statistics provide information on income statements, balance sheets, and capital adequacy by banking groups. Data relate to individual banking groups as defined by country (e.g., Germany: all banks, commercial banks, large commercial banks, savings banks, cooperative banks, regional giro institutions, regional institutions of cooperative banks). Data are provided in national currency and include the following:

- Years covered: 1979 onward, annual, latest update for 2001
- Countries covered: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Iceland, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

Structure of financial system provides information on the overall structure of the financial system by type of institution and their components: central banks, other mon-

etary institutions, other financial institutions, and insurance institutions. Data relate to number of institutions, number of branches, number of employees, total assets and liabilities, and total financial assets. Data are provided in national currency, and they include the following:

- Years covered: 1995 onward, annual, (latest update for 2002)
- Countries covered: Same as in income statement and balance sheet statistics

Classification of banks assets and liabilities provides the composition of bank assets and liabilities of residents and nonresidents denominated in domestic and foreign currencies. Data are provided in national currency and they include the following:

- Years covered: 1995 onward, latest update for 2002
- Countries covered: Australia, Austria, Belgium, Canada, the Czech Republic, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom

The OECD insurance statistics have two main components: comparative insurance data and insurance statistics.

Comparative insurance data include gross premiums, market share in OECD, density, penetration, life insurance share, retention ration, ratio of reinsurance acceptance, and foreign company market share in the domestic market. Those statistics are provided for life insurance, nonlife insurance, and total. They include the following:

- Years covered: 1993 onward, annual, latest update for 2002
- Countries covered: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

Insurance statistics are statistics per country and are provided in the following areas: number of insurance companies, number of employees, business written, outstanding investment by direct insurance companies, breakdown of nonlife insurance premiums, gross claims payments, gross operating expenses, and commissions. They include the following:

- Years Covered: 1993 onward, annual, latest update for 2001
- Countries covered: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

The OECD institutional investors statistics provide the financial assets of institutional investors, insurance companies, pension funds, investment companies, and other forms of institutional investors as outstanding amounts in U.S. dollars and as a percentage of GDP. They include the following:

- Years covered: 1980 onward, annual, latest update for 2002
- Countries covered: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

C.3.2 European Central Bank Monetary Statistics

The European Central Bank (ECB) publishes—as part of its monetary statistics—aggregated and consolidated balance sheets of the euro area monetary financial institutions, as well as details on national aggregated balance sheets of the euro area monetary institutions. Recently published series contain information on the cross-border positions of monetary financial institutions residing in the euro area vis-à-vis all financial institutions residing within and outside the euro area. Other monetary financial institutions statistics cover the number of institutions subject to minimum reserve requirement in each member and accession country, the number of mutual funds, and the number of foreign bank branches In addition, the ECB publishes the aggregated balance sheet of euro area investment funds and statistics on securities issuance, money market interest rates, government bond yields, and stock market indices. They include the following:

- Years covered: 1997 onward (1999 for some series)
- Countries covered: Euro area countries

C.3.3 Bank for International Settlements (BIS)

BIS publishes on its Web site the following databases that are of interest for financial sector assessments: consolidated banking statistics, international banking statistics, securities statistics, derivatives statistics, and payment and settlement system statistics.

Consolidated banking statistics include consolidated data on foreign and international claims by maturity and sector and by nationality of reporting bank. The data cover the following:

- Years covered: 1983 onward, quarterly frequency
- Countries covered: BIS reporting banks' claims on all countries

International banking statistics include locational statistics on external positions of BIS reporting banks by sector and by currency. Their coverage is as follows:

- Years covered: 1977 onward, quarterly frequency
- Countries covered: BIS reporting banks' claims on all countries

Securities statistics include domestic and international debt securities by sector, residence, and nationality of issuer. Their coverage is as follows:

- Years covered: 1987 onward, quarterly
- Countries covered: Developed and developing countries

Derivatives statistics include over-the-counter and exchange-traded derivatives statistics, and cover the following:

- Years covered: 1998 onward, semiannual
- Countries covered: aggregate data by risk category and instrument (regional breakdowns available for exchange-traded derivatives)

Payment and settlement system statistics include data on various settlement media; information on notes and coins; data on various noncash means of payments and transactions; and other information on different interbank funds transfer systems, payment cards, electronic payments, and automated teller machines, etc. The coverage of the data is as follows:

- Years covered :1995 onward, annually updated
- Countries covered: Belgium, Canada, France, Germany, Hong Kong (China), Italy, Japan, the Netherlands, Singapore, Sweden, Switzerland, United Kingdom, United States

C.3.4 Asia Regional Information Center

The Asia Regional Information Center (ARIC Database) includes capital adequacy and nonperforming loan indicators for the financial sector plus the debt-to-equity and return on equity indicators for the corporate sector. The database covers the following:

- Years covered: 1997 onward, frequency—monthly, quarterly, annual, varies by indicator and country
- Countries covered: Bangladesh, Brunei Darussalam, India, Indonesia, Malaysia, Pakistan, Philippines, the Republic of Korea, Singapore, Sri Lanka, Thailand

C.3.5 IMF

IMF produces the following databases of particular interest for financial sector assessments: international financial statistics (IFS) and bonds, equities, and loans database (BEL).

Produced by the IMF, the IFS provides international statistics on macroeconomic indicators and selected aspects of international and domestic finance from 1948 to the present. It contains approximately 32,000 time series covering more than 200 countries and areas.

The BEL database contains data on bond issuance, syndicated loans, and equity placements. Records are available for each individual transaction with several fields that provide the terms of those transactions. Data are also available through reports in an aggregated format at the country and regional levels. This database is internal to the IMF. Its coverage is as follows:

- Years covered: 1980 to present except for equities that span 1983 to present, annual, monthly, daily frequencies
- Countries covered: developing countries

C.3.6 International Finance Corporation (IFC)

IFC publishes the Emerging Markets Database (EMDB).

EMDB contains the latest figures for all IFC indices—global, investable, industry, and frontier—and on market data such as prices, corporate actions, and stock ID information. The database provides three levels of data: comprehensive data on individual stocks covered in all markets, data series for each index computed, and data series for each market covered. It also includes the following:

- Years covered: varies by country and indicator
- Countries covered: emerging market countries

C.3.7 World Bank

The World Bank produces the world development indicators database. It contains statistical data for more than 550 development indicators and time series data from 1960 onward, thus covering more than 200 countries and 18 country groups. Data are provided in both national currencies and U.S. dollars, and ratios are available where applicable. Financial sector data available include the following: bank liquid reserves, domestic banking credit, deposit and lending interest rates and spreads, stock market capitalization, value of stocks traded, system liquid liabilities, and so forth.

C.3.8 Commercial Databases

C.3.8.1 Commercial Databases Providing Aggregate Financial Sector Data

The CEIC Data Company Ltd. produces the CEIC Asia Database. This database provides, in addition to economic data, aggregate balance sheets by banking groups (e.g., all banks, commercial banks, and, in some cases, foreign banks and state-owned banks). For some countries, a limited number of FSIs are available, mainly bank lending and asset quality indicators. However, for some countries, available are bank capital adequacy indicators and, in some cases, a limited number of structural and insurance indicators (e.g., number of banks, some insurance data). For some countries, individual bank balance sheets are provided. In addition, the database has information on financial markets (e.g., stock market capitalization, indices, turnover ratios) and, for some countries, on real estate prices. Data also include the following:

- Years covered: vary by country (from 2–3 years to 5–6 years); frequency is usually monthly, quarterly,, and annually: the balance sheet and FSIs data have a lag of 1–2 quarters.
- Countries covered: Australia, Bangladesh, Cambodia, China, Hong Kong (China), India, Indonesia, Japan, the Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan (China), Thailand, Vietnam

CEIC's emerging Europe and emerging Americas databases provide, in addition to economic statistics, aggregate bank balance sheet data. In addition, the database has informa-

tion on financial markets: stock market capitalization, indices, and turnover ratios. The data coverage is as follows:

- Years covered: varies by country (usually 5–6 years); frequency is usually monthly, quarterly, and annually
- Countries covered: emerging Europe (Bulgaria, Croatia, the Czech Republic, Hungary, Israel, Poland, Romania, Russia, the Slovak Republic, and Slovenia); South Africa; Turkey; and emerging Americas (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, República Bolivariana de Venezuela)

Haver Analytics provides—in addition to economic statistics—financial data, which, depending on the country, may include aggregate bank asset information, or capital markets data, data on domestic and external government debt, number of bankruptcies in the corporate sector, and the like. The data coverage is as follows:

- Years covered: Varies by country and indicator, monthly frequency for the market data
- Countries covered: Africa, Asia Pacific, Central America, Eastern Europe, G10+ countries, Latin America, Middle East, and Western Asia

Global Insight provides—in addition to economic statistics—data on bond indices, commodities, energy pricing, equities, equity indices, exchange rates, fixed income, futures, interest rates, money markets, and options. The data coverage is as follows:

- Years covered: varies by indicator and country, annual, semiannual, quarterly, monthly, weekly, daily frequencies
- Countries covered: worldwide coverage

C.3.8.2 Commercial Databases Providing Bank-Level Data

Bankscope provides financial data (financial statements and bank performance indicators) for more than 10,000 individual banks. Bank-level data can be aggregated automatically, but the prudential indicators are sometimes available only for a limited number of banks, thereby creating distortions in the aggregate indicators. Data can be filtered by banking groups (e.g., commercial banks, savings banks, cooperative banks, foreign banks, state-owned banks), although the ownership information is sometimes incomplete. The data coverage is as follows:

- Years covered: 1995 onward, annual frequency
- Countries covered: covers most of the countries in the world, but level of banking system coverage varies by country

Banker's Almanac provides a comprehensive list of all the financial institutions in a particular country with their ownership and some financial statement information: stylized balance sheet and income statement data for the past 5 years, plus three performance indicators (return on assets, return on equity, and equity capital to total assets). The data coverage is as follows:

- Years covered: 1999 onward, annual frequency
- Countries covered: worldwide coverage

Bloomberg provides company-level financial information (summary balance sheets, income statements, cash flow statements, and performance indicators) for large listed banks, other financial and nonfinancial companies, and a variety of capital markets data and market-based indicators, including information on bond spreads, derivative instruments, ratings, and the like. The data coverage is as follows:

- Years covered: varies by bank, usually about 10 years for the large international banks, annual figures, some quarterly figures available
- Countries covered: Global, covering about 126 countries; data coverage varies by country, more adequate coverage for the industrialized countries and large emerging markets

Thomson One Banker provides company-level financial information (annual reports and financial ratios covering leverage, profitability, liquidity, asset utilization including market indices, and stock performance data for publicly traded companies). Companies can be filtered by industry (market sector). Financial information for banks and financial services companies is also available, but coverage varies by country and is often limited for emerging market countries. Thomson One Banker data are also retrievable through DataStream Advance. The data coverage is as follows:

- Years covered: 1990 onward, annual frequency, quarterly for the United States
- Countries covered: countries with active stock exchanges

DataStream Advance provides data on equities, equity indices, bonds, bond indices, interest rates, futures, options, and commodities. Thomson One Banker's company information can also be accessed through DataStream Advance. The data coverage is as follows:

- Years covered: varies by country, indicator, and company, usually at least 10 years for market data
- Countries covered: primarily countries with active capital markets

C.3.8.3 Ratings Agencies

Moody's Investors Services publishes financial statements and selected FSIs for the rated banks in each country in a banking statistical supplement. Each supplement contains 5 years of annual bank-level data. For some countries, banking system aggregates are also available. Moody's also rates the financial strength of each bank, using bank performance and other country-specific indicators. The data coverage is as follows:

- Years covered: each statistical supplement covers 5 years of annual data
- Countries covered: rated banks in developed and emerging market countries, annual frequency; data timeliness varies depending on when the supplement was published and has up to 1 year of lag

Fitch Research publishes selected financial information for the top five to six banks in developed countries and in some emerging market countries as part of its special reports on rated banks' financial results. Some information on financial system structure and

bank regulations is also available from its reports on banking systems and prudential regulations. The data coverage is as follows:

- Years covered: each report usually covers 2 years of data
- Countries covered: developed and emerging market countries

References

Altman, Edward I., and Paul Narayanan. 1997. "Business Failure Classification Models: An International Survey." In *International Accounting and Finance Handbook*, 2nd ed., ed. Frederick D. S. Choi, chapter 10. New York: John Wiley and Sons.

Bank for International Settlements (BIS). 2001. "Structural Aspects of Market Liquidity from a Financial Stability Perspective." Available at http://www.bis.org/publ/cgfs_note01.pdf (a discussion note for a meeting of the Financial Stability Forum.

———. 2005. "Real Estate Indicators and Financial Stability." BIS Paper No. 21, Bank for International Settlements, Basel, Switzerland.

———. 1999. Market Liquidity: Research Findings and Selected Policy Implications. Committee on Global Financial System. Publications No. 11, Bank for International Settlements, Basel, Switzerland.

Begum, Jahanara, May Khamis, and Kal Wajid. 2001. *Usefulness of Sectoral Balance Sheets in Macroprudential Analysis*. Washington, DC: International Monetary Fund.

Borio, Claudio, and Patrick McGuire. 2004. "Twin Peaks in Equity and Prices?" *BIS Quarterly Review* (March):79–93. Available at http://www.bis.org/publ/qtrpdf/r_qt0403.pdf.

Das, Udabir S., Davies Nigel, and Podpiera Richard. 2003. "Insurance Issues in Financial Soundness." IMF Working Paper No. 03/138, International Monetary Fund, Washington, DC.

Debelle, Guy. 2004. "Household Debt and the Macroeconomy." *BIS Quarterly Review* (March): 51–64. Available at: http://www.bis.org/publ/qtrpdf/r_qt0403.pdf.

Evans, Owen, Alfredo Leone, Mahinder Gill, and Paul Hilbers. 2002. "Macroprudential Indicators of Financial System." IMF Occasional Paper No. 192, IMF, Washington, DC.

Honahan, Patrick. 2004. "Measuring Microfinance Access: Building on Existing Cross-Country Data." Paper presented at UNDP, World Bank, and IMF Workshop on Data on Access of Poor and Low Income People to Financial Services, Washington, DC.

International Monetary Fund. 2000. *Monetary and Financial Statistics Manual*. Washington, DC: International Monetary Fund.

———. 2002. *A Balance Sheet Approach to Financial Crisis*. Washington, DC: International Monetary Fund.

———. 2004. *Compilation Guide on Financial Soundness Indicators*. Washington DC: International Monetary Fund. Available at http://www.imf.org/external/nplstal/bsi/eng/2004/guide/index.htm.

Levine, R. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35: 688–726.

Miles, Colin. 2002. "Large Complex Financial Institutions (LCFIs): Issues to Be Considered in the Financial Sector Assessment Program." International Monetary Fund, Monetary and Exchange Affairs Department, Operational Paper 02/3, International Monetary Fund, Washington, DC.

Pomerleano, Michael. 1998. "The East Asia Crisis and Corporate Finances: The Untold Micro Story." World Bank Working Paper No. 1990, World Bank, Washington, DC. Available at http://econ.worldbank.org/docs/907.pdf.

United Nations, the Commission of the European Communities, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and the World Bank. 1993. *System of National Accounts*, Series F, No. 2, New York: United Nations.

World Bank. 2004. *Access to Financial Services in Brazil*. Washington, DC: World Bank.

Appendix D

Stress Testing

This technical note is intended to answer some of the questions that may arise as part of the process of stress testing a financial system. The note is structured as follows: Section D.1 begins with a discussion of stress testing in a financial system context that highlights some of the differences between stress testing that is designed to identify systemic weaknesses and stress testing within individual portfolios. Section D.2 provides an overview of the process itself—from identifying vulnerabilities, to constructing scenarios, to interpreting the results. Section D.3 shows some examples of stress-testing calculations. Section D.4 draws on experience in conducting stress testing as part of the Financial Sector Assessment Program (FSAP).

D.1 Overview of Stress Testing[1]

A stress test is a rough estimate of how the value of a portfolio changes when there are large changes to some of its risk factors (such as asset prices). The term *rough estimate* is used to avoid the perception that stress testing is a precise tool that can be used with scientific accuracy. Stress testing is an analytical technique that can be used to produce a numerical estimate of a particular sensitivity. Stress tests usually produce a numerical estimate of the change in value of the portfolio that has been caused by exceptional, but plausible, shocks. This change is often expressed in terms of the effect on some measure of capital as a way of understanding the sensitivity of the net worth of the institution to the risk being considered. The stress-testing process, however, is more than just applying a set of formulas to spreadsheets of numbers; it involves a series of judgments and assumptions that can be as critical to producing meaningful results as the actual calculations them-

selves. Each assumption, aggregation, or analytical approximation made in the process can introduce wide margins of error to the results; therefore, much care should be taken in their estimation and interpretation.

The use of stress tests has broadened over time. Stress tests were originally developed for use at the portfolio level to understand the latent risks to a trading book from extreme movements in market prices. They have now become widely used as a risk management tool by financial institutions (see, e.g., Committee on the Global Financial System 2000). Gradually, the techniques have been applied in a broader context, with the aim of measuring the sensitivity of a group of institutions (such as commercial banks) or even an entire financial system to common shocks. Stress-testing results may be compared across institutions, and the aggregate effect may be viewed as a change in financial soundness indicators (FSIs) caused by a common shock. The dispersion of the estimated effect among institutions of a common shock by itself produces valuable information on the potential for systemic risk.

System-focused stress tests, as the name implies, have several important differences from portfolio-level stress tests. The ultimate intent of system-focused approaches is different, because they aim to identify common vulnerabilities across institutions that could undermine the overall stability of the financial system. The focus is also more macroeconomic in nature, because the investigator is often interested in understanding how major changes in the economic environment may affect the financial system. A second difference between system-focused and portfolio-level stress tests lies in the complexity and degree of aggregation. System-focused stress tests may involve aggregation and comparison of more heterogeneous portfolios, often on the basis of different assumptions and methods of calculation. This aggregation requires adding or comparing "apples" and "oranges" to a much greater extent than is the case for a single institution's portfolio.

System-focused stress tests can be classified according to two types: either simultaneous stress tests of multiple portfolios using a common scenario, or a single scenario applied to an aggregated portfolio or model of the entire system.[2] Constructing an aggregated portfolio or model with sufficient detail is often an arduous and complex task. Therefore, most system-focused stress tests have adopted the first approach of applying a common scenario to a variety of institutions. This approach has the advantage that it provides information on the overall effect of shocks, as well as their distribution throughout the system, which can be useful for understanding the potential for contagion and confidence effects on stability. If data availability allows, conducting both types of tests—on an aggregated portfolio, as well as on individual portfolios—will provide the maximum information on a system's vulnerabilities.

D.2 The Process

System-focused stress testing is best seen as a process: part investigative, part diagnostic, part numerical, and part interpretive. Ideally, this process begins with the identification of specific vulnerabilities or areas of concern, followed by the construction of a scenario in the context of a consistent macroeconomic framework. The next step is to map the outputs of the scenario into a form that is usable for an analysis of financial institutions'

balance sheets and income statements, then performing the numerical analysis, considering any second-round effects, and finally summarizing and interpreting the results. Each stage of the process is important to understanding the sensitivity of a financial system to a particular shock or vulnerability. Those stages are not necessarily sequential, because some modification or review of each component of the process may be desirable as work progresses. The following subsections describe the key stages of the stress-testing process in more detail, with the intent of providing a better understanding of what is involved and of how to go about implementing them.

D.2.1 Identifying Vulnerabilities

The first stage in the stress-testing process is the identification of the main vulnerabilities. Narrowing the focus of the exercise permits a more refined analysis, because it is unrealistic to attempt to stress every possible risk factor for a portfolio or system. Focusing on the weak points in a financial system enables the assessor to tailor the stress-testing exercise more effectively and thus permits a richer understanding of inherent vulnerabilities and a more effective use of time and resources.

Isolating the key vulnerabilities to stress test is an iterative process that involves both qualitative and quantitative elements. System-focused stress tests can use a range of numerical indicators to help isolate potential weaknesses, including the "big picture" or macrolevel indicators, broad structural indicators, and institution-focused or microlevel indicators. Those measures should be seen as providing complementary information on potential vulnerabilities. This process may be facilitated by drawing on a range of expertise in the context of a dedicated working group.

Knowledge of the broader macroeconomic environment will provide an overall context for the performance of the financial system and will indicate potential sources of shocks. Understanding the macroeconomic picture aids the understanding of what is "normal" for an economy with respect to its own history and in comparison with other countries. This information provides a useful metric for understanding potential sources of shocks, because key macrovariables and financial variables that are the most volatile, misaligned, or out of equilibrium are often the most susceptible to major shocks or realignments. This analysis can also inform the macrosimulations described later. Such an analysis can use data about the real sector, the government sector, and the external sector and can draw on the existing sources of macroeconomic analysis from local or external sources, including IMF Article IV consultation reports.

A variety of indicators of the structure of the financial system can provide important insights into the location of risks in the financial system, including data on ownership and market shares, balance-sheet structures, and flow-of-fund accounts. Qualitative information on the institutional and regulatory frameworks that govern financial activities can also help to interpret developments in a range of indicators. Discussions with supervisors and regulators, private sector analysts, and market participants can be quite revealing as to the likely sources of vulnerability in a financial system. This type of information is often anecdotal in nature, which may make interpretation difficult, but it can provide important context to an assessment of potential financial sector vulnerabilities and can form the starting point for more quantitative assessments of vulnerabilities.

In addition to using the broad macroeconomic context and structural indicators, we can use a range of FSIs to narrow the focus and to understand the financial system's vulnerability to shocks and its capacity to absorb the resulting losses. The analysis of FSIs can be informed by the information gathered from the macroeconomic and structural indicators discussed earlier.

D.2.2 Constructing Scenarios—Use of Macroeconomic Models

Once the key questions or main vulnerabilities of interest have been identified, the next step is to construct a scenario that will form the basis of the stress test. This phase of the process involves an examination of the available data and models that can be used to understand the behavior of the system with respect to the main vulnerabilities. Using those data, one can construct a scenario in the context of some overall macroeconomic framework or model, depending on the complexity of the system and the availability of a suitable model.

The objective of using an explicit macroeconomic model is to link a particular set of shocks to key macrovariables and financial variables in a consistent and forward-looking framework. The use of a macroframework does not necessarily require a large research effort, but it can leverage existing expertise and research. The key reason for using this approach is to bring the discipline and consistency of an empirically based model and an explicit focus on the link between the macroeconomy and the main vulnerabilities.

Drawing on the main macroeconomic vulnerabilities, the analyst should arrive at a consensus for the key macrovariables and financial variables that are the most volatile, misaligned, or likely to have the greatest effect on the financial system. Typically, such misaligned variables are susceptible to major shocks or realignments and, thus, can form the basis of a realistic simulation scenario. Depending on the structure and features of the macromodel that is available, the simulation can produce a range of economic and financial variables as outputs.

Here are three illustrative examples of the process of developing a scenario:

- Example 1: Suppose that housing prices had risen sharply on the strength of rapid employment growth, rising household disposable incomes, and low interest rates, thereby fuelling a mortgage-lending boom. An analysis of bank balance sheets and income statements shows a strong dependence on mortgage lending both in the stock of assets and in the flow of income. A possible scenario could involve a rise in unemployment, a fall in disposable incomes, and a sharp rise in interest rates affecting the debt servicing capacity of households. The outputs from a macromodel could provide a range of information on employment, real incomes, prices, and interest rates, which could be used to formulate a specific stress test for bank balance sheets.
- Example 2: Suppose that the macrolevel analysis indicated an overvalued exchange rate caused by strong capital inflows with associated credit growth financing a surge in construction investment. An analysis of structural data on institutional balance sheets and income statements reveals a sharp increase in exposure to foreign-currency–denominated real estate loans, and microlevel indicators of FSIs. Individual balance-sheet information shows rising defaults on property loans. One scenario

might include a sudden reversal of capital flows and a rapid depreciation of the exchange rate. Macrosimulations of this scenario could produce a range of outputs, including real gross domestic product (GDP) growth, price level, interest rates, and exchange rate. Those outputs could then form the basis of a stress test of balance sheets for individual institutions.

- Example 3: Suppose that financial deregulation and low interest rates, together with strong wage and economic growth, have fuelled a sharp rise in consumer (nonmortgage) lending. An analysis of balance sheets and income statements reveals banks and nonbanks now earn more than a quarter of their income from this lending, with exposures (and credit extended to consumers) growing rapidly. Furthermore, nonbanks are funding their lending largely through commercial paper placements. Although FSIs show only modest rises in delinquency rates and nonperforming assets, there are concerns about credit quality going forward. One possible scenario might involve a sharp rise in interest rates, increasing banks' funding costs and (temporarily) narrowing their margins, perhaps caused by a policy response to increased inflationary pressures or an external shock. The output of a macromodel could be used to analyze the possible effect on household incomes and the debt-servicing capacity.

Ideally, a macroeconometric or simulation model should form the basis of the stress-testing scenarios. One objective of system-focused stress tests is to understand the effect of major changes in the economic environment on the financial system. Using a macromodel provides a forward-looking and internally consistent framework for analyzing key linkages between the financial system and the real economy. The feasibility of this approach will vary according to the range of modeling expertise available, as well as the type of macromodel in place. Here are some of the considerations involved in using a macromodel:[3]

- *What are the baseline assumptions?* The baseline assumption could be either no change from the latest data, or the central forecast or most likely scenario from the most recent forecasting exercise.
- *What policy responses are assumed?* Depending on the model, different policy reaction functions may be imbedded in the model (such as a Taylor rule relating monetary policy instrument settings to deviations in inflation and output from their targets), or an assumption of no change in policies may be used. One can assume no policy response will typically imply a larger macroeconomic effect of any shock, but this conclusion will depend on the model and scenario.
- *What is the time horizon of the simulations?* If a quarterly model is available, it may be possible to produce forecasts over the next six to eight quarters. When one applies the scenarios to individual balance sheets, however, a shorter time horizon is desirable if no reaction by institutions to the specific shocks is assumed (i.e., if it is assumed that institutions do not adjust their balance sheets, then the results can be interpreted as a comparative static exercise).
- *Which variables are assumed to be fixed, and which are shocked?* Many macroeconomic models use a large number of exogenous variables. Implementing a particular scenario requires a judgment as to which variables are assumed to be constant.

Changing a large number of exogenous variables may make the scenario unnecessarily complex with little benefit in terms of realism and less acceptance of the results by participants.

- *What size of shocks should be used?* Shocks either can be calibrated on historical experience (e.g., largest change over the chosen time horizon seen in the past 10 years), or can be set on the basis of a hypothetical scenario (e.g., a 20 percent fall in the exchange rate). Historical experience may be more intuitive and easier to justify, but major structural changes may invalidate historical calibration (e.g., deregulation may change fundamental economic relations).

In the absence of a macromodel, it may be necessary to rely on more rudimentary approaches. Some authorities may not have a well-developed macromodel available. Even if a model is in place, there may be difficulties in using it to simulate relevant shocks. Some models may not be tractable for the type of economic shock that the analyst wishes to consider, whereas others may not incorporate a financial sector or may not allow for a policy reaction by authorities. Thus, it may not always be feasible to generate a macroscenario using a consistent macromodel. Even in those circumstances, it is still possible to frame the analysis in the context of an internally consistent, forward-looking macroeconomic scenario by using textbook macromodels, which are supplemented by existing empirical research, or by using models developed for another country that has a similar structure.

D.2.3 Balance-Sheet Implementation

Once a set of adjustment scenarios has been produced in a consistent macroframework, the next step is to translate the various outputs into the balance sheets and income statements of financial institutions. There are two main approaches to translating or "mapping" scenarios into balance sheets: the "bottom-up" approach, in which estimates are based on data for individual portfolios, which can then be aggregated, and the "top-down" approach, which uses aggregated or macrolevel data to estimate the effect.[4]

Under the bottom-up approach, the response to various shocks in a scenario is estimated at the portfolio level while using highly disaggregated data from individual financial institutions at a point in time. The results of the bottom-up approach can then be aggregated or compared to analyze the sensitivity of the entire sector or group of institutions. The bottom-up approach has the advantage of making better use of individual portfolio data; however, if individual institutions provide their own estimates, then the approach may introduce some inconsistencies about how each institution applies the scenario and produces its numerical estimates. The bottom-up approach also provides information on how the effect of shocks varies across institutions and on the variance or dispersion of this effect, which is an important statistic on financial stability of the system insofar as large losses in one institution can trigger contagion.

The top-down approach is used to estimate the responsiveness of a group of institutions to a particular scenario. Under this approach, a common parameter or estimate is applied to all institutions in the data set, (e.g., using a panel regression or a regression of aggregated information) to arrive at an estimate of the aggregate effect. The top-down approach is often easier to implement, because it requires only time series of aggregated

data and is a consistent and uniform method that implicitly takes into account the responses of banks to shocks over time. However, aggregate historical relationships may not hold in the future. Ideally, both methods should be applied, but data limitations may preclude the application of both methods in many countries.

The remainder of this section discusses the various steps involved in implementing a system-focused stress test by addressing a series of key questions. The questions include the following: Who should perform the empirical analysis? Which institutions should be included? What are the data constraints? How large should the shocks be? How do we link the macroadjustment scenarios to individual balance sheets and income statements?

D.2.3.1 Execution, Scope, and Coverage

The first question to consider in implementing a system-focused stress test is who crunches the numbers: the supervisory agency or central bank, or the institutions themselves? Ideally, individual institutions should be as heavily involved in the process as possible—regardless of whether a top-down or bottom-up approach is used—because individual institutions will typically have the best access to data and knowledge of their own portfolios. For institutions with sophisticated risk management systems or significant international operations, most will have systems and stress-testing procedures in place as part of their internal risk monitoring processes.[5] For countries with financial institutions that have more rudimentary systems and have less expertise in modeling their portfolios, involvement in the process may be beneficial by expanding their knowledge. In those circumstances, it may be necessary for the central bank or supervisory agency to provide guidance or even to undertake parts of the empirical analysis, but this process should still involve individual institutions as much as possible. Having institutions cooperate in a stress-testing exercise may require some moral suasion or other incentives, including the ability to benchmark their own results against their peer groups or the ability to learn from other participants. At the same time, the supervisory agency or central bank needs to minimize conflicts of interest arising from the institutions' participation in the exercise. In particular, it needs to minimize incentives of institutions to project an overly optimistic picture, which could compromise the quality of the test. The supervisory or central bank staff may need to confirm the validity of the tests, including confirmation by carrying out independent tests as needed.

Implementing a stress test also requires addressing this question: Which institutions should be included in the exercise? The coverage of the stress-testing exercise should be broad enough to represent a meaningful critical mass of the financial system, while keeping the number of institutions covered at a feasible level (e.g., fewer than 20). The total market share of the institutions involved (in terms of assets, deposits, or some other criteria such as importance in the payment system) can be used to determine a cutoff point, because the exercise may become unwieldy if too many institutions are involved. Depending on their interlinkages, both banks and nonbank financial institutions should be included in the analysis, although this involvement may present some difficulties if they are supervised by different entities or have different balance-sheet reporting dates or practices.[6] In countries with a large number of small institutions, consideration could be given to either aggregating smaller institutions into a single balance sheet or taking a

representative sample of institutions, or even ignoring them if they are not systemically important.

Another important factor to consider in conducting a stress test is the data constraints. The availability and quality of data impose major constraints on the nature of stress tests that can be performed. Data limitations arise from the lack of basic data availability (especially in countries where information on balance-sheet exposures may not be available), difficulty in isolating specific exposures (especially in the case of large complex financial institutions, or financial institutions that are active in the derivative markets), lack of risk data (such as duration or default measures in countries where risk management systems are less sophisticated), and confidentiality issues (limitations on what supervisors are legally able to share with other parties).

If one is to overcome the data difficulties, it may be possible to work with the larger and more sophisticated institutions to get better data or to calibrate some parts of the exercise. For example, if the exposure of interest is the aggregate exposure to a specific borrower or sector, individual institutions may be able to produce information on that exposure from their internal risk monitoring systems, even if they do not report data to the authorities in that particular format. When confidentiality issues do arise, it may be possible for the institution with access to the data to conduct the stress testing while using agreed assumptions and methodologies and to share the results with the authorities in a form that is sufficiently informative of the risk exposures but that would not breach confidentiality laws or protocols.

The choice and implementation of stress-testing techniques in practice reflects the data quality and technical capacity available. In addition to the design of the stress-testing scenarios and the choice of top-down versus bottom-up approaches, an important part of the stress-testing process is the selection of technical tools to implement the stress-testing calculations. For each of the risk factors, there are several techniques or approaches to implementing the calculations. The techniques generally differ in the required volume of data and in their computational complexity. The choice, therefore, largely depends on the data availability (e.g., if no data are available on time to repricing of assets and liabilities, the interest rate risk can be assessed only by using very rough methods) and on the technical capacity available (e.g., software, staffing constraints, and time constraints).

D

D.2.3.2 The Calibration of Shocks

Another key question to address in implementing a system-focused stress test is how big are the shocks? Stress testing involves discovering the effect of exceptional but plausible events; therefore, the scenarios considered should be beyond the normal range of experience. Scenarios can be based on historical data (e.g., using the largest observed changes or extreme values over a specified period), or they can be hypothetical and may involve large movements thought to be plausible. Historical scenarios can be more intuitive because they were actually observed, but hypothetical scenarios may be more realistic, especially if the financial structure has changed significantly (e.g., with deregulation, liberalization, or changes in monetary policy operating procedures). Experiences of other countries can be a useful guide as well.

Although the object of stress testing is not to apply shocks until all major financial institutions fail, it is exceptional outcomes that precipitate financial instability.[7] Thus, when one is assessing the vulnerability of financial systems, it is important to consider a range of movements that is wide enough to capture such outcomes. For example, a simple sensitivity test can be calibrated according to the largest change in a risk factor over the past 10 years. It is important to bear in mind that the relevant empirical measure for scenarios is the joint probability of all factors moving simultaneously, which may be difficult to assess empirically. Because it is often difficult to attach a probability to hypothetical scenarios, some judgment is involved. However, this judgment can be guided by historical experience. In some circumstances, small changes in key variables may be sufficient to precipitate difficulties in some institutions.

D.2.3.3 The Mapping of Macroscenarios to Balance Sheets: The Bottom-Up Approach

Translating a macroeconomic framework into the balance sheet of a financial institution requires mapping macrovariables into a set of common risk factors that can be applied to stress individual balance sheets. Applying a stress to an individual balance sheet under the bottom-up approach involves shocking the risk factors that determine the underlying value of a portfolio and then revaluing that portfolio. Because most portfolios have numerous instruments, each with a unique price, the process of revaluing a portfolio may require knowledge of hundreds or thousands of market prices. Financial institutions typically simplify this process by mapping each element of a portfolio into a smaller set of common risk factors. Thus, two mappings are required to implement a system-focused stress test: one mapping from the macroadjustment scenarios to the set of common risk factors and another mapping from the common risk factors into all of the instruments in a portfolio.

For a financial institution, implementing a stress test typically requires a range of specific indicators. The indicators include interest rates (e.g., the term structure of the risk-free rate and credit quality spreads), exchange rates (e.g., spot and forward, bilateral, and trade-weighted), asset prices (e.g., market price indices), and credit exposures and quality. Thus, it may be necessary to supplement the output of the macromodel with additional estimates of what each scenario would imply in terms of the common risk factors.

Some financial institutions have their own internal models that link macroeconomic factors to the performance of their balance sheet, which can, in turn, be used to help calibrate this mapping to a set of common factors. Other potential sources of information to flesh out the details of this mapping could include either studies that are performed on the domestic economy and that address the term structure of interest rates, or models used to estimate the equilibrium real exchange rate. Two examples of this process may prove illustrative:

- Suppose the macro-model produces only two interest rates: an overnight cash rate and a 10-year bond rate. An empirical model of the term-structure of interest rates could be used to produce an estimated set of interest rates for a larger set of maturities. In turn, those data could be used to derive credit spreads.
- Suppose the macromodel produces only a trade-weighted exchange rate or a single bilateral exchange rate. If one is to get a broader range of exchange rates, it may

be possible to use the weightings implicit in the trade-weighted index to produce a set of bilateral exchange rates. Producing a range of exchange rates from a single bilateral exchange rate forecast from a macromodel can be accomplished by assuming some pattern of cross rates.

Once the macro-scenarios have been mapped into a set of common risk factors, the next step is to map the risk factors into the portfolios of individual institutions. The party that is usually best placed to construct such a mapping is the individual institution involved in the stress-testing exercise because it typically has the best access to expertise and detailed information on the portfolio itself. It may also have a well-developed risk management model that is capable of performing many of the calculations. The range of techniques that are typically used to estimate sensitivities of a balance sheet or income statement to shocks in specified risk factors can vary according to the complexities of the portfolio and the scope of risk management framework used by banks. The techniques also differ according to the type of risk being assessed, as illustrated in section D.3 of this technical note. As mentioned earlier, some financial institutions have macroframeworks that can be used to link the larger macroeconomic picture (e.g., unemployment rate, GDP growth, sectoral growth rates) to portfolio performance and so can map the adjustment scenarios directly into their own balance sheets and income statements by using their internal models.

In many circumstances, individual institutions will not have internal models capable of translating broad macroeconomic developments but will have their own internal models or expertise that can be used to construct an appropriate mapping. For example, many banks have internal models that use credit scores or default probabilities as key parameters in understanding the evolution of credit risk in their portfolio. Banks can estimate the effect of macroeconomic changes on those internal risk model parameters or can use the most recent economic downturn as a guiding rod for assessing the effect of broad economic changes on their portfolio. In some cases, it may be necessary to rely on the expert judgment of risk managers in adjusting the key parameters, particularly if the systems have been in place for only a relatively short period of time and thus have not spanned an entire economic cycle.

D.2.3.4 Top-Down Approach

Conducting a "top-down" approach to stress testing provides a useful check on the results on the basis of individual balance-sheet information (the bottom-up approach). Furthermore, financial institutions in some countries may not have the capacity to estimate the effect of a given set of shocks on their portfolio. In this case, the agency coordinating the stress-testing exercise could adopt a "top-down" approach and could apply adjustment parameters that are based on systemwide estimates. For example, a regression model of loan loss rates for the entire banking system could be used to estimate the effect of a macroadjustment scenario on the credit quality of an institution. Examples of this approach include the following:

- Frøyland and Larsen (2002) modeled losses for Norwegian banks on household loans as a function of household debt, wealth, and unemployment. They also mod-

eled losses on loans to enterprises as a function of risk-weighted debt and collateral. Andreeva (2004) modeled the loan loss ratio (to assets) of loans to Norwegian enterprises as a function of bankruptcy probabilities and a variety of economic factors, including the unemployment rate and the real interest rate.

- Benito, Whitley, and Young (2001) extended the Bank of England's macromodel by incorporating household and corporate balance sheets. They then performed a stress test by incorporating a fall in housing prices and a rise in interest rates and by examining the effect on a variety of indicators, including mortgage arrears.
- Hoggarth and Whitley (2003) described the process of using the Bank of England's macromodel, as well as using the top-down approach, to estimate the effect of macrovariables on new provisions by banks.
- Arpa et al. (2000) estimated the effect of macroeconomic factors (real GDP, real estate prices, inflation, and real interest rates) on risk provisions and on earnings for Austrian banks. Kalirai and Scheicher (2002) modeled loan loss provisions in Austria as a function of various macroeconomic indicators and then used the model to conduct a series of sensitivity tests.
- Pesola (2001) examined the Nordic banking crisis by estimating a model of loan losses as a function of GDP, indebtedness, unexpected changes in income and interest rates, and deregulation.

The estimated equations from those papers are all examples of how the authorities or individual institutions can use the top-down approach to approximate the effect of economic developments on individual portfolios or to calibrate the parameters used in their stress tests. Regression-based estimates have their limitations, because they are often providing only a partial equilibrium estimate of some effect; therefore, care should be taken in interpreting the results of such estimates.

D.2.4 Interpretation and Publication

Experience in conducting stress tests suggests they are a useful tool for identifying the latent risk exposures and the likely significance of losses in a systematic and intuitive manner. Stress tests can be particularly useful when they are conducted on a regular basis, thereby providing information about changes in the risk profile of the system over time. Although stress test results are useful to evaluate effects of large movements (tail events) in key variables, care should be taken not to portray them as providing a precise measure of the magnitude of losses. Stress tests can indicate how much could be lost but not how much is likely to be lost.

Interpretation of stress tests needs to take into account their limitations. If the underlying model is incorrectly specified or estimated, the conclusions drawn from a stress-test may be invalid. Stress tests are also unlikely to capture the full range and interaction of risk exposures (such as operational risk and legal risk) and may give a misleading picture of the true nature of risk taking by participating institutions. Finally, stress tests typically consider only part of a bank's income-generating operations. Thus banks may have significant income flows that are unaffected in performance or value by the specific stress test scenarios analyzed.

An overview of the stress tests results can be conveyed by grouping the aggregate effect of the stress tests by type of risk or by scenario. The composition of expected losses (as a proportion of capital or income for instance) can be used to summarize the central results. For bottom-up approaches, descriptive statistics (e.g., mean, median, standard deviation, minimum, maximum, and number of institutions in each decile) and peer group analysis can be used to convey how the effect at the aggregate level is distributed across individual institutions.

Public dissemination of the results of stress tests can present some difficulties with regard to confidentiality and interpretation of results. Participating institutions may be reluctant to have any information disclosed that could identify specific firms. Some analysts may interpret the particular scenarios chosen as reflecting an official view on the most likely scenario or the most problematic, which may not be the case. Nevertheless, the publication of summary or aggregated information on stress test results by a wide variety of countries suggests that those difficulties can be overcome. Disclosure of some summary information on the results (such as the mean and the range) can be informative for financial markets and individual institutions wishing to benchmark their own results against their competitors without revealing the identities of individual institutions. Disclosure of the scenarios undertaken can also raise awareness of different risks for institutions to consider and incorporate into their own stress-testing programs.

D.3 Examples of Stress-Testing Calculations

Stress tests can be applied to both assets and liabilities and can be used to assess various risks: market risk (possibility of losses from changes in prices or yields), credit risk (potential for losses from borrower defaults or nonperformance on a contract), liquidity risk (possibility of depositor runs or losses from assets becoming illiquid), or contagion risk (possibility of losses resulting from failures in other financial institutions). Stress tests usually produce a numerical estimate of the portfolio's change in value—often expressed in terms of the effect on a measure such as the capital asset ratio or risk-weighted capital adequacy ratio—to illustrate the sensitivity of an institution's net worth to a given risk.

D.3.1 Exchange Rate Risk

Exchange rate risk is the risk that exchange rate changes can affect the value of an institution's assets and liabilities, as well as its off–balance-sheet items. Exchange rate risk can be direct (a financial institution takes or holds a position in foreign currency) or indirect (a foreign exchange position taken by one of the financial institution's borrowers or by counterparties may affect their creditworthiness). The most commonly used measure of foreign exchange exposure is an institution's net open foreign exchange position. Under the Basel methodology, a bank's net open position is calculated as the sum of the following items:[8] the net spot position (i.e., all asset items less all liability items, including accrued interest, which is denominated in the currency in question), the net forward-position, guarantees that are certain to be called and are likely to be irrecoverable, net future income or expenses not yet accrued but already fully hedged, any other item representing a profit or

loss in foreign currencies, and the net delta-based equivalent of the total book of foreign currency options. The resulting net open position in each currency can be stress tested against variations in the exchange rate of a particular currency (sensitivity analysis). For example, the change in net open position on account of a change in exchange rate can help determine the sensitivity of the position to exchange rate risk.

To illustrate the relation between the net open position and the direct exchange rate stress test, let F denote the net open position in foreign exchange, C be the capital, A_{RW} be the risk-weighted assets (all in domestic currency units), and e be the exchange rate in units of foreign currency per a unit of domestic currency. A depreciation (a decline) in the exchange rate leads to a proportional decline in the domestic currency value of the foreign exchange exposure, that is, $\Delta e/e=\Delta F/F$.[9] Assume, as is often done, that a decline in the value of the net open position translates directly into a decline in capital, that is, $\Delta C/\Delta F = 1$.[10] The effect of the exchange rate shock on the ratio of capital to risk-weighted assets would then be calculated as

$$\frac{\Delta[C(e)/A_{RW}(e)]}{\Delta e} \cong \frac{\frac{F}{e}A_{RW} - C\frac{\Delta A_{RW}}{\Delta C}\frac{F}{e}}{A_{RW}^2} \cong \frac{1}{e}\frac{F}{C}\frac{C}{A_{RW}}\left(1-\frac{\Delta A_{RW}}{\Delta C}\frac{C}{A_{RW}}\right). \qquad (1)$$

where we used the fact that $\Delta C/\Delta e = \Delta F/\Delta e = F/e$. The operator Δ denotes change, and the symbol $\cong$ means that the equation holds only approximately for larger than infinitesimal changes. Equation 1 can be rewritten as

$$\Delta[C(e)/A_{RW}(e)] \cong \frac{\Delta e}{e}\frac{F}{C}\frac{C}{A_{RW}}\left(1-\frac{\Delta A_{RW}}{\Delta C}\frac{C}{A_{RW}}\right), \qquad (2)$$

The straightforward relationship between the net open position and the direct exchange rate stress test holds only under certain assumptions. Equation 2 summarizes the relationship between the basic exchange rate stress test and the respective FSIs. The term $\Delta A_{RW}/\Delta C$ can have values from 0 to 1, reflecting the degree of co-movement of capital and the risk-weighted assets. In the special case of $\Delta A_{RW}/\Delta C = 0$, that is, if the risk-weighted assets do not change, then the change in the capital adequacy ratio (in percentage points) equals simply the exchange rate shock (in percent) times the exposure, which is measured as a product of the two core FSIs (F/C and C/A_{RW}). This relationship is sometimes used as a shorthand calculation of the direct exchange rate stress test. The calculation highlights the assumptions behind such approximations, in particular the assumption of no change in A_{RW}.[11] Also, equation 2 holds only as a linear approximation, which works well if foreign exchange portfolios are essentially linear, that is, the banking sector is not very active in options markets. If banks have large positions in foreign exchange options, the relation between the exchange rate change and the effect on capital can become highly nonlinear. In such cases, a stress test that is based on a more detailed decomposition of banks' positions in foreign exchange would be a clearly superior analytical tool.[12]

The net open position captures the direct foreign exchange risk. In practice, this risk tends to be rather small compared with other risks that banks face, given that the expo-

sure is relatively easy to measure and, therefore, to manage or regulate by setting limits. It is typically much more difficult to monitor foreign exchange vulnerabilities of banks' counterparties and, therefore, the aggregate risk banks would face through changes in credit risk resulting from changes in the exchange rate. The corporate sector's net foreign exchange exposure to equity is one of the encouraged indicators in the set endorsed by the Executive Board in June 2001. However, no FSAP mission so far has been able to provide this indicator, and only a few FSAP missions have been able to address the indirect foreign exchange risks in the stress-testing calculation. Several FSAP missions recommended improvements in the collection of data on foreign exchange exposures in the corporate sector.

It is important to incorporate the indirect exchange risk in the stability assessment. Although FSAP missions have not been able to collect comprehensive data on corporate sectors' foreign exchange exposure, several FSAP missions that analyzed the corporate sector in detail generally found that the banking sectors' indirect exchange rate risk was more important than its direct exchange rate risk. To illustrate the significance of the indirect risk in overall banking sector risk, denote the corporate sector's debt, equity, and open foreign exchange position as $D_C(e)$, $E_C(e)$, and $F_C(e)$, respectively.[13] Assume that, similar to the case of banks' net open position, a percentage change in the exchange rate will translate into the same percentage change in the domestic currency value of the net open position, which will, in turn, lead to an equivalent change in the corporate sector's equity, that is, $\Delta E_C/\Delta e=\Delta F_C/\Delta e = F/e$. The effect of the exchange rate on the corporate leverage (D_C/E_C) is then given by

$$\frac{\Delta[D_c(e)/E_c(e)]}{\Delta e} \cong \frac{\frac{\Delta D_c}{\Delta E_c}\frac{F_c}{e}E_c - D_c\frac{F_c}{e}}{E_c^2} \cong -\frac{1}{e}\frac{F_c}{E_c}\left(\frac{D_c}{E_c} - \frac{\Delta D_c}{\Delta E_c}\right). \tag{3}$$

Thus, if the corporate sector is short in foreign exchange, a depreciation (decline) in the exchange rate would lead to an increase in its leverage. Corporate leverage typically is positively correlated with the share of banks' nonperforming loans (NPL) in total loans (TL), denoted as NPL/TL, that is, $\Delta(\text{NPL/TL})/\Delta(D_C/E_C) = a > 0$.[14] The effect of a change in the exchange rate on the NPL/TL ratio can then be expressed as

$$\Delta(\text{NPL/TL}) \cong a\Delta[D_c(e)/E_c(e)] \cong -\frac{\Delta e}{e}\frac{F_c}{E_c}a\left(\frac{D_c}{E_c} - \frac{\Delta D_c}{\Delta E_c}\right). \tag{4}$$

In the special case when $\Delta D_C/\Delta E_C = 0$, the change in the NPL/TL ratio would equal the exchange rate change times the respective FSI (the net open position), times the parameter a, which can be estimated empirically, as shown in chapter 3. To find the effect on capital adequacy, we can assume—as done in several assessments—that the credit shock has the form of a transition of performing loans into the nonperforming category. By differentiating C/A_{RW} with respect to NPL/TL, and by substituting for NPL/TL from equation 4, we obtain

$$\Delta(C/A_{RW}) \cong \frac{\Delta e}{e}\frac{TL}{A_{RW}}\left(1-\frac{C}{A_{RW}}\frac{\Delta A_{RW}}{\Delta C}\right)\pi\frac{F_c}{E_c}a\left(\frac{D_c}{E_c}-\frac{\Delta D_c}{\Delta E_c}\right), \quad (5)$$

where we assume (as is commonly done) that provisions are expressed as a fixed percentage (π) of NPLs and that they are deducted directly from capital.

The incorporation of the indirect effect makes the analysis—and the relationship between the FSIs and the stress test calculations—more complex and dependent on additional assumptions or regression analysis. The presentation of the direct effect in equation 2 and the indirect effect in equation 5 may appear similar, given that in both cases, the change in the capital adequacy FSI is expressed as the shock times an FSI that characterizes the exposure (the net open position). However, the calculation of the indirect effect in equation 5 is perhaps the simplest possible expression for the indirect exchange rate effect using FSIs. It relies on additional assumptions and parameters that would need to be estimated or determined, such as the sensitivity parameter, reflecting the effect of the corporate sector on the banking sector, the provisioning rate, and the ratio of TLs to risk-weighted assets.

The complexity of the indirect exchange rate stress test is greater because it should include the effects on stocks as well as on flows. The calculation of the indirect effect shown in equation 5 would need to reflect the effect of exchange rate changes on the net present value of the corporate sector, which means taking into account changes in the net present value of future earnings. For example, in export-oriented companies, a depreciation could generally be expected to increase their future earnings. In terms of the net present value, the effect would be essentially equivalent to the effect of a long position in foreign currency. However, it may be more practical to calculate the effect on flows by estimating the elasticity of earnings to interest and principal expenses (an encouraged FSI) with respect to the exchange rate and then to estimate the relationship between this FSI and the NPL/TL ratio.

Alternatively, it would be useful to compile an indicator measuring the corporate sector's flow exposure, for example, a ratio of foreign exchange earnings to total earnings or (ideally) a ratio of earnings in foreign exchange to interest and principal expenses in foreign exchange. Subject to further developmental work and analysis, such an indicator could be included in the set of encouraged FSIs.

D.3.2 Interest Rate Risk

Duration is a key indicator for the measurement of the direct interest rate risk. The principal usefulness of duration stems from the fact that it approximates the elasticity of the market values of assets and liabilities to the respective rates of return,[15]

$$\frac{\Delta A(r_A)}{A(r_A)} \cong \frac{-D_A\Delta r_A}{(1+r_A)}, \quad \frac{\Delta A(r_L)}{A(r_L)} \cong \frac{-D_L\Delta r_L}{(1+r_L)}, \quad (6)$$

where $A(r_A)$ and $L(r_L)$ are market values of assets and liabilities of a banking system, and where r_A and r_L are annual interest rates on assets and liabilities. This feature of duration can be used to summarize the effect of changes in interest rates on banks' capital. In particular, we can define capital as $A(r_A) - L(r_L)$, and can express it as a ratio to risk weighted assets.[16] Differentiating capital with respect to the interest rate on assets, and substituting from equation 6, the sensitivity of the C/A_{RW} ratio to interest rate changes can be expressed as

$$\frac{\Delta[C(r_A,r_L)/A_{RW}(r_A)]}{\Delta(r_A)} \cong -\frac{(L/A_{RW})}{1+r_A}\left(D_A - D_L\frac{1+r_A}{1+r_L}\frac{\Delta r_L}{\Delta r_A}\right)\frac{1-\dfrac{\Delta A_{RW}}{A_{RW}}\dfrac{C}{\Delta C}}{1-\dfrac{\Delta A}{A}\dfrac{C}{\Delta C}}. \qquad (7)$$

Assuming that the risk-weighted assets move proportionately to total assets, that is, $\Delta A_{RW}/A_{RW}=\Delta A/A$, equation 7 can be simplified to

$$\frac{\Delta[C(r_A,r_L)/A_{RW}(r_A)]}{\Delta(r_A)} \cong -\frac{(L/A_{RW})}{1+r_A}GAP_D, \qquad (8)$$

where GAP_D is the duration gap, defined as

$$GAP_D = D_A - D_L\frac{1+r_A}{1+r_L}\frac{\Delta r_L}{\Delta r_A}. \qquad (9)$$

The duration gap and the direct interest rate stress test are two analytical tools that can often be viewed as substitutes for each other. Equations 8 and 9 illustrate the relationship between the two duration FSIs and the capital adequacy FSI.[17] In particular, equation 8 characterizes the relationship between the "interest rate exposure FSI" and the corresponding stress test in a similar way as equation 2 for the exchange rate risk. The interest rate exposure FSI is the duration gap, which is a function of the two duration FSIs. In the special case when the interest rates for assets and liabilities move simultaneously, the duration gap can be approximated as a difference of the two durations: $D_A - D_L$. Similar to the exchange rate risk, the effect on capital adequacy can generally be expressed as a product of the shock and the "exposure FSI." In both cases, however, this shortcut formula is subject to simplifying assumptions, such as the one on the relationship between total and risk-weighted assets.

The duration gap is a reliable estimator of the effect of interest rate changes only for small shocks. Durations can change with changes in interest rates. Because stress tests typically involve large changes in interest rates, it is advisable to include second derivative terms to account for convexity. However, given the complexities involved in such calculations, FSAP stress tests so far have not been able to satisfactorily reflect possible changes in duration. In fact, most FSAP missions used much simpler approaches than

those based on duration.[18] A related issue is the calculation of a combined interest rate and exchange rate shock, when the combination of the aggregate duration and the aggregate net open position may give only an approximate indication of the overall effect. A currency breakdown of duration would help to identify maturity mismatches by currencies. Again, this analysis was typically not done in FSAP missions, mostly because of the lack of data.

The calculation of duration of total assets and total liabilities of a financial system can be a difficult computational task; however, alternative approaches are possible. In practice, alternative and less-costly approaches to measuring the interest rate risk are often used. Assets and liabilities can be lumped into groups that are based on common features, such as coupon rates (or comparable contractual rates), maturities, and credit risk. Within such cells, one can estimate the implied cash flow stream and the relevant market yields and can compute duration, which can then be aggregated across the cells.

A simplified measure of interest rate sensitivity that is often used in place of duration is based on the traditional "maturity gap analysis." Under this approach, expected payments on assets and liabilities are sorted into "buckets" according to the time to repricing or when payments are due (e.g., period until financial instruments are redeemed or the interest rates on them are reset or reindexed).[19] Similar to duration, the net difference (gap) in each time bucket can be multiplied by an assumed change in interest rates to gain an indication of the sensitivity of banks' income to changes in interest rates.

Maturity gap data are useful, but they are inferior to duration measures and could conceal actual risks in the system. Ahmed, Beatty, and Bettinghaus (1999), using empirical data on U.S. banks, 1991–99, found that maturity gaps reported by the banks were useful in assessing the loss potential of banks' interest rate risk positions, because there was a significant statistical relationship between the maturity gap and future changes in net interest income. However, it is possible that the maturities of financial assets and liabilities match, but the timing of the cash flows on assets and liabilities is not matched (i.e., their durations differ) and banks are, thereby, open to interest rate gains or losses. Bierwag (1987) showed practical examples of banks that have zero maturity gaps but that, in fact, have extremely risky positions (measured by duration).

Similar to the net open position in foreign exchange, duration gaps capture only the direct effect of an interest rate change on the bank. They do not reflect indirect effects, in particular the effect that an increase in lending interest rates is likely to have on the credit risk of banks' borrowers. This risk could be approximated by using the encouraged FSI of corporate earnings to interest and principal expenses. In practice, however, this indicator has so far been reported relatively infrequently, even though it has been used more frequently in the recent FSAP mission. Those FSAP missions that attempted to assess this type of risk typically estimated a regression model for the share of NPLs to TLs, with interest rates among the explanatory variables. The panel data estimate presented by IMF (2003) did not find a significant relationship between interest rates and the NPL/TL ratio, although this lack of relationship may reflect the limitation of the data set. However, for individual countries using time series data, the slope coefficient was often significantly negative.[20] Similar to the exchange rate risk, the integration of the direct and indirect interest rate risk is easier to implement with the help of stress tests.

In some stress-testing exercises, the values of a set of correlated risk factors (e.g., a set of prices, macrovariables, financial ratios, yield curve shifts) are simulated assuming a joint probability distribution of those factors, typically a joint normal distribution that is based on empirically determined parameters. The values drawn from the distribution—through Monte Carlo simulations—are used to stress the portfolio so that probability of specified extreme outcomes or the size of potential losses at specified probability level can be calculated.

D.3.3 Credit Risk

Credit risk is the risk that counterparties or obligors will default on their contractual obligations. It refers to the risk that the cash flows of an asset may not be paid in full, according to contractual agreements. Stress testing of credit risk typically begins with the collection of data on different credit qualities, usually the categories of performing loans and NPLs (e.g., substandard, doubtful, and loss) tracked by the supervisor.

Alternatively, if banks are providing their own data and estimates that are based on their internal models, then the different credit quality measures that they employ can be used. A variety of stress tests can be applied to those data, depending on the underlying quality of banking supervision. For example, if underprovisioning is an issue, a scenario that applies more stringent provisioning criteria to existing balance sheets can be performed.

For other countries, assumptions about the growth rate of different qualities of credit can be applied, or assumptions about the migration between categories can be made. Those scenarios can be based on previous recessions or episodes of rising defaults and increases in NPLs. Cross-sectional regressions of NPL ratios on various macroeconomic variables (e.g., interest rates, growth rates, exchange rates) can provide benchmark sensitivities of NPLs to different macroeconomic shocks. Once a set of adjusted data on credit quality is derived, existing provisioning rates can be applied to determine the effect on bank balance sheets.

An example of implementation of the credit risk stress test is given in the following paragraphs, which are based on a recent FSAP. The methodology proposed in Boss (2002) was used to link default frequencies and macroeconomic conditions. This model is particularly suited for macroeconomic stress testing because it explicitly models credit risk in relation to macroeconomic variables. Some models include a Monte Carlo simulation approach to calculate the loss distribution of a credit portfolio.[21] However, more frequently, including the case discussed here, a simpler regression approach was used to link historically observed default frequencies to macroeconomic variables.

The expected loss at time t, $E[L_t]$, is given by the volume of the credit portfolio at time t, V_t, times the average default probability in the economy at time t, p_t, times 1 minus the recovery rate, RR, which is typically assumed to be a fixed number.

$$E[L_t] = V_t p_t (1 - \mathrm{RR}) \tag{10}$$

The average default probability at time t is modeled as a logistic function of a macroeconomic index, which depends on the current values of the macroeconomic variables under observation:

$$p_t = \frac{1}{1+e^{-y_t}}, \tag{11}$$

where y_t denotes the macroeconomic index at time t. The p_t can be estimated directly (substituting y_t by a linear combination of macroeconomic variables and then using logistic regression in order to get estimated average default probabilities $\widehat{p_t}$). Or it is possible to calculate first the "observed" values for the macroeconomic index y_t by taking the inverse of the logistic function using the historically observed default frequencies

$$y_t = -\ln\left(\frac{1}{p_t} - 1\right), \tag{12}$$

and then use linear regression to explain the index y_t by a combination of macroeconomic variables. If one is to get estimated average default probabilities $\widehat{p_t}$, the output of the macroeconomic model explaining yt has to be plugged into the logistic function of default probabilities. In the particular FSAP case, the following regression was estimated:

$$\Delta^l y_t = \ln\left(\frac{y_t}{y_{t-1}}\right) = \beta_0 + \beta_1 x_{1,t} + \beta_2 x_{2,t} + \ldots + \beta_K x_{K,t} + \varepsilon_t \text{ with } \varepsilon_{s,t} \sim N(0,\sigma_\varepsilon), \tag{13}$$

where

$$\Delta^l y_t = \ln\left(\frac{y_t}{y_{t-1}}\right)$$

is the logarithmic change or growth of the macroeconomic index, calculated according to the respective equation above and $x_{1,t}$, $x_{2,t}$, … $x_{K,t}$ denote the set of macroeconomic variables at time t and β_0, β_1, β_2, … β_K stand for the parameters that determine the direction and extent of the effect that those factors have on the index or, eventually, the sector-specific default probability. The parameters are estimated by means of a linear regression, where the error term ε_t is assumed to be an independent, normally distributed random variable.

D

D.3.4 Other Risks

Stress tests can be performed on other risks, including liquidity risk, commodity risk, or equity price risk. Asset liquidity risk refers to the inability to conduct a transaction at current market prices because of the size of the transaction. Funding liquidity risk refers to the inability to access sufficient funds to meet payment obligations in a timely manner. Liquidity risk can be assessed by imposing a "haircut" on the liquid assets of an institution and by examining the effect on the liquid assets ratio (for asset liquidity risk). A conservative scenario would be to assume that only the cash held by banks (in domestic and foreign currency), as well as the reserve requirements, were always liquid.

The next step would be to add to the category of liquid assets those deposits that banks hold abroad. Deposits with local banks can become illiquid if the country is con-

fronted with a systemic liquidity crisis. Similarly, domestic government or corporate bonds can rapidly become illiquid when enough banks are trying to sell the assets all at once. Conversely, to the extent that the liquidity crisis does not affect the main financial centers, banks could dispose of their foreign bonds to meet liquidity outflows at home. For funding liquidity risk, a stress test can be constructed on the basis of assumptions about the ability of an institution to continue attracting sources of funds. For example, the rate of withdrawal of deposits or other funding sources can be increased, or assumptions can be made about the withdrawal of credit lines and other funding sources to determine the effect on some measure of liquidity for the institution.

Commodity risk refers to the potential losses that may result from changes in the market price of bank assets and liabilities, as well as off–balance-sheet instruments caused by commodity price changes. Even if financial institutions do not take positions in commodities or commodity-linked instruments directly, they may be subject to commodity price risk indirectly through the effect on their loan portfolio. This risk occurs if their borrowers' ability to repay their debts is affected by shocks to commodity prices. This indirect source of commodity risk can be particularly important for many banks in developing countries that lend to exporters or to importers of commodities.

Commodity risk can be assessed by examining the effect of a fall in the value of the commodity (e.g., oil or copper) on the balance sheets of financial institutions. This assessment can be either through their direct holdings of the commodity or indirectly through an analysis of the effect on key customers. One can calculate the financial institution's net position in the most-relevant commodities by netting long and short positions, which are expressed in terms of the standard unit of measurement, in the same commodity. The net position can then be converted into the national currency at current spot rates for the commodity. Commodity derivatives should be converted into notional commodities positions and can be included in the framework in the same way. Assuming a price fall of 20 percent, for example, and estimating the dollar value of this shock show the sensitivity of the portfolio to this commodity.

Equity price risk is the risk that stock price changes affect the value of an institution's assets and liabilities and its off–balance-sheet items. Equity price risk consists of two components: specific equity price risk and general equity price risk. Specific equity price risk refers to the risk associated with movements in the price of an individual stock. General equity price risk is the risk associated with movements of the stock market as a whole. Similar to commodity price risk, the starting point for measuring sensitivity to equity price risk is to calculate the net open position, including on– and off–balance-sheet positions in each equity security, including equity derivatives, converted into notional equity positions (options are delta weighted).

If one is to stress test for specific market risk—that is, equity risk related to the individual issuer—the stress test would have to be applied to the net open position in the equity concerned. Such a stress test would primarily be relevant when the institution is known to hold a highly concentrated trading portfolio of equities. More commonly, stress tests are conducted for general market risk, that is, the risk related to a major change in the overall stock market, usually a market crash scenario. For this purpose, the net open positions of an institution in all equities would be aggregated, and the stress scenario would be applied to the institution's aggregate position.

Financial institutions that include equity risk factors in their internal models should conduct comprehensive stress tests using their own measurement techniques and should provide the results to regulators. For those institutions, the net open positions in each equity should still be available, before aggregation into the overall position, and the model should be able to stress test each equity separately. Internal models can also be used to implement scenario analysis, thus taking account of correlations among stock prices, or indices, although those correlations may break down during crises.

Equity exposures in the trading book may be subject to frequent and substantial swings, along with stock market developments. The results of stress tests can, therefore, be outdated fairly quickly. Whereas supervisory reports or published annual reports of financial institutions can give a reasonable "snapshot," it is preferable to obtain more current data on the composition of an institution's equity portfolio from the financial institution itself. Where such up-to-date data are unavailable, knowledge about the most frequently traded equities, as well as the stock exchange dealing and underwriting activities of the institution, can sometimes help in updating open position estimates.

D.3.5 Second Round Effects

Stress tests can be improved by including second-round effects. In particular, most stress tests assume no realignments of portfolios in response to risk factors. Stress tests are typically applied to balance sheets at a point in time or in conjunction with a forecast over a specific horizon, and the effect is calculated as if the shock were "marked-to-market" or were valued at market prices. This approach is valid if the time horizon is short or if changes in the portfolios take time to implement. For example, assuming only a limited behavioral response in a large loan portfolio over a 1-month horizon may be a reasonable assumption, because it is often difficult to restructure a portfolio in a short time without incurring losses from "fire-sale" prices.[22]

Such an assumption may also be justifiable for an individual institution that does not have a large effect on the financial system or the macroeconomy, that is, the feedback effects are relatively small. However, once the time horizon of a scenario or shock extends beyond a year or more, the assumption of no behavioral response becomes harder to justify. Similarly, for systemically important institutions or systems as a whole, the assumption of no feedback effects may be an oversimplification. The policy environment may also change over a longer horizon as monetary or supervisory authorities react to shocks.

One approach that is often used to consider second-round effects and linkages between institutions is the use of contagion models.[23] Those models attempt to estimate the effect of the failure of key institutions on other institutions and, hence, the overall financial system. The models have so far been used mostly for the analysis of risks arising from the interbank market, even though the same concept can be used for contagion analysis more broadly. The following example shows an analysis of interbank contagion.

There are two general types of interbank contagion stress tests: (a) pure interbank stress test, in which the shock is the failure of one bank, triggered, for example, by fraud, and the effect on other banks in the system is through the interbank exposures; and (b) integrated interbank stress test, in which the banking system is first subjected to macroeconomic shocks or scenarios. If those shocks or scenarios trigger a failure of a bank or

Table D.1. Matrix of Bank-to-Bank Exposures

	Bank 1	Bank 2	…	Bank *n –1*	Bank *n*
Bank 1	-- --	$E_{1,2}$	…	$E_{1,n-1}$	$E_{1,n}$
Bank 2					
. . .	. . .	. . .	-- --	. . .	. . .
Bank *n* – 1	$E_{n,1}$	$E_{n-1,2}$	…	-- --	-- --
Bank *n*	E_{n}	$E_{n,2}$	…	$E_{n,n-1}$	-- --

Note: The diagonal elements of this *n* x *n* matrix marked "-- --" are zero; the off diagonal element E_{ij} indicates net uncollateralized lending from bank *i* to *j*.

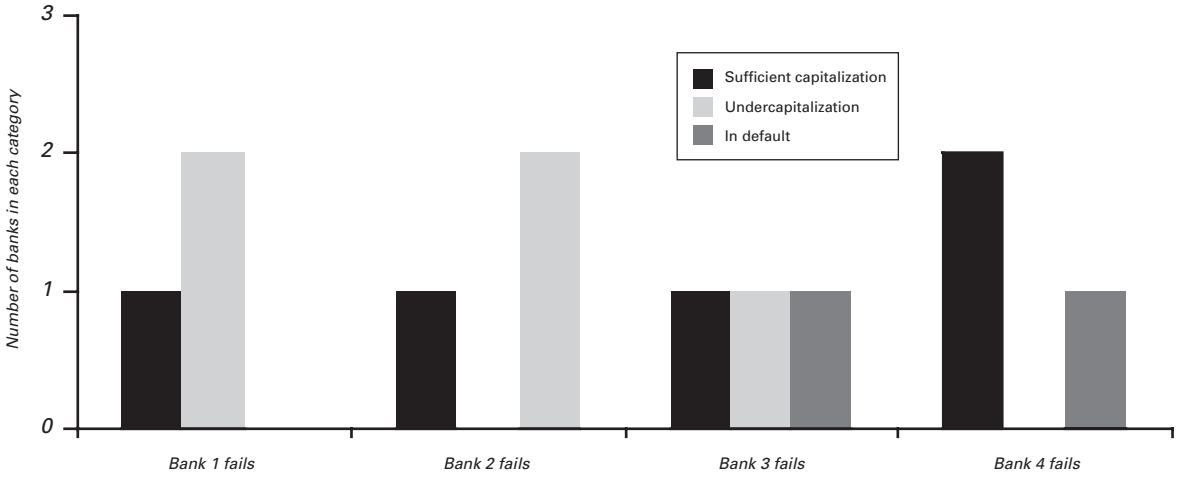
a group of banks, the interbank stress test is run to assess the effect of additional failures through interbank exposures. The basic methodology of the two approaches is the same; the difference is that the integrated stress test is run through a system that is already weakened by an external shock.

The key input to the interbank contagion stress tests is a matrix of bilateral exposures (see table D.1). In this matrix, the cell in the ith row and jth column contains the net uncollateralized lending from bank *i* to bank *j*, E_{ij}, defined as a difference between all loans and similar exposures (including off–balance-sheet exposures) from bank *i* to bank *j*, minus all loans and similar exposures from bank *j* to bank *i*. Note that $E_{ij} = -E_{ji}$.

The "pure" interbank contagion stress test aims to estimate the effect of the failure of a bank or group of banks on the system. The test assumes that there is a failure in a bank (say, Bank 1), for instance, caused by a fraud. The first round of the contagion calculation would derive the direct effect of Bank 1's failure on each of the other banks, assuming Bank 1 would not repay its uncollateralized interbank exposures (or a part of the exposures). If some banks fail as a result of Bank 1's failure,[24] the second round of the calculation would derive the effect on each of the remaining banks of those newly failed banks' not repaying their uncollateralized interbank exposures. The process can be repeated for a third time if there are new failures after the second run, and so on. Concrete examples of such interbank contagion tests and their results can be found in Furfine (1999) for U.S. banks; in Wells (2002) for United Kingdom banks; in Blåvarg and Nimander (2002) for Swedish banks; and in Elsinger, Lehar, and Summer (2002) for Austrian banks. In the case of the United Kingdom, Sweden, and Austria, the tests presented in the articles are very similar to those carried out under the FSAP.

The results of the contagion calculations can be presented in a number of ways. Figure D.1 provides an example of such a presentation in a case of a system with four banks. For an interesting example of presenting the network structure of the interbank market with a large number of banks, see Boss et al. (2004).Two indicators of systemic risk can be calculated from the output of the pure interbank stress test: (a) a frequency of bank failure indicator, which is the ratio of the cumulative number of failures to the number of banks in the system, and (b) statistical measures of the effect on bank system capital (e.g., mean, distribution, and quartiles). Specifically, one can define a "systemic risk index," which is the average reduction in capital ratios of banks in the system triggered by a failure of a

Figure D.1. Example of Contagion Effects of a Counterparty Failure



bank. Such a measure could be computed for all banks in the system and used to rank them by their systemic importance.

D.3.6 Stress Testing of Insurance Companies

Stress testing of insurance company balance sheets and income statements is not as well developed in financial stability analysis as in stress testing of banks. Insurance companies are generally considered to represent a lower level of systemic risk than banks, mainly because of the different character of their liabilities, which often have a longer duration than banks. However, distress in the insurance sector can have important systemic implications, including through ownership relations with the banking sector and its effect on confidence in the financial sector as a whole.

Because insurance companies have a different balance-sheet structure compared to banks, stress tests of their balance sheets present unique challenges. Insurance companies face underwriting risk, catastrophe risk, and risks on technical claims provisions. On the asset side, more or less similar to banks, they also face market risk, credit risk, liquidity risk, operational risk, group risk, and systemic risk in differing degrees to those faced by banks and other financial institutions. Thus, the stress testing of the risks could be based on methods similar to those used for banks. However, on the liability side, different types of shocks and methods of analysis would be needed. For an example, increase in mortality rates or probabilities of certain catastrophic events would increase claims, and those factors would have to be modeled.

The complexity of the contracts underlying insurance company balance sheets can create difficulties in revaluing liabilities and may require detailed data on a contract-by-contract basis to enable an accurate assessment of the effect of changes in risk factors. Stochastic techniques are sometimes used by insurers to assess their resilience to shock. Such techniques are complex and account for the probability of a range of possible outcomes. Alternatively, simple deterministic tests (for example, shifts in loss ratios or in

gauging the effect of specified catastrophic events), can reveal useful information about immunity to shocks. In some jurisdictions, insurance firms are required to report regularly on standardized stress test results to their supervisors. Recent FSAPs have begun to apply stress test scenarios affecting the liability side developments, in addition to the focus on asset values.

D.4 Summary of FSAP Experience[25]

Stress tests have been performed for every country participating in the FSAP. The tests are designed to provide a quantitative measure of the vulnerability of the financial system to different shocks and to complement the insights gathered from other components of the assessment. This analysis includes elements of the legal, institutional, regulatory, and supervisory framework; observance of key financial sector standards and codes; analysis of the financial system structure and key vulnerabilities; and empirical analysis of financial soundness indicators.

Data availability is a key factor in determining the approach and sophistication of stress tests performed as part of the FSAP. Most analyses are performed on a bank-by-bank (bottom-up) basis, which is based on single factor and scenario approaches. Contagion risks and second-round effects have typically not been addressed in many FSAPs, although some have incorporated elements of interbank contagion into the exercise. The involvement of the authorities has varied according to their expertise and ability or willingness to provide data, with some country authorities precluded from providing data on individual institutions by bank secrecy laws or conventions. For countries that have published the summary assessment of the FSAP mission, most have included a summary of the stress-testing results.[26]

The overall approach and implementation of stress tests as part of the FSAP has evolved over time. Some recent trends include the following:

- As familiarity and use of the techniques have spread, country authorities and individual financial institutions now play a greater role in the design and implementation of stress tests. Increased reliance is being placed on using the internal models of banks to evaluate the effect of shocks, including their off–balance-sheet exposures.
- The use of macrosimulation models to calibrate a macroscenario has increased, and several recent FSAPs have included interbank contagion calculations.
- Coverage of nonbank financial institutions has increased, with many insurance companies now being included in many cases as part of the analysis.
- Many country authorities are now implementing their own stress-testings programs as part of their macroprudential surveillance, partly as a result of FSAP-related work.

Notes

1. This section draws substantially on Jones, Hilbers, and Slack (2004). Useful overviews and surveys of the relevant literature are also contained in Blaschke et al. (2001), Čihák (2004a), and Sorge (2004).
2. System-focused stress tests can also take the form of sensitivity tests, in which only a single risk factor is shocked. In this paper, we focused on scenarios, but sensitivity tests can be considered in the same framework as a one-dimensional scenario.
3. For an interesting example of the use of macroeconomic modeling to assess the potential effect of specific vulnerabilities, see Gereben, Woolford, and Black (2003) for a scenario analysis for New Zealand.
4. See Hoggarth and Whitley (2003) for further details, and a discussion of how the approach was used for the U.K. FSAP.
5. Many large banks have value at risk frameworks in place for internal monitoring of risk positions [see Jorion (2001) for a survey of Value at Risk methods]. For an international review of stress testing practices in large banks, see Committee on the Global Financial System (2000). Banks that follow the Basel Committee's internal ratings–based approach are required by their supervisors to have a comprehensive stress-testing program in place (Basel Committee on Banking Supervision 2003). With the implementation of Basel II, stress tests are set to become more commonplace in banks.
6. See section D.3 for a discussion of stress testing of insurance companies.
7. In some cases, it may be useful to calibrate the size of shocks to cause one or more of the institutions involved to breach their minimum capital requirement so they can determine the magnitude of shocks necessary to cause such a "failure." However, as the size of the shocks increases, the accuracy of most estimation methods decreases, thereby increasing the potential margin of error.
8. For more details, see Basel Committee on Banking Supervision (1998).
9. This relation is valid if the net open position is long or short, that is, $F \neq 0$.
10. More realistically, we could deduct the effect of the shock first from profits and only then from capital. However, it would make the notation more complex without providing many additional insights.
11. Empirically, $\Delta A_{RW}/\Delta C$ could be estimated by a regression. In practice, FSAP stress tests have usually been based on simplifying assumptions, such as $\Delta A_{RW}/\Delta C = 1$ or 0.
12. So far, however, most stress tests in FSAP missions have not incorporated such nonlinear effects. The *Compilation Guide on Financial Soundness Indicators* (IMF 2004) encourages the identification of the component elements of the net open position, including options in bought and sold positions.
13. Given the practical difficulties involved in obtaining empirical data on open positions in the household sector, for simplicity we refer here only to the corporate sector, even though the theoretical analysis would be essentially the same even if we included the household sector.
14. Chapter 3 shows that for a panel of 47 countries, a 10-percentage point rise in the corporate leverage was associated with a 1.1-percentage point rise in NPL/TL after a 1 year lag.

15. Duration is defined as the weighted average term-to-maturity of an asset's (liability's) cash flow, the weights being the present value of each future cash flow as a percentage of the asset's (liability's) full price. See the *Compilation Guide on FSIs* (IMF 2004, paragraph 3.52) for a formula that could be used to calculate duration.
16. The effects can also be expressed in terms of banks' profitability, which may be useful when branches of foreign banks, which typically do not have own capital, play an important role in the local economy. Bierwag (1987) derived the effect on profits in the case of a single bank.
17. The actual FSI may be somewhat different, because it refers to regulatory capital rather than the difference of market values of assets and liabilities.
18. Only about 20 percent of FSAPs conducted a duration-based stress test (see IMF and World Bank 2003). The rest typically used simplified methods such as maturity gaps or earnings at risk.
19. The *Compilation Guide on Financial Soundness Indicators* (IMF 2004) includes a table showing how such simplified measure can be calculated. An even simpler approach would be based on the average maturity of assets and liabilities.
20. For instance, in the case of Hong Kong SAR, it has been estimated that an increase in nominal interest rates by 1 percentage point leads to a rise in the classified loan ratio by 0.2 percentage points with a lag of two quarters (Shu 2002).
21. Barnhill, Papanagiotou, and Schumacher (2000) provide an example of such simulations for South African banks.
22. Although the increasingly widespread use of derivatives may permit a more rapid adjustment in exposures.
23. See Čihák (2004a,b) for further details. Upper and Worms (2002), Furfine (1999), Degryse and Nguyen (2004), and Gropp and Vesala (2004) also examine interbank contagion.
24. The simplest way to implement this is to assume that a bank fails if its capital becomes negative as a result of the shock. A more complex calculation could be based on a mapping from capital adequacy to the probability of failure, if such mapping could be estimated based on past data.
25. This section is based on International Monetary Fund and World Bank (2003) and International Monetary Fund and World Bank (2005).
26. See http://www.imf.org/external/np/fsap/fsap.asp#cp for copies of published reports.

D

References

Ahmed, Anwer S., Anne Beatty, and Bruce Bettinghaus. 1999. "Evidence on the Efficacy of Market Risk Disclosures by Commercial Banks." Mimeo, Syracuse University, NY.

Andreeva, Olga. 2004. "Aggregate Bankruptcy Probabilities and Their Role in Explaining Banks' Loan Losses." Norges Bank Working Paper ANO 2004/2, Norges Bank, Oslo, Norway. Available at http://www.norges-bank.no/publikasjoner/arbeidsnotater/pdf/arb-2004-02.pdf.

Arpa, Markus, Irene Giulini, Andreas Ittner, and Franz Pauer. 2000. "The Influence of Macroeconomic Developments on Austrian Banks: Implications for Banking

Supervision." BIS Papers, No. 1, Bank for International Settlements, Basel, Switzerland. Available at http://www.bis.org/publ/bispap01c.pdf.

Barnhill, Theodore M., Panagiotis Papanagiotou, and Liliana Schumacher. 2000. "Measuring Integrated Market and Credit Risks in Banking Portfolios: An Application to a Set of Hypothetical Banks Operating in South Africa." IMF Working Paper, WP/00/212, International Monetary Fund, Washington, DC. Available at http://www.imf.org/external/pubs/ft/wp/2000/wp00212.pdf.

Basel Committee on Banking Supervision. 1998. "Amendment to the Capital Accord to Incorporate Market Risks" (January 1996, updated in April 1998). Bank for International Settlement, Basel, Switzerland. Available at http://www.bis.org/publ/bcbsc222.pdf.

———. 2003. "The New Basel Capital Accord, Consultative Document." Bank for International Settlements, Basel, Switzerland. Available at http://www.bis.org/bcbs/cp3full.pdf.

Benito, Andrew, John Whitley, and Garry Young. 2001. "Analysing Corporate and Household Sector Balance Sheets." *Financial Stability Review 11*: 160–74. Available at http://www.bankofengland.co.uk/publications/fsr/2001/fsr11art5.pdf.

Bierwag, Gerald O. 1987. *Duration Analysis*. Cambridge, MA: Harper & Row.

Blaschke, Winfrid, Matthew T. Jones, Giovanni Majnoni, and Soledad Martínez Peria. 2001. "Stress Testing of Financial Systems: An Overview of Issues, Methodologies, and FSAP Experiences." IMF Working Paper, WP/01/88, International Monetary Fund, Washington, DC. Available at http://www.imf.org/external/pubs/ft/wp/2001/wp0188.pdf.

Blåvarg, M. and P. Nimander. 2002. "Inter-bank exposures and systemic risk." *Sveriges Riksbank Economic Review* 2. Stockholm: Sveriges Riksbank.

Boss, Michael. 2002. "A Macroeconomic Credit Risk Model for Stress Testing the Austrian Credit Portfolio." *Financial Stability Report 4*, 64–82. Vienna, Austria: Austrian National Bank.

Boss, Michael, Helmut Elsinger, Martin Summer, and Stefan Thurner. 2004. "An Empirical Analysis of the Network Structure of the Austrian Interbank Market." *Financial Stability Report 7*, 77–87. Vienna, Austria: Austrian National Bank.

Čihák, Martin. 2004a. "Stress Testing: A Review of Key Concepts, Research, and Policy Note." No. 2/2004, Czech National Bank, Prague, Czech Republic. Available at http://www.cnb.cz/en/pdf/IRPN_2_2004.pdf.

———. 2004b. "Designing Stress Tests for the Czech Banking System, Research and Policy Note." No. 3/2004, Czech National Bank, Prague, Czech Republic. Available at http://www.cnb.cz/en/pdf/IRPN_3_2004.pdf.

Committee on the Global Financial System. 2000. *Stress Testing by Large Financial Institutions: Current Practice and Aggregation Issues*. Basel, Switzerland: Bank for International Settlements. Available at http://www.bis.org/publ/cgfs14.htm.

Degryse, Hans, and Grégory Nguyen. 2004. "Interbank Exposures: An Empirical Examination of Systemic Risk in the Belgian Banking System." Paper presented at the Financial Intermediation Research Society Conference on Banking, Insurance, and Intermediation, Capri, Italy, May 13–15. Available at http://finance.wharton.upenn.edu/~allenf/capri/papers/082degryse.pdf.

Elsinger, Helmut, Alfred Lehar, and Martin Summer. 2002. "Risk Assessment for Banking Systems." Working Paper No. 79, Austrian National Bank, Vienna, Austria. Available at http://www2.oenb.at/workpaper/wp79.pdf.

Frøyland, Espen, and Kai Larsen. 2002. "How Vulnerable Are Financial Institutions to Macroeconomic Changes? An Analysis Based on Stress Testing." *Norges Bank Economic Bulletin* LXXIII (3). Norges Bank, Oslo, Norway. Available at http://www.norges-bank.no/english/publications/economic_bulletin/2002-03/froyland.pdf.

Furfine, Craig H. 1999. "Interbank Exposures: Quantifying the Risk of Contagion." BIS Working Papers, No. 70, Bank for International Settlements, Basel, Switzerland. Available at http://www.bis.org/publ/work70.pdf.

Gereben, Aron, Ian Woolford, and Melleny Black. 2003. "The Macroeconomic Impacts of a Foot-and-Mouth Disease Outbreak: an Information Paper for Department of the Prime Minister and Cabinet." Information Paper, Reserve Bank of New Zealand, Wellington, New Zealand. Available at http://www.rbnz.govt.nz/research/0130346_2.pdf.

Gropp, Reint, and Jukka Vesala. 2004. "Bank Contagion in Europe." Paper presented at the Financial Intermediation Research Society Conference on Banking, Insurance and Intermediation, Capri, Italy, May 13–15, 2004. Available at http://finance.wharton.upenn.edu/~allenf/capri/papers/159gropp.doc.

Hoggarth, Glenn, and John Whitley. 2003. "Assessing the Strength of UK Banks through Macroeconomic Stress Tests." *Financial Stability Review 14*: 91–103. Available at http://www.bankofengland.co.uk/publications/fsr/2003/fsr14art3.pdf.

International Monetary Fund (IMF). 2003a. "Financial Soundness Indicators—Background Paper." Paper prepared by the Staff of the Monetary and Financial Systems and Statistics Departments, International Monetary Fund, Washington, DC. Available at http://www.imf.org/external/np/sta/fsi/eng/2003/051403bp.pdf.

———. 2004. *Compilation Guide on Financial Soundness Indicators*. Washington, DC: International Monetary Fund. Available at http://www.imf.org/external/np/sta/fsi/eng/2004/guide.

International Monetary Fund (IMF) and World Bank. 2003. "Analytical Tools of the FSAP." Background paper prepared for March 14, 2003, IMF Executive Board meeting, International Monetary Fund, Washington, DC. Available at http://www.imf.org/external/np/fsap/2003/022403a.htm.

———. 2005. "Financial Sector Assessment Program—Background Paper." Background paper prepared for March 2005 Bank and Fund Executive Board Meetings, International Monetary Fund, Washington, DC. Available at http://www.imf.org/external/np/fsap/2005/022205a.pdf.

Jones, Matthew, Paul Hilbers, and Graham Slack. 2004. "Stress Testing Financial Systems: What to Do When the Governor Calls." Working Paper 04/127, International Monetary Fund, Washington, DC.

Jorion, Philippe. 2001. *Value at Risk: The New Benchmark for Managing Market Risk*. 2nd ed. New York: McGraw Hill.

Kalirai, Harvir, and Martin Scheicher. 2002. "Macroeconomic Stress Testing: Preliminary Evidence for Austria," In *Financial Stability Report 3*, Vienna, Austria, Austrian National Bank. Available at http://www2.oenb.at/english/download/pdf/fsr_3e.pdf.

Pesola, Jarmo. 2001. "The Role of Macroeconomic Shocks in Banking Crises." Bank of Finland Discussion Paper 6-2001, Bank of Finland, Helsinki, Finland. Available at http://www.bof.fi/eng/6_julkaisut/6.1_SPn_julkaisut/6.1.5_keskustelualoitteita/0106jp.pdf.

Shu, Chang. 2002. "The Impact of Macroeconomic Environment on the Asset Quality of Hong Kong's Banking Sector," Hong Kong Monetary Authority Research Memorandum No. 20/2002, December 2002. Available at http://www.info.gov.hk/hkma/eng/research/RM20-2002.pdf.

Sorge, Marco. 2004. "Stress-Testing Financial Systems: An Overview of Current Methodologies." BIS Working Paper No. 165, Bank for International Settlements, Basel, Switzerland.

Upper, Christian, and Andreas Worms. 2002. "Estimating Bilateral Exposures in the German Interbank Market: Is There a Danger of Contagion?" Discussion Paper 09/02, Economic Research Centre of the Deutsche Bundesbank, Frankfurt, Germany. Available at http://www.deutschebundesbank.de/vo/download/dkp/2002/09/200209dkp.pdf.

Appendix E

Benchmarking and Decomposing Interest Rate Spreads and Margins

The analysis of interest spreads and margins can assist assessors in benchmarking a country's banking system and in identifying and quantifying major deficiencies and impediments to depth, breadth, and efficiency of financial intermediation. As an illustration of how spreads and margins may be analyzed, even in an environment with limited data, this appendix uses Kenya to describe how interest spreads may be decomposed into contributory factors and how interest margins may be benchmarked against international comparators.

Although Kenya has high interest rate spreads and margins that are similar to other countries in the region, it has substantially higher spreads and margins than OECD countries (see table E.1). The term *spread* is used to mean the difference between lending and deposit rates, whereas *net interest margin* refers to the net interest actually received and expressed as a percentage of interest-bearing assets.

The most comprehensive international source for interest rates, and the one from which the data in table E.1 are drawn, is International Financial Statistics, which generally publishes just one representative deposit rate and one loan rate. For any given bank, the spread conceals a wide variation in both deposits and lending rates charged by any given bank, depending on the marginal operating costs (and the provision for likely loan loss) and its market power vis-à-vis the customer. The marginal loan will be priced to ensure that the bank's capital at risk is sufficiently remunerated, given the marginal cost of mobilized funds, including any taxes or reserve requirements that apply to the loan or to the mobilized funds. For a country's banking system as a whole, the use of a single representative rate blurs much of the detail. Nevertheless, it helps throw some light on the relative magnitude of different contributors to the cost.

For Kenya, data on the average interest rate spread were calculated from individual bank returns and were averaged over different classes of banks as shown in table E.2.[1] Then again for each bank, administrative costs and the additions to loan loss provisions were expressed as a percentage of loans. Finally, the opportunity cost of reserve requirements was calculated.[2] With before-tax profits as a residual (and a profits tax rate of 30 percent), the decomposition of table E.2.was arrived at. It points to overhead costs and the profit margin as the most important component of the interest rate spread in Kenya.

State-owned banks have the highest spread, followed by foreign-owned banks and privately owned Kenyan banks. High operating costs may suggest inefficiency or may imply the use of more costly staff personnel and systems. Despite their higher operating costs, the foreign banks, benefiting from reputational advantages that allow them to mobilize deposits at lower interest rates, enjoy higher profit margins and, therefore, higher spreads. Overhead costs and loan loss provisions constitute two-thirds of government-owned banks' spread, whereas overhead costs and the profit margin constitute two-thirds of the spread of privately owned banks. Although the profit margin seems relatively high, note that this is the profit on lending only, the most risky line of business for banks. The overall

Table E.1. Interest Rates, Spreads, and Margins in International Comparison

	Real lending rate	*Real deposit rate*	*Interest spread*	*Interest margin*
Kenya	16.5	3.5	13.0	9.2
Sub-Saharan Africa (total)	9.9	–1.5	11.5	8.1
Uganda	19.4	5.9	13.5	12.7
Tanzania	12.0	–1.2	13.1	7.5
Other low-income countries	10.8	–1.6	12.4	7.8
OECD countries	4.6	0.5	4.1	3.6

Source: The net interest margin is calculated as the actual net interest revenue relative to total earning assets. Data are from the World Bank Financial Structure Database based on raw data from Bankscope for 2001.

Note: OECD = Organisation for Economic Co-operation and Development; CPI = Consumer Price Index . Real lending (deposit) interest rates are the difference between average lending (deposit) interest rates for 2002 and the log of CPI inflation for 2002. The interest spread is the difference between deposit and lending rates quoted in International Financial Statistics.

Table E.2. Kenya: Decomposition of Interest Spreads

	All banks	*State-owned banks*	*Domestic private*	*Foreign banks*
Overhead cost	5.6	4.4	5.3	6.6
Loan loss provisions	2.5	4.9	1.5	1.8
Reserve requirements	0.3	0.3	0.4	0.2
Profit tax (30 percent)	1.9	2.2	1.6	2.1
After tax profit margin	4.5	5.2	3.7	4.9
Total spread	14.9	16.9	12.5	15.5
Return on assets (after tax)	1.4	–0.4	1.0	3.0

Source: Beck and Fuchs (2004), who used bank-by-bank data from the Central Bank of Kenya as explained in the text.

Note: All data are for 2002.

Table E.3. Bank Productivity in International Comparison

	Net interest/ employee	*Assets/employee*	*Loans/employee*	*Deposits/ employee*
Kenya	36	581	295	458
Other Sub-Saharan Africa	49	1,073	505	742
Emerging markets	60	2,040	911	1,620

Source: Authors' calculations using data from Bankscope.

Note: All data are from 2002 and in thousands of U.S. dollars.

Table E.4. Bank Productivity Across Different Kenyan Bank Groups

	Net interest/ employee	*Assets/employee*	*Loans/employee*	*Deposits/ employee*
State-owned banks	23	303	187	222
Private domestic banks	31	577	317	447
Foreign banks	50	770	349	625

Source: Authors' calculations using data from Central Bank of Kenya.

Note: All data are from 2002 and in thousands of U.S. dollars.

profitability for banks is significantly lower, as indicated by the return on assets, which is of a level comparable to other banking markets.

An analysis of the overhead costs shows that they are driven by wage costs, which constitute 50 percent of total overhead costs. Other factors relating to the costs of financial service provision in the local market include fraud, security costs, the inefficient payment system, and a heavy regulatory burden, as illustrated by the high reporting requirements, the annual re-licensing process, and the licensing procedures for the opening and closing of branches. Compared with banks in other sub-Saharan African countries and other emerging countries, Kenyan banks appear to be overstaffed, and their employees appear to be less productive (see table E.3). Kenyan banks have more than three times as many employees for a given amount of assets, loans, and deposits than other banks in emerging countries, and the average Kenyan bank employee earns only half of the net interest revenue as the average employee in emerging markets.

However, there are large differences in productivity across different ownership groups of Kenyan banks (see table E.4). Employees in state-owned banks earn only half of the net interest revenue of employees in foreign-owned banks. State-owned banks have twice as many employees relative to their assets, loans, and deposits as foreign-owned banks. The higher productivity of foreign-owned banks compensates for the higher wage costs of those banks when compared with domestic banks. Private domestic banks are less productive and more overstaffed than foreign-owned banks but are more productive and less overstaffed than state-owned banks. This disparity across ownership groups indicates significant potential gains from increased competition and the resulting productivity improvements.

Table E.5. Net Interest Margins and Overhead Costs in International Comparison

	Interest margin	*Overhead cost*
Kenya	7.0	5.9
Worldwide average	3.6	3.0
Difference	3.4	2.9
Protection of property rights	1.4	0.8
Bank size	0.9	0.7
Other bank characteristics	–0.3	0.5
Other country characteristics	0.1	0.0
Unexplained (Kenya residual)	1.2	0.8

Source: Beck and Fuchs (2004), using data and results from Demirgüç-Kunt, Laeven, and Levine (2004) and data from Central Bank of Kenya.

Instead of our looking at bank-level cost patterns, it is equally interesting to stand back and to examine what national structural features (and external characteristics of different banks, such as ownership) are associated with higher interest spreads and margins. A recent cross-country study of the determinants of net interest margins and overhead costs for banks in 72 countries (Demirgüç-Kunt, Laeven, and Levine, 2004) provided the material for such an analysis. The authors provided a regression equation that explains a reasonable proportion of the variation in net interest margins in terms of national and bank-level characteristics. Inserting local values for the explanatory variables allows a predicted value for any given country and, indeed, any given bank.

The difference between average Kenyan interest margins and those in the rest of the world for the period studied by Demirgüç-Kunt, Laeven, and Levine[3] was 3.4 percent (7.0 percent compared with 3.6 percent). About two-thirds of the difference can be explained by differences in the values of the explanatory variables in Kenya compared with the rest of the world. In particular, as shown in table E.5, Kenya's relatively weak protection of property rights and the small size of its banks are major contributors to the difference.[4] Those two factors also provide the most important explanation for the higher overhead costs in Kenya—accounting for 0.8 percentage points of the costs. The relative smaller size—thus the lack of scale economies—of Kenyan banks explains 0.9 percentage points of the higher net interest margin and 0.7 percentage points of the higher overhead costs.

The lack of a sound legal and institutional environment and the small size of Kenyan banks thus seem to be two of the most important factors explaining why net interest margins and overhead costs are almost twice as high in Kenya as in the rest of the world. Overall, this analysis of national structural features confirms the conclusions that are based on cost and profit decomposition. In particular, the deficient legal and institutional framework contributes to the need for high loan loss provisions. The benchmarking exercise clearly suggests a desirable direction of policy.

Notes

1. The calculations and discussion follow Beck and Fuchs (2004).
2. For large loans to risk-free borrowers funded on the wholesale deposit market quasi-taxes, such as unremunerated reserve requirements, may contribute most of the spread. Calculating the break-even spread on such loans is a good way of inferring the marginal contribution of reserve requirements to intermediation spreads.
3. Although Demirgüç-Kunt, Laeven, and Levine (2004) use data over 1995–1999 and have a limited sample of banks for each country, the data for Kenya is based on 38 Kenyan banks representing 98 percent of the banking system and is for the year 2002.
4. These calculations were obtained by multiplying the coefficient estimates from two regressions in that paper (Table 8, column 3 and Table 11, column 3) with the difference between values of the respective variables for Kenya and the mean value for all countries in the study.

References

Barth, James, Gerard Caprio, and Ross Levine. 2004. "Bank Supervision and Regulation: What Works Best?" *Journal of Financial Intermediation* 13 (2): 205–48.

Beck, Thorsten, Aslı Demirgüç-Kunt, and Ross Levine. 2000. "A New Database on the Structure and Development of the Financial Sector." World Bank Economic

———. 2003. "Law, Endowments and Finance." *Journal of Financial Economics* 70 (2): 137–81.

———. 2002. "Industry Growth and Capital Allocation: Does Having a Market- or Bank-based System Matter?" *Journal of Financial Economics* 64: 147–80.

Beck, Thorsten, and Michael Fuchs. 2004. "Structural Issues in the Kenyan Financial System: Improving Competition and Access." World Bank Policy Research Working Paper, World Bank, Washington, DC.

Beck, Thorsten, Ross Levine, and Norman Loayza. 2000. "Finance and the Sources of Growth." *Journal of Financial Economics* 58: 261–300.

Bossone, Biagio, Patrick Honohan, and Millard Long. 2002. "Policy for Small Financial Systems." In *Financial Sector Policy for Developing Countries—A Reader*, ed. G. Caprio, P. Honohan, and D. Vittas, pp. 95–128. New York: Oxford University Press. Available at http://wbln0018.worldbank.org/html/FinancialSectorWeb.nsf/(attachmentweb)/Fs06/$FILE/Fs06.pdf.

Christen, Robert Peck, Timothy R. Lyman, and Richard Rosenberg. 2003. *Microfinance Consensus Guidelines*. Washington, DC: Consultative Group to Assist the Poorest.

Claessens, Stijn, and Luc Laeven. 2004. "What Drives Bank Competition? Some International Evidence." *Journal of Money, Banking and Credit*. Volume 36, Number 3 (part2), June 2004, pp. 563–583.

Demirgüç-Kunt, Aslı, and Harry Huizinga. 1999. "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence." *World Bank Economic Review* 13: 379–408.

Demirgüç-Kunt, Aslı, Luc Laeven, and Ross Levine. 2004. "Regulations, Market Structure, Institutions and the Cost of Financial Intermediation." *Journal of Money, Banking and Credit*. Volume 36, Number 3 (part2), June 2004, pp. 593–622.

Fazzari, Steven, Glenn Hubbard, and Bruce Petersen. 1988. "Financing Constraints and Corporate Investment." Brookings Papers on Economic Activity 1, pp. 141–95, Brookings Institute, Washington, DC.

Financial Stability Forum. *Compendium of Standards*.

Honohan, Patrick. 2003. "Avoiding the Pitfalls in Taxing Financial Intermediation." In *Taxation of Financial Intermediation: Theory and Practice for Emerging Economies*, ed. P. Honohan. New York: Oxford University Press.

———. 2004a. "Financial Development, Growth and Poverty: How Close Are the Links?" World Bank Policy Research Working Paper 3203, World Bank, Washington, DC.

———. 2004b. "Measuring Microfinance Access: Building on Existing Cross-country Data." Paper presented at the UNDP, World Bank, and IMF Workshop Data on the Access of Poor and Low Income People to Financial Services, Washington, DC, October 26.

Impavido, Gregorio, Alberto Musalem, and Dimitri Vittas. 2003. "Promoting Pension Funds." In *Globalization and National Financial Systems*, ed. J. A. Hanson, P. Honohan and G. Majnoni. New York: Oxford University Press.

International Monetary Fund and World Bank. 2001. *Guidelines for Public Debt Management*. Washington, DC: International Monetary Fund and World Bank. Available at http://www.imf.org/external/np/mae/pdebt/2000/eng/index.htm.

———. 2003. "Development issues in the FSAP." Mimeo.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. "Government Ownership of Commercial Banks." *Journal of Finance* 57: 265–301.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. "Legal Determinants of External Finance." *Journal of Finance* 52: 1131–1150.

———. 1998. "Law and Finance." Journal of Political Economy 106: 1113–55.

Levine, Ross. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35: 688–726.

Levine, Ross, Norman Loayza, and Thorsten Beck. 2000. "Financial Intermediation and Growth: Causality and Causes." *Journal of Monetary Economics* 46: 31–77.

Jaffee, Dwight M., and Betrand Renaud. 1996. "Strategies to Develop Mortgage Markets in Transition Economies," World Bank Policy Research Working Paper 1697, World Bank, Washington, DC.

Jappelli, Tullio, and Marco Pagano. 2002. "Information Sharing, Lending and Defaults: Cross-Country Evidence." *Journal of Banking and Finance* 26: 2017–45.

Miller, Margaret (ed). 2003. *Credit Reporting Systems and the International Economy*. Cambridge, MA: MIT Press.

Organisation for Economic Co-operation and Development. 2002. *Insurance and Private Pensions Compendium for Emerging Economies*. Paris: Organisation for Economic Co-operation and Development.

Vittas, Dimitri. 1998. "Regulatory Controversies of Private Pension Funds," World Bank Policy Research Working Paper 1893, World Bank, Washington, DC. Available at http://econ.worldbank.org/docs/824.pdf.

World Bank. 2001a. *Finance for Growth. Policy Choices in a Volatile World*. New York: Oxford University Press.

———. 2001b. *Developing Government Bond Markets*. Washington, DC: World Bank.

Appendix F

Institutional Structure of Financial Regulation and Supervision[1]

Overview

Around the world, many countries are reconsidering the institutional structure of regulatory and supervisory agencies in the financial sector. This reconsideration reflects the concern that the existing structures—which were often established in a markedly different market and institutional environment than exists today—may have become inappropriate to meet the key regulatory objectives effectively. These objectives include fostering market efficiency and promoting market confidence and stability. As countries reassess and then implement changes in their regulatory and supervisory architecture, a number of issues are raised in relation to both the developmental and stability aspects of the financial sector's evolution.

From the developmental perspective, the main question that arises is whether the existing organizational structure of the financial regulatory and supervisory function is adequate to oversee an often rapidly evolving financial sector that is characterized by new types of financial institutions and new institutional structure (such as financial conglomerates.) It is also feasible that a poorly structured supervisory function could impede financial innovation or encourage inappropriate forms of innovation. For instance, if the structure gives rise to significant supervisory gaps—that is, differences in regulation of activities that have a similar function but that are performed by different institutional types—market participants are likely to seek opportunities for regulatory arbitrage and to engage in financial operations that are not appropriate from a regulatory perspective. This regulatory arbitrage, in turn, will lead to a developmental outcome for the financial sector that is suboptimal.

From the stability perspective, several key issues pertain to the institutional structure of regulation. The question of regulatory gaps and the implications for regulatory arbitrage is pertinent in this context also. Unsupervised, or inadequately supervised, institutions can be a primary cause of financial instability, and weak institutions will likely try to seek out the lines of least supervisory resistance and to engage in overly risky types of financial behavior. There is always a possibility that a change in supervisory structure could lead to less-optimal outcomes from the stability point of view. Such a case could be, for instance, moving responsibility for supervising banks from a strong and independent central bank to a new agency that is perceived to be less robust. Another issue that has stability implications relates to the risks that arise in transitional phases. Specifically, if a country decides to change the institutional structure of its supervision, there is typically a transitional period during which responsibility is shifted from one set of supervisory bodies to another. During such a transitional phase, there is a risk that the stability of the financial system could be undermined, especially if a supervisory vacuum exists for an extended period.

Range of Financial Supervisory Structures

A wide variety of institutional structures for financial supervision exists around the world. There is a spectrum of alternatives rather than an "either–or" choice, and there is considerable variety within the spectrum and even within the same basic model. Although no universal pattern exists, there is a general trend toward (a) reducing the number of separate agencies, (b) integrating prudential supervisory arrangements, (c) reducing the role of the central bank in prudential oversight of financial institutions, (d) placing more emphasis on the role of the central bank in systemic stability, and, if a unified agency is created, (e) making this an agency other than the central bank.

National differences reflect a multitude of factors: historic evolution, structure of the financial system, political structure and traditions, and size of the country and financial sector. Table F.1 gives an indication of the range of models for supervisory structure that have been adopted around the world. The framework for organizing supervision functions is along sectoral lines (multiple supervisors), is integrated for two sectors regardless of the objectives of supervision, or is integrated across all sectors into unified agencies. In the unified model (i.e., integrated across all sectors) two variants have appeared: (a) a single integrated supervisor responsible for all objectives of supervision (except possibly competition issues) and (b) two integrated supervisors—one focusing on prudential regulation and supervision of financial institutions and another focusing on conduct of business supervision across all institutional types and markets. This model of integrating supervisory functions according to objectives of supervision is further discussed in the section below on types of unified supervision, drawing on the experience of the Netherlands.

Importance of Institutional Structure

The institutional structure of supervisory agencies is not simply an administrative matter; it is important to meet the objectives of financial supervision for several reasons. The

objectives of financial supervision are to promote efficiency and competition,[2] to maintain market confidence, to protect depositors or consumers (as appropriate), and to foster systemic stability. Supervisory capacity and the supervisory process itself are the critical elements in attaining those goals. Above all other considerations, institutional structure may have an effect on supervisory capacity and process and, hence, on the overall effectiveness of regulation and supervision, because of the expertise, experience, and culture that develop within particular regulatory agencies and with the approaches they adopt.

One school of thought argues that focused, rather than diversified or conglomerate, regulators are more effective simply because their mandates are clearly defined, which allows the buildup of expertise. There is a danger (although this risk is by no means inevitable) that expertise, collective memory, and experience can be lost when changes are made. Others argue that regulation is more likely to be effective if a single agency is responsible for all aspects of regulation and supervision.

Closely related to effectiveness is the clarity of responsibility for particular aspects or objectives of regulation. This clarity, in turn, raises the question of interagency rivalry and disputes and of the effectiveness of needed information exchange and coordination. Seldom does regulation have a single objective; when multiple objectives are set, conflicts can arise between them. Although this potential for conflict is true irrespective of institutional structure, different structures may be more or less efficient at handling conflicts and facilitating information exchange and cooperation. Specific country circumstances dictate whether conflicts could be better handled or whether cooperation could become easier within a single agency or between agencies if responsibilities for particular objectives are more clearly defined. It becomes a question of whether transaction costs are lower when conflicts are resolved internally (e.g., between different divisions of a single agency) rather than externally between different agencies.

Different structures have implications for the costs of regulation. On the one hand, if there are economies of scale and scope in regulation, there should be advantages to having a small number of agencies or even a single authority. On the other hand, if a single regulator (encompassing a wide variety of financial institutions) adopts an inappropriate regulatory regime (perhaps because its remit is too wide and unfocused), then the compliance and structural costs of regulation would rise—even though the purely institutional costs of regulatory agencies (i.e., the costs of running supervisory agencies) might be lower. The following considerations are relevant for the costs of regulation:

- A major issue relates to overlap and underlap and to whether a particular structure causes an unnecessary duplication of regulatory activity and, hence, places unnecessary costs on firms; it also relates to whether some aspects of business or some institutions fall through the net altogether.
- A multiple-agency regime, especially if it allows regulated institutions an element of choice, creates the potential for regulatory arbitrage and inconsistent regulation between different institutions conducting the same type of business.
- Public perceptions and credibility also may be a significant issue in that, with multiple agencies, it may not be clear to the consumer which agency is responsible for a particular issue of regulation or to whom complaints should be addressed.

Any change in supervisory architecture must take into account the likely effect on the governance of the agency or agencies concerned. There are four prerequisites for good regulatory governance in regulatory and supervisory agencies: accountability, independence, integrity, and transparency. Each may be affected by a structural change in the supervisory process.[3] The importance of corporate governance arrangements arises from several factors: (a) they determine the effectiveness and efficiency of the agencies' operations; (b) they have a powerful effect on the agency's credibility, authority, and public standing; and (c) they have an important effect on the authority and credibility of agency's attempt to encourage and to require effective corporate governance arrangements within regulated firms.

For all those reasons, the institutional structure of regulatory agencies is an issue of some significance. However, the importance should not be exaggerated. A crucial point is that institutional structure does not, in itself, guarantee what really matters: the effectiveness of regulation in achieving its objectives in an efficient and cost-effective manner. The arguments in favor of and against various supervisory structures can best be drawn out by considering the case for and against a fully unified prudential agency.

Case for the Fully Unified Model

The fully unified model is particularly relevant when regulated entities are increasingly consolidating their activities and turning into conglomerates with centralized risk management. Several arguments might favor the creation of a single unified agency for prudential regulation and supervision. Those arguments are as follows:

- There may be economies of scale within regulatory agencies (particularly with respect to skill requirements and recruitment of staff members with appropriate skills and qualifications). If so, the smaller the number of agencies, the lower the institutional costs should be. A single regulator might be more efficient because of shared resources and, in particular, shared information technology systems and support services. The argument for economies of scale might apply particularly to the "small-country" case.
- It is likely to be easier to achieve an optimal deployment of staff members within a unified agency than within a specialist and fragmented institutional structure.
- As noted, the distinction between functional and institutional regulation does not apply to a financial system made up of specialist institutions. For financial conglomerates, a unified agency enables a groupwide picture of the risks of an institution to be observed more clearly and thus to be supervised. This groupwide supervision of risks is especially important when financial conglomerates themselves adopt a centralized approach to risk management and risk taking. In such a case, there is merit in having an institutional structure of supervision that mirrors the practice of regulated institutions. As a result, a more rapid response to emerging groupwide problems should be possible.
- There is less scope for incomplete coverage, with some institutions or lines of business slipping through the regulatory and supervisory net because of confusion about which agency is responsible. There may even be damaging disputes between agencies in a multiple-agency structure.

- There might be merit in having a simple regulatory structure that is readily understood and recognized by regulated firms and consumers. Some of the traditional distinctions between different types of institutions have become increasingly blurred, which undermines some of the traditional arguments in favor of separate regulation and supervision of different types of financial institutions.
- There might be an advantage to having a structure that mirrors the business of regulated institutions. To the extent that financial institutions have steadily diversified, traditional functional divisions have been eroded. Although there are various ways of addressing overall prudential requirements for diversified institutions, a single, conglomerate regulator might be able to monitor the full range of institutions' business more effectively and be better able to detect potential solvency risks emanating from different parts of the business.
- Equally, the distinctions between certain types of financial products have become increasingly blurred, which raises questions about the case for regulating them differently. The potential danger of a fragmented institutional structure is that similar products (products providing the same or a similar service) are regulated differently because they are supplied by different types of financial firms. This difference in the regulation of similar products may impair competitive neutrality. It is more likely that a consistent approach to regulation and supervision of different types of institutions will emerge.
- A single agency should, in principle, avoid problems of competitive inequality, inconsistencies, duplication, overlap, and gaps that can arise with a regime that is based on several agencies. A singe regulator should make it easier for similar products offered by different types of institutions to be regulated and supervised in a consistent manner.
- A single agency also should minimize regulatory arbitrage. A potential danger with multiple agencies is that overall effectiveness may be impaired as financial firms engage in various forms of regulatory and supervisory arbitrage. This arbitrage can involve the placement of a particular financial service or product in that part of a given financial conglomerate where the supervisory costs are the lowest or where supervisory oversight is the least intrusive. It also may lead firms to design new financial institutions or to redesign existing ones strictly to minimize or avoid supervisory oversight. This regulatory arbitrage also can induce "competition in laxity," as different agencies compete to avoid the migration of institutions to competing agencies.
- If expertise in regulation is in short supply, expertise might be used more effectively if it is concentrated within a single agency. Such an agency also might offer better career prospects. Accountability of regulation also might be more certain with a simple structure if for no other reason than that it would be more difficult for different agencies to "pass the buck."
- The costs imposed on regulated firms might be reduced to the extent that firms would need to deal with only one agency. This issue was particularly significant in the United Kingdom when, before the creation of the Financial Services Authority (a fully unified agency), a financial conglomerate might be regulated and supervised by and required to report to nine regulatory agencies. There also can be

economies, plus greater effectiveness, when all information about financial firms is lodged within a single agency.

Case Against the Fully Unified Model

There is clear merit in the arguments stated in the case for a unified model, and there is a certain prima facie appeal to the concept of a unified prudential regulator. However, several reservations may be voiced about such an agency:

- One of the arguments in favor of a single prudential agency—that as financial firms have increasingly diversified, the traditional functional distinctions between institutions have been eroded—is not applicable in many countries. Although this lack of applicability is generally the case in industrial countries, it may not be true of all countries or even of all institutions in industrial countries. In very many countries, there remain—and will remain for the foreseeable future—major differences among banks, securities firms, and insurance companies.
- Firms in all sub-sectors of the financial system have diversified, but their core business almost invariably remains dominant. The nature of the risks may be sufficiently different to warrant a differentiated approach to prudential regulation. Insurance companies have long-term liabilities with ill-defined value, whereas assets are generally marketable with readily ascertainable values. Banks, by contrast, tend to have relatively short-term liabilities with assets that are difficult to liquidate and to value. Consequently, the applicable prudential supervisory regimes are different, and there would be few (if any) efficiencies in bringing their supervision together.
- Accountability of the single agency might be more difficult, because of the problems of defining clear objectives for the agency. Accountability always has been difficult to implement for a supervisory agency—whether it be in a single agency or with multiple agencies—given the multiple objectives and the need to ensure a sufficient degree of confidentiality of supervisory actions on individual institutions. Nevertheless, accountability for objectives can be better implemented if cross-sectoral integration of supervisory functions is organized based on objectives of supervision, as in Australia and the Netherlands.
- There is a danger within a single agency that the necessary distinctions between different products and institutions will not be made. A single agency might not have a clear focus on the objectives and rationale of regulation and supervision and might not make the necessary differentiations between different types of institutions and businesses. Even if the different regulatory requirements of different types of firms are managed within specialist divisions of an integrated regulator, there is no guarantee that supervisors who are within the same organization (but who are responsible for different types of business) will necessarily communicate and coordinate more efficiently and closely than if they were within different, specialist regulatory agencies. Regardless of the institutional structure that is chosen in a particular country, the ultimate skill lies in balancing conflicting pressures.
- A potential moral hazard is that the public will believe that the spectrum of risks among financial institutions has disappeared or become blurred. In particular,

the distinction could become obscured between deposits that are redeemable on demand at face value and certain investments where the value of an institution's liability is a function of the performance of the institution in managing its assets. There may be a tendency for the public to assume that all creditors of institutions supervised by a given supervisor will receive equal protection.

- A large unified regulator might become excessively bureaucratic in its procedures and might be slow to react to problems as they emerge.
- The creation of a single regulator might involve a loss of potentially valuable information because a single approach is adopted. In effect, there might be merit in having a degree of competition and diversity in regulation so that lessons can be learned from the experience of different approaches. In some respects, the case for not having a monopoly regulator is the same as with any monopolist.
- Further, there may not be any economies of scale to be derived from an integrated regulator. The economics literature demonstrates quite clearly that diseconomies of scale can arise in some circumstances. Put another way, what economists refer to as X-inefficiencies (that is, inefficiencies caused by suboptimal resource allocation and not by a lack of economies of scale) may arise in a monopolist regulator. It is not self-evident that a single, unified regulator would, in practice, be more efficient than a series of specialist regulators that are based on clearly defined objectives and are focused specifically on regulation to meet those clearly defined objectives. In addition, as in Ireland and Finland, economies of scale in infrastructure, information technology, and services can be achieved by locating separate agencies within the same building and by sharing common resources while, nevertheless, maintaining strict separation of regulatory and supervisory policy and execution.
- A single, all-embracing agency also may be subject to the hazards of the "Christmas tree" effect, in which a wide range of miscellaneous functions are loaded onto it, overburdening it with activities divorced from its primary function and objectives.
- Regardless of the nature of the change made to institutional structure, there are always potentially serious transaction costs to consider. There is a degree of unpredictability in the process of change itself. A bargaining process may be opened between different interest groups, the legislative process might be captured by vested interests, key personnel may be lost, and management may be diverted from the core activity of regulation and supervision.

The arguments for and against unified prudential agencies are finely balanced,and the optimal structure is likely to vary between countries, depending on the structure of their financial system (and, in particular, whether the system is populated by specialist or conglomerate institutions), the past traditions, the political environment, and the size of the country. If a single agency is created, the type of unified supervision and the issue of internal structure need further consideration.

Types of Unified Supervision

The decision on the type of unified supervision agencies—whether based on limited objectives or cross-sectoral unification of all objectives—also gives rise to complex trade-

Table F.1. Countries with a Single Supervisor, Semi-Integrated Supervisory Agencies and Multiple Supervisors in 2004

Single supervisor for the financial system	*Agency supervising two types of financial intermediaries*			*Multiple supervisors*[a]
	Banks and securities firms	*Banks and insurers*	*Securities firms and insurers*	
Austria Bahrain* Bermuda* Cayman Islands* Denmark Estonia Germany Gibraltar Hungary Iceland Ireland* Japan Kazakhstan* Latvia Maldives* Malta* Nicaragua Norway Singapore* Korea, Rep. of Sweden United Arab Emirates* Uruguay* United Kingdom Australia[b] Netherlands[b]	Finland Luxembourg Mexico Switzerland Uruguay	Australia Belgium Canada Colombia Ecuador El Salvador Guatemala Malaysia* Peru Venezuela, República Bolivariana de	Bolivia Bulgaria* Chile Egypt, Arab Rep. of* Jamaica* Mauritius* Slovakia* South Africa* Ukraine*	Albania* Argentina* Bahamas* Barbados* Botswana* Brazil* China Croatia* Cyprus* Dominican Republic* Egypt* France* Greece* Hong Kong (China)* India* Indonesia* Israel* Italy* Jordan* Lithuania* New Zealand* Panama Philippines* Poland* Portugal* Russia* Slovenia* Sri Lanka* Spain* Thailand* Tunisia* Turkey Uganda* United States*
As percentage of all countries in the sample				
29%	6%	12%	11%	42%

*Banking supervision is conducted by the central bank.

Source: How Countries Supervise Their Banks, Insurers, and Securities Markets. 2004. Central Banking Publications, London: Sponsored by international law firm Freshfields Bruckaus and Beringer.

Note: Sample includes only countries that supervise all three types of intermediaries (banks, securities firms, and insurers).

a. At least one for banks, one for securities firms, and one for insurers.
b. Two integrated cross-sectoral supervisors, each focusing on specific objective of supervision: one for prudential supervision of institutions in all sectors; another for conduct of business supervision of all sectors and markets .

offs. In principle, a supervisory framework could be organized in line with basic policy objectives (or functions), regardless of the type of financial business (banking, insurance, securities trading, and non-bank financial business). The objectives (or functions) to be accommodated include prudential regulation, systemic stability, consumer or investor protection, and competition. Although the multiplicity of objectives and institutional types gives rise to a matrix of potential regulatory arrangements by objective and type of business, the normal approach in creating integrated supervisors has been (as seen in table F.1) to adopt cross-sectoral unification of all objectives and related functions (with the exception of competition objective) in a single agency.

Australia and the Netherlands are, however, unusual among integrated supervisors because they created two separate integrated supervisors: one focused on prudential supervision and one focused on the conduct-of-business supervision. Thus, each agency focuses on a specific objective of supervision. If the objectives of supervision were few and very distinct, it would be fairly straightforward to design a framework in which each institution was charged with achieving a distinct objective. In reality, a major complication is the fact that the various supervisory norms and instruments underpinning the objectives of supervision are not fully distinct. In general, the various supervisory domains will contain shared elements as well as inconsistent elements.

Consequently, the practical design of a supervision framework will face tradeoffs between maximizing synergies among the common elements and minimizing conflicts among the inconsistent elements. Because the importance of the various tradeoffs will vary across countries with different financial systems and legal arrangements, if follows that the appropriate arrangement of objective or functionally oriented supervision will vary across countries. For example, the Netherlands model differs from other cross-sectoral supervision frameworks in many ways: (a) consolidation of both microprudential and macroprudential supervision into a single body within the central bank (DNB-PVK); (b) the consolidation of all conduct-of-business supervision within a separate body, the Authority for Financial Markets (AFM); and (c) the establishment of agreements or "covenants" between main supervisors to ensure good coordination and cooperation. A council of financial supervisors (RFT) offers the two supervisors (DNB-PVK and AFM) a platform for the coordination and mutual fine-tuning of regulation and policy, especially on integrity supervision issues.

Consolidation of macroprudential and microprudential supervision in a single agency distinguishes the Netherlands model from cross-sectoral approaches in other countries. In both the United Kingdom and Australia, for example, macroprudential surveillance is conducted by the central bank, but microprudential surveillance has been taken over by separate agencies.[4] The combination of both aspects of prudential supervision in the Netherlands largely reflects the fact that its financial system is dominated by a handful of large, complex financial institutions. That being the case, the distinction between microprudential and macroprudential issues is blurred, at least in the case of the largest institutions.

There are both pros and cons associated with such consolidation. On the positive side, consolidation is likely to encourage taking greater account of macroeconomic and systemic stability considerations in microprudential analysis. Macroeconomic analysis is also likely to benefit by taking better account of the structure and characteristics of the

financial system at the microlevel. A single macroprudential and microprudential supervisor also is seen as advantageous in the event of a financial crisis, because it would facilitate rapid assembly of essential prudential information and facilitate speedy decision making.

At the same time, it is recognized that combining macroprudential and microprudential supervision under one roof could lead to conflicts between objectives. A particular concern is that microprudential considerations could put increased pressure on the central bank to provide generous lender-of-last-resort facilities and that knowledge of this support could encourage less-prudent behavior by banks. In principle, this concern is valid. However, in practice, it may not be a very significant issue in the Netherlands because the DNB is authorized to lend—including in emergency circumstances—only against acceptable collateral. In practical terms, the moral hazard is that the DNB might be willing to offer slightly better terms on offered collateral than it might otherwise do. That probability is unlikely to promote significantly riskier behavior by financial institutions.

An additional issue in relation to the consolidation of macroprudential and microprudential supervision is whether this supervisory role should be located within the central bank. The fact that the DNB is no longer responsible for conducting an independent monetary policy undercuts one of the traditional arguments in favor of locating prudential supervision outside the central bank, because the scope for conflict of interest between monetary policy and prudential policy objectives is largely eliminated.

Internal Structure of Unified Supervisory Agencies

Given the arguments that have been outlined, the objective within a single agency must be to create an internal organizational structure that maximizes the potential advantages (e.g., cost efficiency, less regulatory arbitrage), while at the same time guarding against the potential hazards (e.g., heavy bureaucracy, lack of focus). Internal organization could reflect different institutional types or different functional lines. For instance, some supervisory activities (e.g., licensing, prudential control) could be established to cover all institutional types. A number of variations are possible. Country experiences to date suggest that no one model for the internal organization of unified agencies has been notably more successful than any of the others.

Role of the Central Bank

A key issue in any institutional structure of regulatory and supervisory agencies is the position and role of the central bank. In the vast majority of countries, the central bank has historically been responsible for both the systemic stability and the prudential regulation and supervision of banks. In only a very small minority of cases has it also been responsible for the supervision of non-bank financial institutions. Even so, there are several alternative models for the role of the central bank, depending on whether it is involved in monitoring the payments system, providing emergency liquidity to the markets, supervising banks, managing deposit insurance, or playing a role in providing the safety net or crisis resolution.

Nevertheless, almost universally, the central bank is allocated at least some role in maintaining systemic stability, even if it is not involved in the prudential supervision of the banks that make up the system. However, its role raises a number of issues.

The first issue is that of power. If the central bank has independent powers to set interest rates, the combination of a widespread regulatory function with monetary control might appear to place excessive powers within the hands of unelected officials. It might create the public perception that any "safety net" that might apply to banks will also be extended to a wide range of financial institutions.

Another issue is that of possible conflicts of interest. These conflicts could arise, for example, because of monetary policy implications of bank resolution actions, thereby posing a tradeoff among conflicting objectives. This concern is frequently advanced by academic economists as the main argument against allowing the central bank to participate in regulation. Those economists believe that a central bank with responsibility for preventing systemic risk is more likely to loosen monetary policy on occasions of difficulty.[5]

The question of conflicts of interest might be an argument in favor of giving the central bank regulatory responsibilities. There are several questions: If not the central bank, then which other body should have such powers? What conflicts of interest might the body have? If the central bank does not play this role, will it then be given to a body more subject to direct political influence? If public policy conflicts do arise, they will do so regardless of whether supervision is a responsibility of the central bank. Such conflicts may arise no matter what institutional structure is created, and the conflicts must be resolved somehow. The key issue is whether the transaction costs of resolving them are higher or lower when they are resolved internally rather than externally. The advantages of having the central bank also serve as the supervisory agency of banks in the financial system may be summarized as follows:

Because the central bank has responsibility for oversight of the system as a whole and for stability of the payments system, there are powerful synergies in being the supervisory agency for the institutions that make up the system. Some analysts doubt that, in practice and when stability is under strain, it is feasible for an agency to be responsible for the system but not for the individual firms.

The central bank necessarily gains information about banks by virtue of its monetary policy operations. There are, therefore, information synergies between the conduct of monetary policy and the prudential supervision of banks. The central bank needs information about the solvency and liquidity of banks when considering its role as lender of last resort.

The central bank often has an independent status in the economy that might not be replicated by other regulatory or supervisory agencies. Moreover, the central bank usually has considerable authority in an economy, and that authority enhances the credibility of regulation and supervision—if it is allocated this task.

From time to time, conflicts of interest can arise between the requirements of monetary policy and the prudential position of banks. It can be argued that such conflicts are better resolved internally within a single agency than externally between different agencies. Monetary policy operates largely through interest rates that also affect the financial position of banks. In addition, economies of scale may be derived from combining responsibility for monetary policy and prudential supervision of banks. Moreover, the

status of the central bank may enhance its ability to recruit the necessary skills for bank supervision.

There are, however, arguments against having the central bank as the supervisory agency of banks. Such an arrangement may be viewed as concentrating excessive power in the hands of an unelected central bank whose accountability may be weak. Regulatory failures may compromise the authority of the central bank in other areas of its activity. For example, the central bank's objective of ensuring monetary stability may conflict with its objective of securing the safety and soundness of banks.

In a recent reform of institutional arrangements for financial regulation and supervision, the government of Ireland embedded prudential regulation of banks and other financial institutions within the central bank (which was already responsible for banks and securities) but at the same time changed the structure of the bank. Supervision and monetary stability are now separated and run as independent arms within the central bank. However, because Ireland is a member of the European Monetary Union, the monetary policy powers of the central bank are very limited. Similarly, as discussed earlier, the Netherlands Bank now combines prudential supervision of all sectors with its macroprudential surveillance responsibilities.

In practice, no bank regulator could, or should, ever be totally independent of the central bank. The central bank is the monopoly provider of the reserve base and the lender of last resort. Any serious banking problems are bound to lead to calls for the central bank to use its reserve-creating powers. Moreover, the central bank, in its macro-policy operational role, must have a direct concern with the payments and settlements system, the money markets, and the development of monetary aggregates. Any serious problem with the health of the banking system will touch on one or more of these concerns. Therefore, there are bound to be, and must be, very close relationships between the bank regulator and the monetary policy authority. Establishing such relationships is one of the priorities in structural reform.

Furthermore, with the growing international integration of financial institutions and markets, central banks are increasingly focused on macroprudential surveillance as part of their systemic stability responsibilities (which is reflected in the publication of financial stability reports by increasing numbers of countries). This top-down approach to analyzing financial soundness requires very close collaboration with supervisory bodies—within or outside the central bank (e.g., in data sharing, conducting aggregate stress tests, or providing transparency of aggregate information).

This need for coordination might suggest unifying the functions within the central bank. However, for a variety of reasons (including the need for confidentiality), when the central bank combines both roles, the supervisory department is usually separate from the monetary policy department. Coordination is regarded as necessary only between the top officials. Such regular meetings of senior officials can be organized just as easily whether their subordinates are in separate buildings or the same building and whether their organization is formally separate or not. Perhaps the only real difference is that disagreements between senior officials would be settled (quietly) within the central bank in the case of unification, and they would be settled outside the bank, presumably by the minister of finance, with more likelihood of publicity, in the case of separation. However, it is hard

to identify actual cases of publicly observed disagreement between the central bank and the bank regulator in countries where there is such a separation.

The bottom line is that banking realities will force considerable coordination and interaction between the senior officials dealing with monetary policy and with bank supervision. There must always be a close link between the central bank and the supervisory authority. The question of whether the banking supervisory body is formally within or outside the central bank is then essentially a subsidiary issue, depending on perceptions of the appropriate locus of power and responsibility. Those perceptions will vary depending on the accidents of history and culture. There is no single, best approach under all circumstances, as is clearly evidenced by the variety of regulatory structures in different countries.

Whatever institutional structure is created, there will always be an important need for effective coordination among the central bank, the regulatory agency (or agencies), and the ministry of finance. In particular, cooperation, coordination (especially when intervention is made), and (perhaps above all else) information sharing are needed around the world. Mechanisms are needed to ensure information sharing regardless of the type of institutional structure created for regulation and supervision.

The overall conclusion is that safeguarding financial stability is a core function of the modern central bank, even though it may not be responsible for regulating and supervising banks and other financial institutions. Irrespective of the decision about the role in regulation and the supervision of individual financial institutions, the central bank must necessarily be centrally involved in the safety net arrangements, the liquidity support, the payments system, and the maintenance of stability in the financial system as a whole. In cases where the central bank is not responsible for regulation and supervision, its responsibility for financial stability requires cooperation with and from those agencies that are responsible for regulation and supervision. This issue cannot be avoided, and explicit arrangements are needed.

Conclusions

International experience indicates a wide variety of institutional regulatory formats, suggesting that there is no universal ideal model. A key consideration is the extent to which regulatory structure affects the overall effectiveness and efficiency of regulation and supervision, because this consideration should be the ultimate one when choosing between alternative formats. This consideration is also the reason why the issue of institutional structure is important.

However, in itself, institutional structure does not guarantee effective regulation and supervision, and it would be wrong to assume that changing the structure of regulatory institutions is a panacea. What an institutional structure does is it establishes the framework in which to optimize a regulatory regime. In effect, institutional structure provides the architecture of regulation and supervision. More appropriate structures may help, but, fundamentally, better regulation comes from stronger laws, better-trained staff members, and better enforcement.

If effectiveness of supervision, as judged by the observance of various international standards and codes, is seen to be adversely affected, owing to weakness in specific areas (core principles), then the key issue for an assessor is the extent to which changes in the institutional structure could help overcome those weaknesses. If the lack of compliance with some of the core principles reflects either weak infrastructure or weak supervisory capacity of sectoral supervisors, then forming a unified supervisor may not be the answer. There is also additional risk that the existing weaknesses could be exacerbated by attempting to form a unified supervisory structure without addressing up front the problems at the sectoral level of supervisors. Moreover, when a change in institutional structure has been implemented, it is important to assess whether this change has adversely affected the quality of enforcement in a particular sector (e.g., because of a loss of skilled staff members in securities laws enforcement) or has weakened regulatory governance (e.g., because of weakened transparency or independence). The ultimate decision is fundamentally driven by the extent to which the financial services industry has integrated its functions and adopted centralized risk management.

With the emergence of mixed financial institutions, the case for unified agencies has strengthened as they more closely mirror the emerging structure of financial systems and the business of financial firms. Whatever decisions are made, it is important to recognize that a perfect institutional structure is a chimera, and it might be necessary to accept the inevitability of working within an imperfect structure.

Notes

1. This Appendix draws heavily on chapter 2 of Carmichael, Fleming, and Llewellyn (2004).
2. An important question is how to fit competition issues into the overall institutional structure of regulation and supervision and, in particular, the extent to which competition issues should be the responsibility of a supervisory agency or whether they should fall within the domain of an agency for competition policy for the economy as a whole. This issue has been the subject of much debate, and even controversy, and countries have solved this issue in a range of different ways.
3. For a recent discussion of the effect of regulatory governance on financial soundness, see Das, Quintyn, and Chenard (2004).
4. It may be noted that separation of macroprudential surveillance from microprudential supervision also occurs in some systems, such as Canada's, that are not explicitly based on a cross-sectoral approach.
5. In dollarized economies, such conflicts of interest are diminished because of the limited room for both lender of last resort and monetary policy operations. This reduced scope for conflicts might favor the case for having the central bank assume supervisory responsibilities.

References

Abrams, Richard K., and Michael Taylor. 2000. "Issues in the Unification of Financial Sector Supervision." MAE Operational Paper, International Monetary Fund, Washington, DC.

Briault, Clive. 1998. "A Single Regulator for the U.K. Financial Services Industry." *Financial Stability Review* 5 (Autumn): 19–25.

Brimmer, A. F. 1989. "Distinguished Lecture on Economics in Government: Central Banking and Systemic Risks in Capital Markets." *Journal of Economic Perspectives* 3 (2): 3–16.

Carmichael, Jeffrey. 2002. "Public Sector Governance and the Finance Sector." Ch. 5.in *Financial Sector Governance: The Role of the Public and Private Sectors*, ed. Robert Litan, Michael Pomerleano, and V. Sundararajan, pp. 121–62. Washington DC, Brookings Institutions Press.

Carmichael, Jeffrey, Alexander Fleming, and David T. Llewellyn. 2004. *Aligning Financial Supervisory Structure with Country Needs*. Washington, DC: World Bank.

Cukierman, Alex. 1992. *Central Bank Strategy, Credibility, and Independence*. Cambridge, MA: MIT Press.

Das, Udaibir S., and Marc Quintyn. 2002. "Crisis Prevention and Crisis Management: The Role of Regulatory Governance." In *Financial Sector Governance: The Role of the Public and Private Sectors*, ed. Robert Litan, Michael Pomerleano, and V. Sundararajan, pp. 163–208. Washington, DC: Brookings Institution Press.

Das, Udaibir S., Marc Quintyn, and Kina Chenard. 2004. "Does Regulatory Governance Matter for Financial System Stability? An Empirical Analysis." IMF working paper 04/89, International Monetary Fund, Washington, DC.

George, E. A. 1996. "Some Thoughts on Financial Regulation." *Bank of England Quarterly Bulletin* 36 (May).

Goodhart, Charles A. E. 1996. "Some Regulatory Concerns." *Swiss Journal of Economics and Statistics* 243 (4–2): 651–4.

Goodhart, Charles A., Philipp Hartmann, David T. Llewellyn, Liliana Rojas-Suárez, and Steven Weisbrod. 1999. *Financial Regulation: Why, How, and Where Now?* London: Routledge.

Goodhart, Charles A. E., and Dirk Schoenmaker. 1995. "Institutional Separation between Supervisory and Monetary Agencies." In *The Central Bank and the Financial System*, ed. Charles Goodhart, Ch.16, London: Macmillan.

Healey, Juliette. 2003. "Financial Stability and the Central Bank: International Evidence." In *Financial Stability and Central Banks*, ed. Peter Sinclair and Juliette Healy ed., 19–78. London: Routledge.

Heller, H. R. 1991. "Prudential Supervision and Monetary Policy." In *International Financial Policy: Essays in Honor of Jacques J. Polak*, ed. Jakob A. Frenkel and Morris Goldstein, 269–81. Washington, DC: International Monetary Fund.

International Monetary Fund, Financial Sector Assessment Program, The Kingdom of the Netherlands—Netherlands. 2004. "Technical Note: the Netherlands Model

of Financial Sector Supervision." International Monetary Fund, Washington DC. Available at http://www.imf.org.

Llewellyn, David T. 1998. "A Prospectus from the FSA: Its Approach to Regulation." *Journal of Financial Regulation and Compliance* (December).

———. 1999a. "The Economic Rationale of Financial Regulation." FSA Occasional Paper 1. London: Financial Services Authority.

———. 1999b. "Introduction: The Institutional Structure of Regulatory Agencies." In Neil Courtis, ed., *How Countries Supervise Their Banks, Insurers, and Securities Markets*. London: Central Bank Publications.

Luna Martínez, José, and Thomas A. Rose. 2003. "International Survey of Integrated Financial Sector Supervision." Policy Research Working Paper 3096. World Bank, Washington, DC.

Ministry of Finance of the Republic of Estonia. 2001. *Challenges for the Unified Financial Supervision in the New Millennium*. Tallinn, Estonia: Ministry of Finance of the Republic of Estonia.

Oosterloo, Sander, and Jakob de Haan. 2003. "A Survey of International Frameworks for Financial Stability." *Occasional Studies*, Vol. 1, No. 4. Amsterdam: De Nederlandsche Bank.

Sinclair, P. J. N. 2000. Central Banks and Financial Stability. *Bank of England Quarterly Bulletin* (November): 377–91.

Taylor, Michael. 1995. *Twin Peaks: A Regulatory Structure for the New Century*. London: Centre for Study of Financial Innovation.

———. 1996. *Peak Practice: How to Reform the U.K.'s Regulatory System*. London: Centre for the Study of Financial Innovation.

Taylor, Michael, and Alexander E. Fleming. 1999. "Integrated Financial Supervision: Lessons from Northern European Experience." Policy Research Working Paper 2223. World Bank, Washington, DC.

Thompson, Graeme. 1996. "Regulatory Policy Issues in Australia." In *Future of Financial System*, ed. Malcolm Edey, pp. 252–69. Sydney: Reserve Bank of Australia.

Appendix G

Banking Resolution and Insolvency—Emerging World Bank and International Monetary Fund Guidelines

G.1 Bank Insolvency Framework: Objectives and Scope

G.1.1 Objectives

In early 2002, the World Bank and the International Monetary Fund (IMF) in coordination with the Bank for International Settlements (BIS), Basel Committee on Banking Supervision (BCBS), Financial Stability Institute (FSI), Financial Stability Forum (FSF), and some regional financial institutions, launched the Global Bank Insolvency Initiative (GBII). Its main objectives are as follows:

- To identify the appropriate legal, institutional, and regulatory framework to address banks in distress (Bank Insolvency Framework)
- To progressively create an international consensus regarding the framework, including best practices and alternatives
- To design a methodology for the assessment of the countries' framework and to undertake voluntary country assessments as appropriate
- To facilitate the provision of technical assistance to countries for the improvement of their framework for addressing bank insolvency

G.1.2 Background

World Bank–IMF staff members have carried out a broad consultative process to prepare a draft report on the bank insolvency framework. A number of global and regional seminars, with participation of more than 90 countries, have been held as part of the GBII in

the past three years to ensure a wide consultation process, including countries from all regions of the world, as well as representatives for the regulatory and legal professions. A joint World Bank–IMF drafting team prepared successive versions of a report on bank insolvency in consultation with a Core Consultative Group (CCG).[1] Since mid-2004, a number of pilot country reviews of the institutional, legal, and regulatory framework to address bank insolvency have been carried out for a number of systemically and regionally important countries. After those pilot reviews, a revised version of the main report is expected to be circulated for the information of World Bank and IMF Boards.

G.1.3 Scope

The initiative aims to identify internationally accepted principles regarding the legal and institutional framework necessary to address cases of bank failures, starting at the point at which the authorities need to assume control of the bank for the purpose of rehabilitating or, where appropriate, liquidating it in a structured and orderly fashion. In particular, the report covers the following areas:

- The institutional arrangements necessary for dealing with bank insolvency
- General legal issues arising in bank insolvency proceedings
- The legal framework empowering the banking authorities to assume control of a distressed bank (either in the context of official administration or by way of other arrangements), which allows them to conduct the restructuring of an insolvent bank
- The principles applicable to the restructuring of insolvent banks, the special problems associated with different restructuring techniques, and the legal approaches that may be followed to deal with them
- The legal underpinnings and modalities of bank liquidation proceedings
- Modifications to the legal and institutional framework in the event of a systemic crisis

G.1.4 Links with the Basel Core Principle

The "efficient resolution of problems in banks" is mentioned in the Core Principles for Effective Banking Supervision (BCP) issued by the BCBS as one of the key preconditions for effective banking supervision. Other preconditions are jointly the sound and sustainable macroeconomic policies, a well-developed public infrastructure, an effective market discipline, and the mechanisms for providing appropriate systemic protection. In addition, earlier reviews of lessons from BCP assessments by World Bank and IMF staff members have recommended that, in view of their importance, adequate procedures for the resolution of problem banks should be made an integral part of the BCP assessments.[2] In addition, compliance with BCP 22 on remedial measures depends critically on a strong framework for bank insolvency.[3]

G.2 Key Institutional Aspects of the Bank Insolvency Regime

A set of key features of the broader legal and institutional environment for bank regulation and contract enforcement will affect the effectiveness of any bank insolvency regime. Many of those features are included as part of BCPs, and others may be viewed as part of the preconditions for effective supervision and robust bank exit policies. The features include the following:

- A clear legal framework for banking supervision, including operational autonomy of banking authorities, and specific decision making powers and procedures (part of BCP 1)
- Well-defined property and contractual rights (part of preconditions of BCP)
- Effective enforcement procedures (for expeditions and effective collection of claims and enforcement of security interests)
- Integrity and transparency of official decision making process

G.3 General Issues in Bank Insolvency Proceedings

G.3.1 Choice of Bank Insolvency Regime

The choice of legal arrangement should be conducive to achieving financial stability while also preserving the value of bank assets.[4] A primary choice must be made between a system based on the type of proceedings generally applicable to insolvent corporations, with any appropriate modifications,[5] and a special regime that is designed exclusively for banks.[6] A special regime for bank insolvency—or adequate modifications to the corporate insolvency regime—is needed because of (a) the potential systemic effects of bank failures, (b) the objective of safeguarding financial stability in the course of bank insolvency, and (c) the special role of banking authorities in bank insolvency.

The choice between the two systems has implications for the institutional framework for bank insolvency. There is no dominant model; countries share features of both systems to varying degrees. Either system—dominant general insolvency model with adaptations to deal with banks or special regime for bank insolvency—can work effectively.[7] A country's choice will depend on a variety of institutional, legal, and practical factors, including the quality and effectiveness of the country's existing corporate insolvency legislation, the ability of the insolvency courts to reach decisions in the short timeframe necessary for bank restructuring, the skills and integrity of the judiciary in comparison with the banking authorities, and the quality of supporting professions such as accountants and lawyers.

G.3.2 Administrative or Court-Based Special Bank Insolvency Regime

When a country seeks to address cases of bank insolvency through the corporate insolvency framework (with appropriate modifications), insolvency proceedings are invariably conducted in the courts. By contrast, the adoption of a special bank insolvency regime

separate from corporate insolvency law offers two main possibilities: first, the insolvency proceedings may be initiated and conducted by a banking authority, or, second, the proceedings may remain under the jurisdiction of the insolvency courts even if the banking supervisory authorities retain a number of key functions, which are, in most cases, related to the commencement and the supervision of certain key aspects of the proceedings.

In some jurisdictions, there would be significant opposition to the introduction of purely administrative proceedings. Constitutional principles may preclude any official action involving the removal or extinction of property rights, unless it is sanctioned by court order or accompanied by appropriate compensation. Where the supervisory authority is given the responsibility to declare insolvency and to control the administration or liquidation, the relevant administrative decisions are typically subject to judicial review by the administrative courts or an equivalent mechanism of control. Judicial review ensures the legality of the authorities' actions and avoids unjustifiable interference with private interests.

Overall, the establishment of a special bank insolvency regime (in particular, an administrative one) can be designed to ensure speed and consistency between the supervisory and insolvency-related functions. However, the success of such a system depends on careful legislative drafting and implementation, so it can ensure the greatest possible compatibility with other branches of the law, avoid distortions and arbitrage arising from the uneven treatment of banks and non-bank financial institutions, and resolve the problems of jurisdictional scope and institutional competence resulting from the emergence of financial conglomerates.

G.3.3 Commencement of Bank Insolvency Proceedings

Banking authorities have an informational advantage and are, thus, better placed than creditors to assess a bank's true situation and to detect insolvency at an early stage. It is, therefore, generally accepted that the supervisory authority must have the power to initiate insolvency proceedings against a bank.[8]

Many jurisdictions go further and grant to their supervisors exclusive competence to commence proceedings. Two justifications are usually put forward in support of this approach: First, the declaration of a bank's insolvency may have systemic implications, which the bank's creditors would fail to take into account. Second, the decentralized initiation of proceedings might allow frivolous or malicious creditors to initiate proceedings against solvent banks. In other countries, however, a bank's owners, management, or creditors also are entitled to bring proceedings before the insolvency courts on the usual grounds of corporate insolvency law. This approach seeks to preserve the rights of parties who have a financial stake in the bank to bring proceedings, and it assumes that the procedural requirements of court-based proceedings will provide sufficient safeguards against abuses. It also recognizes that those parties may ensure that insolvency proceedings are launched against insolvent banks even if the supervisors are unjustifiably reluctant to take action.

Where other parties are allowed to bring insolvency proceedings before the insolvency courts, the law should require prior consultation with the supervisory authority before proceedings are filed. Subsequently, the supervisory authority should be fully entitled to

participate in all stages of the proceedings. In particular, the authority should have a right to be heard before the original decision on the declaration of insolvency. The supervisory authority—or a member of its staff or other person proposed by the authority—could also be eligible for appointment as official administrator, liquidator, or both. The supervisory authority should be given full access to an insolvent bank's records. It should receive documents and notifications as if it were a creditor. It should be entitled to submit restructuring plans and other proposals to the court, raise objections to the proposals of other parties, and participate in all hearings and shareholders' or creditors' meetings. It also should retain the power to control the timing and manner (including the content) of public announcements relating to the original filing of proceedings and subsequent actions, as well as to take other appropriate measures (e.g., to declare a short "bank holiday") to enhance the quality and credibility of information available to the market and to prevent a crisis of confidence.

In an administrative system, where the commencement of insolvency proceedings takes the form of a decision of the supervisory authority, the law should grant to the bank's owners an opportunity to appeal against the decision to a special tribunal or to seek judicial review in the general administrative courts. In all cases, the available remedy should be specified in the legislation, and the procedure should be expeditious. It is, however, of singular importance that the exercise of any rights of appeal or review does not automatically lead to an interim restoration of the old owners and directors in the bank's management. It is also important that the system for the exercise of any right of appeal or judicial review should include safeguards for the avoidance of abuse by interested parties and should not result in the provision of interim relief by way of staying of the administrative proceedings.

G.3.4 Licensing Implication of Bank Insolvency

The law should clearly specify the relationship between the declaration of a bank's insolvency and its status as a licensed institution. In a number of countries, the withdrawal of an institution's banking license automatically results in its placement in liquidation. Elsewhere, this approach is considered draconian and unwarranted to the extent that it could lead to the mandatory termination of institutions that are not marred by criminality, that are otherwise solvent, and that could continue to operate as non-bank enterprises.[9] In some countries, it is the commencement of insolvency proceedings that triggers the automatic or discretionary withdrawal of the bank's license. However, the automatic withdrawal of authorization is not advisable unless the bank has already been placed in liquidation.[10] If liquidation proceedings have not been commenced and if an attempt is being made under official administration to restructure the bank, the loss of the bank's license could rule out many forms of open-bank restructuring.

Finally, some jurisdictions with court-based bank insolvency systems dissociate the decisions concerning licensing from the insolvency process. There, the power of the supervisor to revoke a bank's license operates in parallel to—and independently of—the procedure for declaring insolvency. Accordingly, the supervisory authority may seek to close an insolvent bank either by applying to the courts for its liquidation or by withdrawing its license.[11]

G.3.5 Rights of Shareholders and Creditors in the Context of Bank Insolvency

The survival of shareholders' governance rights can significantly complicate the search for an effective bank resolution. To avoid this eventuality, a sound bank insolvency regime can transfer control over the institution to the official administrator, in particular, through the suspension of the governance rights of shareholders. Where bank insolvency proceedings take place within the general framework of corporate insolvency law, the possibility of appropriate exceptions should be considered.

When official administration and liquidation are organized as distinct legal proceedings that are subject to separate rules, the commencement of liquidation will imply that the survival of the bank is no longer possible and will generally result in the outright termination of shareholders' governance rights (although shareholders will retain a residual, purely financial interest in the estate's assets, in the event that those assets prove sufficient for the satisfaction of all remaining liabilities).

By contrast, in the case of official administration (or of single-stream proceedings, in which rehabilitation and liquidation are alternative results), many legal systems seek to ensure that the restructuring will not be conducted in ways that violate shareholders' property rights, including their continuing stake in a potentially viable enterprise. For the same reason, some jurisdictions continue to recognize shareholders' governance rights during the official administration, even though this recognition can make the process more cumbersome and potentially inefficient. The property-rights-based rationale for the continuing participation of shareholders in the governance of an insolvent bank is stronger when the bank still has a positive net worth (e.g., because it has crossed the threshold of regulatory insolvency but is not insolvent in a balance-sheet sense). Nonetheless, to provide appropriate safeguards for shareholders' property rights without undermining the effectiveness of the insolvency proceedings, alternative solutions can be used.

For instance, the law could enable the official administrator to seek a special court order for the approval of restructuring plans if the consent of shareholders is not forthcoming. Alternatively, the official administrator could be empowered to formally invite shareholders to participate in the bank's recapitalization and to expel them only if they fail to do so in time. In any event, the recognition of any shareholders' rights in the context of official administration (including their preemptive rights of participation in the bank's recapitalization) should not affect the powers of the banking supervisory authority to take swift action as needed, including the power to decide on the fitness of large shareholders of banking institutions.

A more difficult question concerns the dilution or expropriation of the shareholders' financial participation in the bank as part of a restructuring plan that involves recapitalization with public funds, with outside private capital, or both. If the bank has a positive net worth, dilution or expropriation should not be done without compensation, whether at the time of the relevant action or at a later point. Nonetheless, because of constitutional or other considerations, dilution or expropriation—with or without compensation—may not be possible in some countries other than by order of an insolvency court. If dilution or expropriation is possible, the relevant corporate actions should be conducted in a legally secure way and should be based on an explicit ordering of potentially conflicting rules

so that the old shareholders do not have surviving claims on the restructured bank (e.g., under general rules of commercial or company law).

Whatever the domestic legal position, under no circumstances should shareholders' rights provide an excuse to allow shareholders to appropriate the benefits of outside financial support to an insolvent bank. For instance, when a bank is successfully restructured with public financial assistance, the old shareholders should not be restored (after the termination of the official administration) to ownership rights beyond the measure justified by the bank's net worth immediately before the commencement of the restructuring effort. To do otherwise would have the effect of transferring the value of the public assistance from the taxpayer to the bank's preexisting shareholders.

G.4 Official Administration of Banks

G.4.1 Definition

In this report, official administration of banks refers to those forms of insolvency proceedings in which an official authority (e.g., a court-appointed administrator, a banking authority, an administrator appointed by a banking authority) assumes direct managerial control of an insolvent bank, with a view to (a) protecting its assets, (b) assessing its true financial condition, and (c) then either conducting all the necessary restructuring operations or placing the bank in liquidation. Official administration continues until the institution has been restored to soundness or placed in liquidation.

G.4.2 Basic Principles

An effective framework for official administration needs to be built on a number of basic premises, including the following:

- *Speed:* The threat of bank insolvency needs a quick and decisive response.
- *Autonomy:* The official administrator must have sufficient autonomy in taking action.
- *Proportionality:* The powers of the official administrator need to be sufficient to protect creditors', depositors', and systemic interest while avoiding unnecessary interference with the property rights of owners.
- *Flexibility:* The option to close the bank and proceed with liquidation must never be excluded.
- *Accountability:* The broad powers of official administrator need to be balanced by transparency and accountability.
- *Professionalism:* The official administration should be conducted by experienced, fit, and proper official administrators, with specific experience in managing a bank.

G.4.3 Basic Elements of the Official Administration Regime

The report describes sound practices in relation to triggers for official administration and for the phases of official administration, including diagnosis and restructuring of insolvent banks. The report also discusses basic legal features of official administration:

- Appointment, replacement, and discharge of the official administrator
- Temporary protection against creditors' rights
- Protection of assets, containment of liabilities, and pursuit of claims
- Preparation of an inventory of assets and liabilities
- Decisions on restructuring or liquidation
- Cost of official administration
- Termination of official administration

Some of the principles to govern the framework for official administration are as follows:

- The law should identify which institution appoints a temporary administrator (for a limited time) and the rights and responsibilities of an administrator.
- The law should indicate the treatment of depositors during the temporary administration.
- The temporary administrator should have the authority to take over the day-to-day operations of the bank while the bank's financial conditions are being evaluated. During temporary administration, shareholder rights should be suspended.
- The temporary administrator should have sufficient authority to prevent asset stripping, to reverse asset transfers that have taken place just prior to suspension of the shareholders, and, in general, to keep credit discipline. The temporary administrator may also have authority to halt certain actions against the bank, pending the completion of due process.
- Shareholders may be able to protest the actions of the temporary administrator through the court system, but any appeal should not halt the resolution activities of the administrator.

G.5 Bank Restructuring

G.5.1 Definition

Bank restructuring is used in an economic sense to signify a set of actions designed to substantially modify the operations and financial structure of a banking institution. From a legal perspective, restructuring will, in some cases, result in the bank's survival as a legal entity, whereas, in other cases, the bank's legal personality will be dissolved—even if most of the bank's economic operations will continue (as a consequence, for example, of a merger or of a purchase-and-assumption operation).

G.5.2 Key Objectives

The purpose of restructuring is to ensure the continuation of the bank's business, in whole or in part, as an economic unit ("going concern") on a financially sound basis. A country's laws need to establish the objectives and basic principles to be followed by the authorities in restructuring a bank in the context of insolvency proceedings.

G.5.3 Basic Principles

Drawing on international experience and practices, certain principles for bank restructuring are outlined in the following paragraphs.

G.5.3.1 Limit Moral Hazard

In a sound and efficient financial system, only well-administered institutions should remain in business. It is not the role of authorities to prevent bank failure; rather their role is to facilitate the rapid exit of insolvent institutions from the financial system. Exceptions to this principle should be allowed only on the basis of justifiable considerations directly related to the stability of the financial system.

G.5.3.2 Least Cost Solution

In choosing between alternative schemes, the authorities should engage in restructuring operations that minimize restructuring costs. Restructuring costs are defined as the cost of recapitalization and of other operations by the government, after deducting the subsequent proceeds from re-privatization and asset recovery.

G.5.3.3 Expeditious Bank Restructuring

Insolvent banks should be restructured quickly to minimize the eventual costs to depositors, creditors, and taxpayers. The longer a bank or banking asset is held by an administrator, the more value it is likely to lose. Experience has shown that, if left unchecked, the restructuring of insolvent banks may drag on for a long time (especially in the context of a weak institutional environment). In countries where an official administration scheme exists, the relevant provisions should limit the time a bank under official administration is kept operating when no resolution scheme can be arranged.[12]

G.5.3.4 Operational as Well as Financial Restructuring

Bank restructuring must aim at addressing the causes, not just the symptoms, of bank insolvency. The new owners and directors of the bank must eliminate nonprofitable branches, must lay off redundant staff members, and must refocus the bank's business operations on profitable activities. Moreover, they must ensure that the bank complies with sound financial and prudential ratios. Thus, any restructuring scheme that allows an insolvent bank to survive as a separate entity should ensure that the bank is restored not only to solvency, but also and more important, to profitability so that it can operate on a sound basis over the medium and long term.

G.5.3.5 *Maintenance of Competitive Conditions*

Bank restructuring should not distort competition, subsidize failure, or penalize the more efficient banks in the system. This principle may be contained in competition law and enforced by the relevant authorities, though often in cooperation with the banking authorities.

G.5.3.6 *Accountability and Transparency of Process*

Bank restructuring should be carried out in a framework of fairness and transparency. Autonomous banking authorities should be held accountable for their actions. In particular, information should be made public about the rationale for important decisions, such as those involving the use and allocation of public funds, government assumption of control and ownership of a weak bank on systemic stability grounds (see section G.5.5 below for a discussion), the sale of banks to private investors, or the definitive closure and liquidation of insolvent institutions. Nonetheless, the authorities should retain sufficient flexibility to make decisions rapidly and without having to disclose relevant information in advance. In particular, they should be able to negotiate and implement in confidence certain actions, such as the sale of the bank under insolvency proceedings to a solvent acquirer or the transfer of its assets and liabilities to other institutions in the context of purchase-and-assumption transactions. In those cases, public disclosure of all relevant information should occur once the relevant transactions have been completed.

G.5.4 Bank Restructuring and Cases with Actual or Potential Systemic Implications

Although legislation should require the authorities to observe the principles whenever they deal with an insolvent bank, the law should also provide flexibility to the banking authorities to handle exceptional cases, such as bank failures with systemic implications that may cause disruptions or even the collapse of the payment and settlement systems, may trigger bank runs, or may cause other widespread disruptions in the financial system. If the authorities deem that the failure of a bank has serious systemic implications, they will need to use a restructuring technique that minimizes any systemic risks, even if some of the above principles cannot be fully observed.[13]

To prevent bank failures without systemic consequences from being treated as cases of a systemic nature, the law should establish the requirements that the authorities must comply with before they can use exceptional legal provisions.

G.5.5 Publicly Assisted Bank Restructuring

More recently, there has been broad international convergence on the principle that the discretionary, open-ended application of public funds to keep afloat insolvent banks and to make good their losses is unjustifiable. This practice transfers commercial losses to the taxpayer, validates bad bank management, and prevents the operation of the financial sector under conditions of market discipline and undistorted competition.

Generally, in situations of individual bank failure, no public funds should be used in the bank's restructuring or liquidation, except in relation to payments under state-guaranteed deposit insurance schemes. However, to facilitate the continuation of the viable part of insolvent banks on a going-concern basis and to minimize the cost of bank failure, the laws of some countries should authorize (or even require) that the deposit protection agency—or another agency with restructuring functions and powers—must provide limited financial assistance for the restructuring of insolvent banks in official administration. That provision must be to the extent that it is likely to result in a least-cost resolution from the perspective of the agency (as distinct from that of the bank or its stakeholders).

More specifically, a public agency may be empowered to assist bank-restructuring operations whenever the value of its assistance does not exceed, on its estimation, the amount that it would have to pay out against insured deposits in the event of closure and liquidation. The forms that the agency's assistance can take may vary and may include the subsidization of the sale of impaired assets, loss-sharing arrangements, or direct transfers of cash funds to the insolvent institution or its acquirers to absorb losses. Invariably, however, it will be aimed at making possible the bank's merger with a solvent institution or a purchase-and-assumption transaction, in circumstances where this change would not be commercially feasible otherwise.

A fundamental principle underpinning any type of publicly assisted bank restructuring is that recapitalization with public funds (accompanied by government assumption of control and ownership, or government approved restructuring plan) should be attempted only in situations where the bank's existing owners are made to absorb all accumulated past losses. This principle means that the shareholders' net position in the bank should be verified and recognized through appropriate write-downs of the own-fund items. For banks that are under insolvency proceedings and that are not yet completely insolvent in the balance-sheet sense, shareholders' participation in the restructured institution should be diluted. For balance-sheet insolvent banks, public funds should be forthcoming only after the shareholders have surrendered their shares or the shares have been otherwise eliminated in recognition of accumulated past losses. More generally, the shareholders should not gain any benefit from a bank's restructuring except to the extent that they have directly participated in its costs.[14]

G.5.6 Main Restructuring Techniques and Basic Applicable Principles

The guidelines include the appropriate treatment of the legal issues involved in different bank restructuring techniques, such as mergers or acquisitions, good-bank and bad-bank separation, bridge banks, and purchase-and-assumptions transactions. Key legal issues include the following:

- Need for supervisory approval of the restructuring
- Mechanisms to protect property rights and dilute shareholders' rights
- Rules for negotiations with prospective investors
- Rules affecting the transfer of assets and liabilities
- Rules on the use of a bank's proprietary information

The key principles to govern the legal and regulatory framework for bank restructuring are as follows:

- The agency responsible for bank resolution should be clearly identified. The rights and responsibilities should be clearly described.
- The treatment of shareholders must be clearly laid out in the law. In principle, shareholders who do not participate in the recapitalization of the bank should lose their investment in the bank. Shareholders participating in the bank's recapitalization must first be judged to be "fit and proper."
- Actions that can be taken in bank resolution must be described in the law and could include bank mergers, sale of the bank, and purchase and assumption of bank assets (which may include a branch network) by another bank.
- If the authorities wish to establish an asset management company to manage some portion of the nonperforming loans of problem banks, explicit legal authority must be established, including how the assets will be transferred, what the valuation is of transferred assets, what the problem bank will receive in exchange, and what the methods are for asset workout.
- If an agreement is reached with a majority of the creditors of the bank to share in the restructuring and recapitalization costs, a minority of creditors should not have the ability either to prevent such actions or to avoid participating (there should be a "cram down" provision.)

G.6 Bank Liquidation

In liquidation, an insolvent bank is dissolved after a liquidator assumes legal control of its estate, collects and realizes its assets, and distributes the proceeds to creditors—in full or partial satisfaction of their claims—in accordance with the principle of equal (pari passu) treatment of similarly situated creditors and the applicable rules on priority. Liquidation will be appropriate if the bank's restructuring does not appear feasible or if the restructuring involves the spinning off of the viable operations of the bank, thus leaving only its residual, nonviable part with the original legal entity. On the commencement of liquidation and until the final act of dissolution, the bank will continue to exist as a legal entity but will no longer be a going concern. However, bundles of assets may be sold as part of a business, rather than on a piecemeal basis, to ensure the maximization of their economic value.

The primary objective in a liquidation is to ensure the preservation and optimal collection of the bank's assets so that creditors (including depositors) receive as much as possible of what is owed to them. Effective bank liquidation presupposes that the legal system provides satisfactory answers to certain special problems, which may not be present in a non-financial firm. Accordingly, a jurisdiction must have a complete legal framework in place to handle the liquidation of banks. The absence of such a framework will not only result in disorderly closure of individual insolvent banks but also increase the risk of spillover effects, with potential systemic implications.

In particular, the liquidation framework should comprise clear rules for formally placing the insolvent bank in liquidation, terminating its banking activities, and assigning to a qualified agency the tasks related to the liquidation of its estate. With regard to the latter, the liquidation framework must contain provisions that ensure immediate and effective protection of the assets, including an automatic moratorium or suspension of all collection activity against the bank to prevent a race between creditors for the seizure of assets and to ensure the orderly realization of assets and equitable distribution of proceeds. It is also of vital importance that the rules provide sufficient flexibility to enable the liquidator to achieve the realization of assets in the most cost-effective way and that they ensure that proceeds are distributed to the various classes of creditors (including depositors) in a fair and transparent manner, which does not violate their relative priority. Some of the key principles to govern the legal and regulatory framework for bank liquidation are as follows:

- Bank shareholders must be held responsible for the losses of the bank. When a bank is found to be insolvent, the supervisory agency must be in a position to write down shareholder equity and to eliminate shareholder rights.
- The supervisory agency should be given the responsibility to establish the list of qualified liquidators.
- The supervisory authority must have the right to appoint a bank liquidator to replace the shareholders. The bank liquidator must have the authority to sell all or part of the bank's assets including branches.
- The law must determine the priorities for distributing resources from asset sales among creditors.

G.7 Key Features of the Legal Framework in the Context of Systemic Crises

Despite the fact that systemic banking crises and their resolution are qualitatively different from individual cases of bank insolvency, there are at least two benefits to having in place an adequate legal and institutional framework to address bank insolvency in normal times for managing systemic banking crisis situations:

- First, a good legal and institutional framework could play a mitigating role. A legal framework that comprises many of the critical principles discussed in this report could allow the authorities to ensure that weak-bank problems or insolvency cases are addressed before they can cause systemic problems.
- Second, if the legal and regulatory framework is adequate enough to handle single bank failures, the same framework also could provide a basis for the implementation of most operational aspects of a restructuring strategy, thereby smoothening and expediting the systemic bank restructuring phase.

Nonetheless, modifications to both the legal and institutional framework may still be needed (and in most cases are) to deal with systemic crises. Modifications to the legal framework would help address (a) special institutional arrangements for systemic

crisis management (e.g., bank restructuring agency), (b) the need for coordination and exchange of information among all government agencies (e.g., high-level financial stability policy committee), (c) clear legal authority to take the measures that may be required, (d) systemic bank restructuring, (e) asset management and resolution, (f) general conditions and key legal issues for the use of public funds, (g) financial instruments and techniques, (g) role of the central bank, (h) reestablishment of regulatory compliance after a crisis, and (i) treatment of depositors. However, changes to the institutional framework, which would be needed at times of crisis, should be temporary and should respect the basic institutional structure of the country's governmental arrangements.

Notes

1. The CCG consisted of 20 country representatives and representatives from all the international financial institutions involved, as well as a few independent experts. Its main task was to review and provide comments on the different versions of the main report to ensure that a basic level of international consensus is reflected in the report. The World Bank Board considered the report at a technical briefing in January 8, 2004.
2. See IMF (2002b).
3. A recent IMF study (IMF 2004a) concluded that insufficient legal basis, ineffective enforcement, forbearance, limited range of measures available, and excessive court intervention have been factors that impede appropriate compliance with BCP 22 by a significant number of countries. This study highlighted the importance of developing a strong bank insolvency framework. The GBII would help in fostering such a framework.
4. An effective bank insolvency framework should enable the resolution of a troubled bank in a way that (a) does not unduly increase moral hazard and, thus, maintains market discipline; (b) does not unduly raise the risk of contagion; and (c) avoids the unnecessary destruction of the value of the bank's assets.
5. In jurisdictions where the general insolvency legislation is also applied to banks, the law in most cases requires a special role for the banking regulatory authorities in relation to the commencement of the proceedings. In some countries, the special role of the banking regulatory authorities includes the appointment of a trustee or liquidator or other key aspects of the proceedings.
6. Because one of the main arguments for the appropriateness of having a special regime for banks is frequently predicated on the need to give special protection to deposits from the general public, in many jurisdictions, the special insolvency regime is not applied to non–deposit-taking financial entities.
7. For example, the United Kingdom has no special statutory regime to address insolvency of financial institutions. They are subject to the same formal insolvency procedures as unregulated companies, but the law allows for exceptions to grant the Financial Services Authority various rights in insolvency proceedings and does not allow banks certain rescue or rehabilitation procedures that are available to small unregulated companies. Together with other powers of Financial Services Authority and Financial

Services Compensation Scheme, the system provides an effective insolvency regime. (See IMF Country Report No. 03/46 on UK).

8. Depending on whether the jurisdiction follows the court-based or the administrative approach, the supervisory authority will need to either petition the insolvency court or declare the insolvency itself in the form of an autonomous decision in public law.
9. In certain jurisdictions, however, the justification for automatic liquidation as a consequence of de-licensing will be precisely that banks are organized as special-purpose companies and would not constitutionally be able to continue operating as non-bank entities.
10. In countries in which banks are subject to special liquidation proceedings, logic requires that the automatic withdrawal of an institution's banking authorization as a result of the commencement of liquidation proceedings should not affect its continuing characterization as a bank for the purposes of these proceedings.
11. In some cases, the supervisory authority retains the discretionary power to withdraw the license even after the commencement of insolvency proceedings. It would be clearly anomalous, however, if a supervisory authority were permitted to use this power to effectively veto a restructuring plan that it was unable to oppose successfully before the insolvency court.
12. In many cases, countries with a weak institutional environment have encountered serious problems in implementing any scheme of official administration whereby banks are kept open. In those cases, it may be desirable to implement the restructuring operations in an extremely quick manner to avoid loss of value of insolvent banks' assets.
13. For example, in some cases with clear systemic implication, emergency assistance involving the use of public funds may be needed, and it may be unavoidable to go over the least-cost principle, especially when it has been formulated in a very rigid manner. Nevertheless, in those special cases, a decision-making process that ensures proper assessment of the systemic consequences involved and that properly limits the moral hazard effects is needed. For example, provisions requiring a previous joint pronouncement from the highest authorities involved could be necessary before any kind of exception to the general norms could be made.
14. One reason why publicly assisted restructuring may not be effectively carried out by means of voluntary transactions outside the formal bank insolvency framework is that once the shareholders become apprised of the likelihood of assistance, they will be unwilling to approve the dilution of their own interest in the bank and will hold out for some additional benefit.

Appendix H

Assessment of Pension Schemes from a Financial Sector Perspective

A pension plan is a long-term financial contract that promises to pay a retiring worker a sum of money intended to support old age consumption (Mitchell 2002, p. 2). Pension plans are generally classified as either a defined contribution (DC) plan or a defined benefit (DB) plan. Those two plans have significantly different characteristics. In a DC plan, the sponsor promises to periodically deposit a specified contribution into the plan (e.g., per pay period), which is then invested in capital market instruments of various risk levels. An individual's total pension is based on amount contributed, length of employment, and investment return. By contrast, a DB plan is based on a promise by the sponsor to pay the retiree a specified benefit, usually based on the employee's wage plus the length of service. In that case, the market risk associated with the investment returns is borne by the employer (sponsor), who must set aside sufficient funds to pay the promised benefits. In a DC scheme, market risk is borne by the employee.

Hybrid pension schemes that have the features of a DB plan but require a greater sharing of risks by beneficiaries (as in DC schemes) are emerging in several countries, partly in response to rising costs of DB plans in an environment of increasing longevity of retirees. Similar to traditional DB plans, the employer or trustee invests the plan assets and typically bears some of the investment risk. At the same time, the employee has an individual account—a notional account maintained for record-keeping purposes—and receives the account balance at separation as a lump sum or annuity, thereby assuming more longevity risk.[1]

Pension plans can be either funded or unfunded. In funded plans, pension liabilities are paid out from the accumulated assets. Essentially, benefits are paid out from a fund built over a period of years from the contributions of its members (i.e., on the basis of accumulation of financial assets), plus investment income. Most DC plans are funded.

Unfunded pensions also are financed directly from the contributions of the plan provider or sponsor, the plan's participant, or both, but unlike funded schemes, they are not fully backed by assets to pay the future promised benefits, although they may still have associated reserves to cover immediate expenses (Yermo 2002). Generally, in unfunded schemes, resources are transferred directly from the currently working generation to the retired generation. For example, in pay-as-you-go (PAYG) schemes, contributions by present workers through payroll deductions are used to pay the current benefits of retirees.

National pension systems are usually represented by a multi-pillar structure, whereby the sources of retirement benefits are a mixture of government, employment, and individual savings. Although there are various definitions, the three pillars can be identified by their sources of savings as follows: Pillar I is the government, usually a combination of a universal entitlement and an earnings-related component; Pillar II is occupational (employer) pension funds, increasingly funded; and Pillar III is private savings and individual plans, often tax advantaged.[2]

The assessment of pensions from the perspective of financial sector stability focuses on the financial management and financial markets aspects. The assessment process cannot follow a strict framework, in part because pension systems vary greatly across countries and are marked by different contribution and payout characteristics. Accordingly, each assessment is guided by the individual country's level of pension system development. The process is further complicated by the fact that pensions are intrinsically complex forms of long-term savings linked to capital markets, insurance, and social security (Whitehouse 2002).

H.1 Assessment Framework

Despite the cross-country variations, assessments typically cover the following:

- *Structure and Performance of the Pension Sector:* number and types of providers; portfolio compositions; investment regimes; asset growth; gross and net rates of return; fees, costs, and profits; payouts and replacement ratios; coverage of the labor force; and contribution to capital markets development
- *Regulatory Framework:*[3] pension laws, licensing criteria, governance structures, accounting and auditing rules and practices, custodian rules and arrangements, disclosure, investment regulations, outsourcing regulations, and the voluntary pension system
- *Supervisory Framework:* approach to supervision (proactive vs. reactive), legal status and internal structure of the supervisory agency, regulatory and enforcement powers of supervisor, ability to carry out early interventions, and relationship with other supervisors

Within the assessment of the structure and performance of the pension sector, the focus on the effect on capital markets development is of great importance. Pension systems also have significant effects on poverty alleviation, labor markets, fiscal soundness, fairness and adequacy, and intergenerational and intra-generational redistributive effects, but those issues are typically beyond the scope of the financial sector assessment.

H.2 Importance of Regulating and Supervising Pension Systems

Effective oversight of pension systems is an integral component of financial sector stability because of the social, fiscal, and global financial ramifications of pension fund management. Sections H.2.1 to H.2.4 highlight the following considerations:

H.2.1 Income and Household Security

Pensions provide a critical source of income security for workers in their retirement years. The pensions are often long term in nature (60 years or more). The significance of well-managed and well-regulated funds extends beyond the elderly to current workers, who contribute on the basis of an expected future revenue stream. In addition, the increasing transition from DB to DC and to hybrid plans, plus the decrease in state pensions, bears financially on the household sector, which is now more exposed to retirement risks (e.g., investment, market, longevity). Therefore, to date, much of pension fund regulation has focused on the protection of pensioner and employee rights.

Effective oversight in this regard is predicated on ensuring that individual investors have confidence that their savings are secure.[4] Notably, trust and confidence on the part of both participants toward the integrity of the provider—be it government or a private entity—are essential components of a well-functioning system. A sound regulatory and supervisory framework can also significantly enhance pensioner security by increasing the long-term security of the funds, ensuring efficiency, and providing considerable freedom of choice in planning options.

H.2.2 Issues of Funding

As populations mature, the relative size of pension liabilities and the related investment risks have grown accordingly and have, in many instances, exceeded expectations. Consequently, greater attention is being called to managing and maintaining funding levels and to meeting payment obligations, which is reflected in greater emphasis on regulatory and supervisory structures.

H.2.3 Fiscal Management

If one considers the risks of politically motivated misallocation of funds and the fiscal implications of mismanagement, regulatory and supervisory attention must be given to publicly managed funds (see section H.3 below).

H.2.4 Financial Markets

The focus on ensuring the soundness of pension sectors also attests to their growing role in, and influence on, global financial markets. The effect of pension funds on the stability of financial markets is transmitted in a number of ways, most notably through their investment behavior. The pension fund sector, especially in Organisation for Economic Co-operation and Development (OECD) countries, is an investor class on its own whose global size and

projected growth means that it can unilaterally move markets through any reallocation of funds. Known as institutional investors, pension funds (along with insurance companies) hold not only tremendous amounts of domestic and international fixed income but also equity assets.

There is no uniform approach to pension supervision, only fundamental elements that guide the oversight framework in many countries. Those prudential and protective rules encompass the following:

- Establishing a "fit and proper" test for funds and managers
- Segregating, diversifying, and performing a valuation of assets
- Imposing checks and balances on fund governance, custodians, actuaries, and auditors
- Guaranteeing extensive disclosure and high transparency on the part of funds through regular financial reporting (on a quarterly basis)
- Ensuring the financial soundness of funds, sometimes by imposing restrictions on certain investments and asset holdings
- Protecting beneficiaries from misconduct and misallocation of funds
- Establishing strong supervisory capacities for financial analysis and frequent inspection, as well as providing an early action tool to contain losses and to protect members
- Shielding supervisors from political pressure

H.3 Regulation and Supervision of Public and Government Pension Funds: Risks and Regulatory Responses[5]

Public pension plans are schemes, social security or similar, whereby the government administers the payment of pension benefits. The basic goal is to provide benefits for the population at large. Traditionally, public plans have been PAYG, although some countries have prefunded pension liabilities or private plans.

Oversight of government-run plans is required for numerous reasons, particularly the fiscal implications of mismanagement. The risks associated with DC schemes managed by the public sector arise namely from the government's control over a large pool of funds. Such control can be problematic because those funds are frequently subject to political manipulation and pressures to, among other things, increase benefits, lower contributions, and hide problems. Moreover, government officials can be tempted to direct the investment of such funds either into government securities to help fund the budget or into politically attractive projects, disregarding the interests of pension investors. Risks also arise when fund management is outsourced to the private sector, including the possibility that the funds will not be optimally managed.

Under-funded pension systems can impose a heavy fiscal burden. Recent Financial Sector Assessment Programs have found that many government plans are under-funded and sometimes insolvent. The main culprit is the mismatch of funds, whereby often generous benefits are not matched by adequate contributions. Short working years and early

Table H.1. The Core Principles of Occupational Pension Regulation (OECD 2004)

1.	Conditions for effective regulation and supervision	• Legal and regulatory framework should be comprehensive and flexible to protect soundness of pension plans and overall stability. • Financial Market infrastructure should be developed to support diversified investments of pension funds.. • The regulatory framework should promote a level playing field between different operators and not impose excessive burdens on pension markets, institutions or employers
2.	Establishment of pension plans, pension funds, and pension fund managing companies	• Pension funds must meet proper legal, accounting, technical, and financial criteria. • A clear statement of pension funds objectives, parameters, responsibilities, and beneficiaries rights needs formal documentation. • Pension plan assets need to be legally separated from the assets of plan sponsor.
3.	Pension plan liabilities, funding rules, winding up, and insurance	• Adequate funding of pension liabilities is required for defined benefit pension plans. • Appropriate calculation methods to measure liabilities and value assets, including actuarial techniques are necessary. • Proper winding-up mechanisms must be put in place to recognize creditors' rights and to ensure payment of contributions due from employers in the event of insolvency.
4.	Asset management	• Proper disclosure is necessary for valuation of pension assets. • Pension fund governing body should be subject to prudent person standard. • Pension funds must mitigate risk by imposing portfolio limits that maintain the proper diversification of assets. • Self-investment and investment abroad should be prohibited. • A governing body is required to set and follow investment policy.
5.	Rights of members and beneficiaries and adequacy of benefits	• There should be nondiscriminatory access to private pension schemes, regardless of age, race, salary, gender, and terms of employment. • The portability of pension rights and beneficiary protection should be ensured in the event of early departure. • Adequate disclosure and education should be given to a beneficiary with regard to fee structure, plan performance, and benefit conditions.
6.	Supervision	• Effective supervisory bodies need to be established with appropriate powers to conduct on and off -site supervision and examine individual plans when relevant. • The supervisory body should have comprehensive investigatory and enforcement powers to obtain relevant data, take action to ensure compliance, impose sanctions, and initiate matters for criminal prosecution.

Source: OECD (2004).

retirements, which are common and sometimes encouraged, contribute to the mismatch problem.

A range of appropriate regulations can be established to oversee public pensions:

- Profitability rules (or minimum return requirements) can be imposed on private suppliers to reduce the risk that the funds will under-perform the industry average. This regulation also reflects the moral obligation imposed on a government to ensure an adequate pension income for individuals with no control over their investments.
- Restrictions on portfolio composition of pension funds can ensure a high probability that their performance will fall within a narrow range.
- A guarantee fund can be established to supplement shortfalls.
- A strong government commitment is needed to the disclosure of both the composition and performance of the portfolio.
- A strong and publicly disclosed set of internal governance standards should be required.
- Public pension schemes must show a commitment to regular audit for compliance and efficiency by an independent audit agency.

- Public pension schemes must report against publicly agreed benchmarks for performance.

Strong regulatory standards are also necessary for DB schemes to ensure that the promise of a specific payout is honored, especially when management is privatized or contracted to the private sector. Regulation usually takes the form of periodic actuarial reviews of the funds to assess the capacity of the fund to meet its payment obligations.

H.4 Regulation and Supervision of Private Funds

Private pension plans are schemes administered by an employer, a pension entity, or a private sector provider. They may either complement or substitute for social security systems and may include plans for public sector workers (Yermo 2002, p. 3). The regulation and supervision of privately run pension funds is equally as important as that of public plans and increasingly so as more countries move toward a mix of public and privately run plans. In addition, governments have moved toward contracting out the investment arm of their pension programs to private fund management companies.

Privately managed or independent funds rely heavily on professional asset management. As such, "trust" in the integrity of managers and the solvency of funds is fundamental to securing the confidence of both sponsors (government, private company) and employees that their retirement savings are not mismanaged (Carmichael and Pomerleano 2002). Accordingly, the focus of supervision is on ensuring high transparency plus strong reporting and conduct rules.

The primary regulatory tools for managing private pensions are (a) licensing requirements to ensure the high quality of asset managers, (b) disclosure standards, (c) governance standards, and (d) minimum capital requirements (Carmichael and Pomerleano 2002, p. 113). Because the investment decision is out of the control of employees, the strength of the regulations regarding investment regimes and their enforcement is particularly relevant.

The OECD, recognizing the importance of protecting pensions provided by employers, developed guidelines for regulation, which are summarized in the following paragraphs.

Occupational pension plans have raised regulatory concerns, because of the inherent risk they bear from their exposure to capital market volatility. Any unexpected declines in equity or bond prices have the potential to cause significant losses in a fund, thereby posing serious threats to a worker's expected retirement funds. The rise in occupational pension schemes has called attention to requiring greater accountability on the part of private entities. In recognition of those risks, the OECD has established the six Core Principles of Occupational Pension Regulation (see table H.1). The goal of those recommendations is to mitigate the risk of pensioners and to provide standards for the funding of company pension schemes.

H.5 Regulatory Oversight

The methods of pension regulation and supervision differ across countries, reflecting individual national standards and structures. For example, some OECD countries have

established independent, separate pension fund supervisory agencies. Elsewhere, pension funds can fall under the insurance regulator, a universal financial services supervisor, or the ministry of finance. Nevertheless, despite country differences, there are broadly two models of supervision: proactive and reactive.

- Proactive supervision involves detailed specification of the activities of pension fund managers, as well as tight supervision and audit to enforce the rules.
- Reactive supervision allows for a greater degree of self-regulation within the sector.

Supervision can cover institutional controls (authorization and licensing of managers and funds); financial tasks (e.g., ensuring financial reporting, valuing portfolios, and supervising restrictions on asset holdings); membership; and benefits controls (e.g., enrollment, marketing and transfer between funds, and monitoring the calculation of entitlements).

Concern over insufficient regulatory attention to solvency and risk management issues has directed focus on greater risk-based supervision and on greater attention to asset–liability management by pension funds. For example, several pension guarantee funds take portfolio risks into account when establishing premiums. In some countries, risk-based capital or funding requirements have been introduced into the pension system.[6] The OECD Core Principles of Occupational Pension Regulation propose principles related to the full funding of pension schemes and the enhancement of portability.

H.6 The Regulation of Investment Regimes[7]

The means by which investment regimes, and thus asset allocation, related to public and private pensions are regulated will vary across and within countries (e.g., each individual U.S. state has its own investment regime). Regulatory (and tax) constraints on investment behavior and national funding rules significantly influence pension fund strategies. For example, in the case of Chile,[8] the pension sector is regulated by a highly complex investment regime, with limits by instruments, instrument characteristics, issuers, and issuer types. By comparison, the investment regime for pension funds in OECD countries is considered relatively much simpler.

OECD countries are typically classified in two groups, adhering to either the prudent man rule or the quantitative restrictions regime. The former states that pension funds should manage their portfolios as a prudent man, implying a proper diversification of the portfolio and few direct restrictions. The lack of restrictions is countered by a heavy reliance on the presence of competent and honest managers to ensure the implementation of relevant standards, as well as on the assurance of an adequate level of ability and integrity. This assurance requires the development of strict criteria comparable across firms or of legislating criteria regarding the expertise of fund managers. Prudent man rules also require that greater financial and legal responsibility be attached to any imprudent action by corporate officers. Such rules can vary across countries, sectors, and companies, but the OECD recommends a flexible general framework that can be applicable across borders.

A quantitative restrictions regime involves direct restrictions on the portfolio, both by instrument and user, including foreign asset and concentration limits. Despite variations across countries, general principles for the regulation of investment portfolios have been articulated by OECD (2000). The purpose of regulation is to ensure both the security and

the profitability of the funds invested. Basic principles of portfolio management focus on (and differentiate between) both assets and liabilities, especially asset–liability management (ensuring that liabilities are sufficiently covered by suitable assets). Another important principle is that they differentiate between each institution, thus taking a comprehensive view of each institution's structure and the range of risks to which it is exposed.

Basic standards of portfolio management outlined by the OECD include the following:

- Diversification (between categories) and dispersion (within a given category) of assets
- Maturity matching (including a liquidity principle) of assets and liabilities
- Currency matching applied comprehensively (derivatives can be used in this regard)
- Pension assets invested primarily in long-term securities that provide for a prudent risk–return profile
- Schemes managed in a way that is consistent with the risk tolerance profile of stakeholders

Quantitative restrictions outlined by the OECD include the following:

- No minimum level of investment should be placed on the portfolio, except on an exceptional and temporary basis.
- Maximum levels of investment by category may be justified on prudential grounds, in which case it may be advisable to
  - allow firms to exceed such conditions under certain circumstances,
  - differentiate between maxima and allow ceilings to be exceeded on the basis of that differentiation, and
  - take account of how such investments are valued and of the actual effect of that valuation.
- Investment in an asset must be limited to a proportion of the fund's total portfolio and even restricted if that asset involves special risks.
- Certain categories of investments may need to be strictly limited (e.g., loans without appropriate guarantees, unquoted shares, and company shares that raise risks of conflict of interest).
- Limits should be placed on investments by insurance companies and pension funds in companies or on investments holding a large volume of such categories of assets.
- The use of financial derivatives as management instruments may be useful or effective if done prudently and in accordance with established rules that ensure consistency with appropriate risk management systems.
- Appropriate and compatible accounting methods may be set up so that information on investments is sufficiently transparent.

H.7 Government Guarantee Funds[9]

In several countries, government guarantee funds have been established to ensure DC private pension plans. The goal of such guarantees is to reduce an individual's exposure to

investment and other risks associated with private plans and to diversify the risk of pension fund failures among the general population of pension plans. In developing countries, especially in Latin America where they have sprouted, government guarantee schemes have helped to ease the transition from government sponsored DB plans to privately run DC plans. It is expected that guarantee funds will grow in importance as more countries shift to greater emphasis on private plans.

Government pension guarantees, as illustrated by the practices in the Latin American region, have commonly been of two forms:

- A guarantee that ensures that each DC fund earns an annual rate of return greater than a pre-specified minimum
- A guarantee that directly ensures each individual return on pension savings, rather than the guarantee on each pension fund (guarantees that participants receive a minimum benefit payment throughout their retirement years, even if their retirement savings are exhausted)

Nonetheless, the structure of government pension guarantees varies across countries. The United States, Germany, and Switzerland have long-standing institutions to insure pension benefits. For example, in the United States, the key role of the Pension Benefit Guarantee Corporation, whose funds are contributed by private firms, is to ensure private pension plans and to protect the retirement benefits of workers whose companies fail or go out of business. In Chile, by contrast, the government has established a minimum pension guarantee that promises to keep pension benefits above a certain level. Only workers who have contributed for at least 20 years are eligible, and the guarantee is intended to reduce the risk that workers will outlive their savings.

The presence of insurance funds is not without inherent risks, including moral hazard and poor design and operation. For example, a fund may carry an investment portfolio similar to that of covered pension funds, which can limit its ability to act in times of crisis. The use of more risk-based elements in the design of guarantee funds, such as risk-based premiums would reduce moral hazard.

Notes

1. See Green (2003), Francis (2004), Johnson and Steuerle (2003), and Scheiber (2003), for a discussion of hybrid plans.
2. For a discussion of various types of pension systems, see Yermo (2002) and Carmichael and Pomerleano (2002).
3. Analyzing the regulatory framework depends heavily on the level of government involvement in pension provision.
4. Several recent corporate failures have underlined the importance of transparency and the diversification of pensions fund assets, regardless of type (e.g., the collapse of U.S.-based Enron saw the loss by workers of their entire occupational pension savings, which had been invested largely in company stocks. Losses are estimated between US$5 billion and US$10 billion. The employees were encouraged to buy stocks, which were hugely overpriced and were based on false financial statements that grossly inflated earnings.)

5. This section is based on Carmichael and Pomerleano (2002), pp. 115–17.
6. For an interesting case study in the development of a risk-based capital system, see the IMF (2004) box 3.4 on the Netherlands, p. 104.
7. Investment strategies are typically based on the size and depth of domestic capital markets, as well as access to international capital markets, which is important for diversification and possibly higher rates of return. Size and depth of markets determine the availability of instruments of varying risk, return and maturity, and liquidity characteristics. In many developing countries, shallow capital markets result in heavy investment in government bonds and bank deposits.
8. Chile's pension fund sector, one of the most developed among emerging markets, is a fully funded system operated by the private sector (which insulates it from political pressures). The Chilean investment regime includes limits specified for each instrument, each class of instrument (variable and fixed income), different combinations of instruments and also sub-limits, depending on risk, liquidity, characteristics, and company age. The limits by issuer are divided into three main categories aimed at (a) portfolio diversification, (b) restricting investments in related companies, and (c) limiting ownership concentration.
9. Section is based on Pennacchi (1998).

References

Carmichael, Jefferey, and Michael Pomerleano. 2002. *The Development and Regulation of Non-Bank Financial Institutions*. Washington, DC: World Bank.

Green, L. Bernard. 2003. *What Is a Pension Equity Plan?* Washington, DC: U.S. Department of Labor.

Francis, David. 2004. "As Pensions Fade, Some Firms Try Hybrid Plans." *Christian Science Monitor*, October 25, 2004.

International Monetary Fund. 2004. *Global Financial Stability Report*. Washington, DC: International Monetary Fund.

Johnson, Richard, and Eugene Steuerle 2003. "Promoting Work at Older Ages: The Role of Hybrid Pension Plans in an Aging Population." Pension Research Council WP 2003-26. The Wharton School, University of Pennsylvania, Philadelphia, PA. Available at http://rider.wharton.upenn.edu/~prc/PRC/WP/WP2003-26.pdf.

Mitchell, Olivia. 2002. "Redesigning Public Sector Pensions in Developing Countries." Pension Research Council WP 2002-9, The Wharton School, University of Pennsylvania, Philadelphia, PA.

OECD. 2000. *Selected Principles for the Regulation of Investments by Insurance Companies and Pension Funds*. OECD: Paris.

———. 2004. *Recommendation on Core Principles of Occupational Pension Regulation*. OECD: Paris.

Pennacchi, George. 1998. "Government Guarantees on Pension Fund Returns." WB Social Protection Discussion Paper No. 9806, World Bank, Washington, DC.

Scheiber, Sylvester J. 2003. "The Shift to Hybrid Pensions by US Employers." Pension Research Council Working Paper 2003-23, The Wharton School, University of

Pennsylvania, Philadelphia, PA. Available at http://rider.wharton.upenn.edu/~prc/PRC/WP/WP2003-23.pdf.

Whitehouse, Edward. 1999. *Pension Reform Primer—Supervision: Building Public Confidence in Mandatory Funded Pensions*. Washington, DC: World Bank.

Yermo, Juan. 2002. *Revised Taxonomy for Pension Plans, Pension Funds and Pension Entities*. A Paper prepared for the OECD Working Party On Private Pensions, OECD (October 2002): Paris.

ECO-AUDIT

Environmental Benefits Statement

The World Bank is committed to preserving endangered forests and natural resources. We have chosen to print *Financial Sector Assessment: A Handbook* on 30% post-consumer recycled fiber paper, processed chlorine free. The World Bank has formally agreed to follow the recommended standards for paper usage set by the Green Press Initiative—a nonprofit program supporting publishers in using fiber that is not sourced from endangered forests. For more information, visit www.greenpressinitiative.org.

The printing of these books on recycled paper saved the following:

Trees*	Solid Waste	Water	Net Greenhouse Gases	Electricity
46	2,158	19,575	4,239	7,872
*40' in height and 6–8" in diameter	Pounds	Gallons	Pounds	KWH