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Analytical Tools of the FSAP

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I. INTRODUCTION

1. **This paper focuses on the experience with stress testing and the assessment of standards and codes in the FSAP.** Section II of the paper summarizes the main findings of a review of stress tests in 28 FSAPs, including in six industrial countries. Based on this experience, the paper discusses lessons, progress, and issues going forward. Section III summarizes the experience with the assessment of standards and codes in the FSAP. It builds on recent Board reviews of the individual standards and codes, presents a focused review of the experience with the assessments to date, and draws lessons and conclusions based on the collective experience with the assessments of the various standards and codes.

2. **Progress made on FSIs will be discussed in a paper on Financial Soundness Indicators (FSIs) scheduled for discussion by the Fund Board in mid-2003.** FSIs play an integral role in the assessment of financial sector vulnerabilities that is carried out in the FSAP. They also provide a common set of indicators to be continuously monitored, thereby helping to strengthen surveillance and monitoring of financial sectors following FSAP assessments, including in Article IV consultations. They are intended to complement macroeconomic indicators, which also help to identify risks to financial stability. FSIs may also be used to monitor the impact of policy action. In the FSAP context, the analysis of FSIs is becoming increasingly integrated with the stress testing exercise. For example, recent work done on FSAPs has shown how FSIs can help the interpretation of stress tests by providing an indication of deterioration in financial conditions associated with a change in FSIs of a given size. At the same time, stress tests can provide a basis for interpreting—benchmarking—future movements in FSIs.

II. STRESS TESTING IN FINANCIAL SECTOR STABILITY ASSESSMENTS: EXPERIENCE, PROGRESS, AND ISSUES GOING FORWARD

A. Introduction

3. **The exercise of stress testing is a key component of FSAPs conducted to date. Stress tests carried out in the context of the FSAP aim to assess key risks and vulnerabilities arising from macro-financial linkages by assessing the impact of exceptional but plausible shocks to key macroeconomic variables on the soundness of the financial system.** The findings supplement the FSAP analyses that use a number of other tools to analyze financial sector systemic risks and vulnerabilities. Stress tests also serve as a useful tool for the country authorities—the supervisory authorities and financial stability policymakers—as they highlight risk measurement and management both at the individual financial institution level and at the systemic level.

4. **The value-added of stress tests derives importantly from a consultative process between the FSAP mission and country authorities and integrates a forward-looking macroeconomic perspective, a focus on the financial system as a whole, and a uniform approach to the assessment of risk exposures across institutions.** They differ from the

institution-specific stress tests conducted at large financial institutions in advanced financial systems. The latter are designed to measure portfolio- and institution-specific risk exposures. As a result, the specifications of stress scenarios could vary considerably across financial institutions.¹ In contrast, stress tests conducted in the FSAP apply a common set of scenarios based on discussions with the authorities on macroeconomic and market risks. This uniform approach to stress tests across institutions facilitates the aggregation of results and provides comparable information on risk profiles across financial institutions. It therefore helps FSAP missions identify *systemic* risk exposures, rather than focus on individual institutional risk.

5. **The stress testing exercise in the FSAP has developed into a multi-step process of assessing key risk exposures in a financial system.** The process begins with a consultation with the country authorities on potential macroeconomic and market risks that helps the mission form preliminary hypotheses about the risk exposures. Potential risk exposures are identified based on macroeconomic risks, an analysis of the sector's FSIs, and other information and models that the supervisory authorities might be using. Stress tests are designed to evaluate the impact of these risks by mapping macroeconomic shocks into implications for key asset prices such as interest rates, exchange rates, and stock prices. The effect of the macroeconomic shocks on key FSIs is then traced to evaluate the resilience of the system to these shocks. The selection of FSIs reflects, *inter alia*, discussions with country authorities, a preliminary examination of institutions' risk exposures, which can be based on financial stability reports produced by the authorities, discussions with market participants, and surveys on stress tests conducted by financial institutions.²

6. **On this basis, stress tests are implemented by:** (i) identifying potential risk exposures and vulnerabilities in the system; (ii) identifying the data required and its availability; (iii) calibrating the scenario or shocks to be applied to the data, based on identified exceptional but plausible shocks; (iv) selecting and implementing the methodology; and (v) interpreting the results. The exercise is focused on a few important questions that are intuitive and easy to explain.

7. **Stress tests have continued to evolve.** The majority of stress tests have included single-factor sensitivity analysis based on historical extreme values, although an increasing number have also applied scenario analyses, using multiple techniques to determine the size of shocks. The involvement of the authorities has expanded beyond merely providing data to being actively involved in designing and implementing stress tests in the recent FSAPs. Moreover, recent FSAP assessments in industrialized countries have aimed to improve the

¹ For a survey on stress tests practices at large financial institutions, see Committee on the Global Financial System, *A Survey of Stress Tests and Current Practice at Major Financial Institutions*, Basel (April 2001).

² For more details see Paul Kupiec, *Stress Testing and Financial Sector Stability Assessments: A Basic Recipe for an FSAP Stress Test*, 2002, MAE memorandum.

effectiveness of stress tests through the use of macroeconomic models, the analysis of contagion resulting from interbank exposures, the involvement of major financial institutions in the stress testing exercise, and a closer cooperation with the authorities on the formulation of scenarios and implementation.

8. **It is recognized that a “one size fits all” approach for carrying out stress tests is inappropriate**, as it is often necessary for the missions to tailor the stress tests to country-specific circumstances, complexity of the financial system, and data availability, while also being mindful of the resource burden imposed on the central bank and supervisory authorities. The degree of accuracy in the quantification of risk exposures by a stress test depends critically on data availability and the institutional capacity in measuring risk. **Simpler stress tests should be used in countries with smaller or less complex financial systems, where the sources of risks to bank balance sheets can be more readily assessed and measured at an aggregate level.**

9. **Building on a broad range of experience, the Bank and the Fund have also intensified efforts to further improve the exercise through internal training seminars, involvement of external experts, and ongoing research efforts.** In addition, a staff-level working group has been established to promote good practices and to provide guidance on the design and implementation of stress tests to FSAP teams.

10. The remainder of this section is organized as follows. Section B summarizes the experience with the stress tests that have been conducted to date. Section C reviews the usefulness and limitations of stress tests. Section D discusses progress and issues moving forward.

B. The FSAP Stress Testing Experience

11. **This section summarizes the main findings of a review of stress tests in 28 FSAPs, including those in six industrial countries.** The review is based on an internal survey on stress testing sent to Fund FSAP mission chiefs in the summer of 2001, and an internal Fund survey on the experience with the FSAP in general conducted in early 2002. A summary of the results is included in Tables 1–4.

Types of risks and analytical techniques³

12. **FSAP missions pointed to data availability and the degree of sophistication of the financial systems as two key factors in determining the approach taken by the FSAP**

³ For a description of each type of risk and analytical techniques, see Blaschke W., Matthew T. Jones, G. Majnoni, and S. M. Peria, *Stress Testing of Financial Systems: An Overview of Issues, Methodologies, and FSAP Experiences*, 2001, IMF Working Paper, WP/01/88.

mission to determine risk exposure for various types of shocks. Table 1 summarizes the main areas of risk studied and the analytical techniques used.

13. **Interest rate risk** was analyzed in 25 cases using a variety of techniques including maturity gap, duration, value at risk, and earnings at risk. Reflecting data constraints, maturity buckets and gap analysis (based on the weighted-average maturity of the assets and liabilities) were used in most cases. In five cases, where data on maturity buckets or duration was not available, income statement data to calculate simple earnings at risk were used.

14. **Exchange rate risk** was analyzed in 24 cases, half of which calculated the impact on net open foreign exchange position for individual institutions or for groups of banks. The impact was calibrated in terms of effect on capital. Regressions and Monte Carlo simulations to determine the effect of exchange rate changes on credit quality (non-performing loans) were applied in ten missions.

15. **Credit risk** was examined in 26 cases using a number of techniques. More than half, especially in developing countries applied a direct shock to the stock of non-performing loans. In six cases, the sensitivity of unexpected credit losses was examined with regression analysis of the impact of future potential macroeconomic shocks on the behavior of non-performing loans. Four missions analyzed credit risk in the banking sector by examining the impact of changes in the extent of provisioning on bank solvency.

16. **Liquidity risk** stress tests were conducted in only four cases. These examined the impact on liquidity using various definitions of liquid assets. Assumptions were often made about the extent of liabilities that would need to be re-paid without notice and the types of assets that could be considered liquid. The ability of FSAP missions to adequately examine liquidity risk was limited by the unavailability of appropriate data to conduct the exercise.

17. **Equity and/or real estate price risk** were examined in 13 cases. In most cases, equity price risk stress tests were conducted for *general* market risk, i.e., risk related to a major change in the overall stock market, usually a market crash scenario. Five missions (mainly in industrial countries) used a mark-to-market approach to evaluate the effect of changes in stock and real estate prices.

18. **Commodity price risk** was measured in four cases, notably in developing countries where trade in commodities is important. Scenarios were based on assumptions about commodity price shock and historically observed large changes.

19. In addition to the above listed risks, some missions conducted stress tests for **other types of risks** such as a slowdown in GDP growth, shocks to key sectors in the economy (such as the information technology and computer exports or the forestry sector), losses in the value of collateral requiring more provisions, and changes in the value of government bonds.

Table 1. Summary of the FSAP Stress Testing Experience: Analytical Techniques 1/

	Number of FSAP assessments
<i>Interest Rate Risk</i>	25
Repricing or maturity gap analysis	6
Duration	5
VaR	3
Earnings at risk	5
Others (e.g., change in net present value of balance sheet, change in market value of bank capital, regressions and simulations)	6
<i>Exchange Rate Risk</i>	24
Sensitivity Analysis on the Net Open Position	12
VaR	2
Others (e.g., regressions and simulations)	10
<i>Credit Risk</i>	26
Non-performing loan (NPL) based analysis (unexpected credit losses)	14
historical NPL	6
ad hoc NPL migration	8
Provisioning adjustment (i.e., increase provisioning for incurred credit losses)	4
Others (e.g., shocks to banks' loan portfolio, elasticity of NPLs, simulations, regressions)	8
<i>Liquidity Risk</i>	4
Ad hoc adjustment in liquidity ratio	1
Historical	1
Others (regressions and simulations)	2
<i>Equity Price and Real Estate Price Risk</i>	13
Shocks to main stock market index	6
Changes resulting from marking to market	5
Others (change in loan-to-value ratios and mortgage default rates)	2
<i>Commodity Price Risk</i>	4
Ad hoc	2
Historical	1
Others (regressions and simulations)	1
<i>Other Type of Risk</i>	7
Change in Information Computer Technology (ICT) exports	1
Shocks to forestry sector	1
Losses in value of collateral	1
Mark to market change in govt. bond value	1
Changes in GDP growth	3

1/ The table is based on responses from MAE mission chiefs for 28 FSAP assessments. Some missions used more than one technique for testing a type of risk. Accordingly, the numbers under each risk category do not necessarily add up to the total in each category.

Scope and methodology

20. **The coverage of stress tests largely depended on country-specific circumstances, the complexity of the financial system, and data availability.** (Table 2 summarizes the coverage of and methodologies used in the FSAP stress tests.) Eleven missions focused on the whole banking sector on a bank-by-bank basis, while in another ten cases only systemically important institutions were covered. Some missions performed stress tests for all banks aggregated. Nine missions focused on domestic banks only. In four industrial-country FSAPs where the major financial institutions were financial conglomerates, stress tests were applied to each of the consolidated groups as a whole, incorporating the activities of their nonbank subsidiaries such as non-life insurance. Such a complex exercise was possible because it was conducted in collaboration with financial institutions utilizing these institutions' own risk data and models.

21. **Most of the FSAPs conducted stress tests only for the banking sector, although they addressed systemic risks that nonbank financial institutions (NBFIs) may cause in other analyses conducted in the FSAP.** Only seven FSAPs included stress tests for NBFIs. In these cases, stress tests were conducted mostly on insurance companies and, in some cases, on mortgage and finance companies. The coverage of NBFIs ultimately depended on data availability. However, in many cases, the decision not to stress test NBFIs was made after discussions with the authorities concluded that nonbank financial institutions did not pose any systemic risk to the operation of the financial system, e.g., through a possible disruption to the payment system, or through contagion effect.

22. **All stress tests involved one or more of the following types of analyses:** (i) *sensitivity analysis*, which seeks to identify the vulnerabilities of the financial system to changes in individual financial variables, such as interest rates, exchange rates, and equity prices; (ii) *scenario analysis*, which seeks to assess the resilience of the financial system to scenarios that entail simultaneous changes in a number of macroeconomic variables, which are then mapped into implications for financial risks; and (iii) *contagion analysis*, which seeks to assess the impact of a shock transmitting from an individual financial institution to the rest of the financial system.

23. **The majority of stress tests conducted a series of single factor sensitivity analyses that measure the impact of the shock associated with one financial variable at a time.** About half of these attempted to capture the second order effects by allowing feedback between variables, for example, assessing the impact of a devaluation on the quality of credit. In terms of the type of shocks, stress tests generally focused on the impact of shocks in interest rates, exchange rates, equity prices, real estate prices, and credit quality. Real estate price shocks were applied to four of the six industrial countries.

Table 2. Summary of Stress Testing Experiences: Scope and Methodology 1/

	Number of FSAP assessments
<i>Coverage of Stress Tests</i>	
1. What was the coverage of the test?	
All banks, aggregated	5
All banks, by peer group	3
All banks, bank by bank	11
Only systemically important banks	10
Local activities of the bank	
Domestic banks only	9
Domestic banks and subsidiaries of foreign banks	6
Domestic banks, and branches and subsidiaries of foreign banks	4
Local and foreign activities of domestic banks on a consolidated basis	3
Consolidated banking group (including nonbank financial subsidiaries)	4
Local market only:	2
Including overseas subsidiaries:	2
<i>Stress Tests for Other Financial Institutions</i>	
2. Were stress tests prepared for financial institutions other than banks?	
No	21
Yes	7
Insurance Companies	5
Others	2
<i>Sensitivity Analysis</i>	
3. Was sensitivity analysis conducted on a single variable?	
interest rates:	25
exchange rate:	23
equity prices:	7
commodity prices:	4
real estate prices:	6
nonperforming loans:	22
other (please specify): 2/	12
2. Did the single variable sensitivity analysis allow for second order effects?	
Yes	12
No	16
<i>Scenario Analysis</i>	
3. Was scenario analysis conducted?	
No	10
Yes	18

Table 2. Summary of Stress Testing Experiences: Scope and Methodology 1/
(continued)

<i>Contagion Analysis</i>	
4. Were aggregate stress tests calculated which sought to take account of the contagion from individual exposures to vulnerabilities in the financial system as a whole?	
No	25
Yes	3
<i>Size of Shocks</i>	
5. Please specify how the size of the shock(s) to the variables were determined:	
ad hoc—give range of percentages	14
statistical analysis of time series—please specify the methodology	6
historical event or extreme value	18
other	3
<i>Data set used</i>	
6. What was the data set used? Please list the main elements:	
Balance Sheet and Income Statement	15
Maturity Structure of Assets and Liabilities	5
Exchange rate, Interest rate, NPLs, equity price, and real estate price	25
Liquidity, Provisioning	8
Regulatory and Prudential data, , data on market and credit risk	6
off-balance sheet exposures and market exposures	4
Macroeconomic variables (e.g. GDP growth)	4
<i>Model Calibration</i>	
7. How were the results calibrated?	
In terms of the equity of the bank:	12
In terms of BIS Capital (tier 1 and tier 2):	19
In terms of the profitability of the bank:	3

1/ The table is based on responses from MAE mission chiefs for 28 FSAPs. Some missions used more than one approach indicated under each category. Accordingly, the number of FSAP under each category does not necessarily add up to 28.

2/ Other variables include government bond prices, liquidity ratios, interest income, and exposures to non-financial sectors, emerging markets, and interbank markets.

24. **More recently, in addition to sensitivity analyses, an increasing number of stress tests have used scenario analysis in which the effects of multiple simultaneous shocks were estimated.** Two types of scenario analysis have been applied. One allows for the interaction of several plausible shocks simultaneously. For example, the scenario used could involve a simultaneous change in equity markets and exchange rates with corresponding movements in domestic interest rates and a deterioration in domestic credit quality, although the changes were not driven by any underlying model. The second approach models the changes based on some underlying assumptions regarding a plausible political, economic, or financial crisis. The hypothesized crisis guides the magnitude of the potential market changes, which are then transposed into balance sheet and profit and loss estimates for the relevant financial institutions. Three missions applied scenario analysis using macro models to calibrate the size of changes to financial variables resulting from a hypothetical macroeconomic scenario, for example, a prolonged decline in real growth.

25. **Mainly due to data limitations, most stress tests did not formally quantify contagion risk among institutions, although FSAP reports have commented on the possible importance of contagion risks.**⁴ Only three recent FSAP missions (Gabon, Luxembourg, and Sweden) conducted contagion analysis. For example, where data on interbank exposures were available, the Swedish and Luxembourg FSAP stress tests incorporated contagion analysis to estimate the impact of a bank's settlement failure on other banks' liquidity and capital.

26. **Eighteen FSAPs based their stress tests on extreme historical events, using past data to calibrate the size of shocks.** The second common type of test was based on hypothetical scenarios, of which fourteen missions used ad hoc size of shocks and six established shock size based on statistical analysis of historical time series. Three FSAPs used Monte Carlo simulations.

27. **An analysis of stress test scenarios and the size of shocks for each type of risk shows marked variations across missions (see Table 3).** For interest rate risk, the size of shocks ranged between 50–300 basis point increases in interest rates. One mission assumed a 3 standard deviation change in interest rates. For exchange rate risk, the range of appreciation or depreciation of the exchange rate varied between 10–50 percent. For credit risk, the size of shocks ranged between 5–30 percent increases in nonperforming loans. Such variations in the size of shocks reflected country-specific circumstances based on the missions' consultations with the authorities.

⁴ Contagion analysis is very difficult to conduct properly with available techniques. Currently, FSAP missions work through the contagion channels in a mainly qualitative sense.

Table 3. Summary of the FSAP Stress Testing Experience: Scenarios and Size of Shocks

Types of shocks	Types of Scenarios Used	Size of Shocks
<i>1. Interest Rate risk</i>	<ul style="list-style-type: none"> • Ad hoc or hypothetical interest rate increase • Parallel shift in yield curve • Historical interest rate increase • Basel Committee Amendment to Capital Accord to incorporate market risk 	<ul style="list-style-type: none"> • 3 standard deviations of 3-month changes • 50%–100% increase • three-fold increase in nominal rate • 100 basis point shock to interest rates • 100 basis point shock to dollar interest rates and a concomitant 300 basis point shock to local currency interest rates • 300 basis point increase
<i>2. Exchange Rate Risk</i>	<ul style="list-style-type: none"> • Ad hoc or hypothetical devaluation • Historical large exchange rate changes 	<ul style="list-style-type: none"> • 20%–50% devaluation • 30% devaluation • 10% depreciation • 20% depreciation/appreciation • 40% depreciation/appreciation of Euro/Dollar exchange rate
<i>3. Credit Risk</i>	<ul style="list-style-type: none"> • Ad hoc or hypothetical assumptions about the extent of under-provisioning, the future pattern of NPLs, and the size of macro shocks that could affect the value of bank's capital and loan portfolio • Observed historical shocks • Monte Carlo simulations of shocks • increase in arrears • NPL migration • loan misclassifications 	<ul style="list-style-type: none"> • 50% increase in domestic lending • 5% increase in NPLs • 10% of commitments called and considered loss; 50% of substandard becomes doubtful, 5% of "watch" becomes substandard, and 1% becomes watch • after 90 days 20% migration of current loans to watch loans, 100% from watch to substandard, 100% from substandard to doubtful, 50% from doubtful to loss. • 50% loss on watch loans, 100% on all other NPLs. • An estimate of underprovisioning was made by reclassifying all loans to specific debtors to the lowest classification level in the system • 2.5% increase in ratio of classified loans in combination with 10% depreciation and 300 bps increase interest rate • 30% increase in NPLs in combination with 100% provisioning and with 86% provisioning

28. **The scope of the data used varied significantly among stress tests, whereas the calibrated output was similar.** The quality and the availability of data reflected to a great extent the state of risk management of the financial system and the financial institutions in that system. For example, while the information on balance sheets and income statements was generally available, it was often difficult, especially in less developed countries, to find available risk data such as default frequency and maturity mismatches of assets and liabilities. As for the results, in most cases, stress tests results were calibrated in terms of the book value of the bank's capital and/or capital adequacy, after calculating the estimated changes in asset values.

Operational modalities

29. **The modeling and computing capacities of the supervisory authorities and the mission team, as well as the scope of available data, are crucial for the effective implementation of the stress tests.** Table 4 summarizes the operational modalities of the FSAP stress tests. In two FSAPs, where the major financial institutions have employed sophisticated risk measurement techniques internally, their cooperation allowed the FSAP to feed the common scenarios through the banks' internal risk data and models, thereby optimizing the information flow and possibly the quality of the results.

30. **In most cases, stress tests were conducted by using data provided by the authorities. However, the actual involvement of authorities and institutions in the exercise varied.** Fewer than half of the FSAP missions selected the stress testing scenarios and the size of shocks together with the authorities. Although this finding reflects the lack of institutional capacity in many developing countries, it suggests that there is room for improvement in involving the authorities in the exercise of stress testing. In this regard, recent FSAPs have had a closer cooperation with the authorities on the formulation of scenarios and implementation.

31. **Countries' prior experience (especially experiences with macro models and risk evaluation models) with similar types of stress test exercises appeared to be limited.** Only two countries, Mexico and Luxembourg, regularly conducted stress tests prior to the FSAP stress tests. More recently, following their FSAP experience, a number of countries (e.g., Finland, Hungary, and Poland) have started to update the stress tests conducted in the FSAP on a periodic basis and have included them in their financial sector surveillance programs.

Table 4. Summary of the FSAP Stress Testing Experience: Operational Modality 1/

	Number of FSAP assessments
<i>Authorities' prior experience with stress tests</i>	
1. Prior to the FSAP stress testing, have the national authorities conducted similar stress tests regularly? 2/	
Yes	2
No	17
<i>Selection of scenarios</i>	
2. Who selected the scenario(s)?	
The mission alone	7
The mission in collaboration with the authorities	11
The mission in collaboration with area departments	5
<i>Selection of shocks</i>	
3. Who decided on the size of the shock(s)?	
The mission alone	13
The mission in collaboration with the authorities	9
The mission in collaboration with area departments	9
<i>Implementation</i>	
4. Who performed the calculations?	
The mission based on bank specific data provided by the authorities?	22
The mission based on a model provided by the authorities?	2
The authorities?	6
The individual financial institutions?	2
Other (please specify)	1

1/ The table is based on responses from MAE mission chiefs for 28 FSAPs. Some missions used more than one approach indicated under each category. Accordingly, the number of FSAP under each category does not necessarily add up to 28.

2/ This item is based on responses received from 19 FSAPs.

C. Usefulness and Limitations of Stress Tests

32. **As part of the learning experience with stress tests, recent FSAPs have made improvements in the design and implementation of the stress tests in a number of areas.** Examples of stress tests in developing (Gabon), emerging market (Mexico), and industrialized (Sweden) economies are presented in Box 1.

33. **The continued improvement in the implementation of the stress tests depends importantly on feedback, both within the Fund and Bank and from the authorities of the member countries.** In addition, data and methodological limitations have led FSAP missions to increase the emphasis on the role of consultation with country authorities in formulating sensitivity tests and scenarios, and in discussing potential risk exposures of the financial system as a way to further improve the usefulness of the exercise.

34. **Feedback from the outreach indicates that countries' experience with the stress tests has been generally positive.** It was agreed that stress tests served as a useful vehicle for the mission and the country authorities to approach various issues from different perspectives, and that stress test results provided a meaningful cross check with the findings on the vulnerabilities indicated by the analyses made elsewhere in the FSAP. In addition, while a number of countries viewed shocks used in FSAP stress tests as extreme, two country authorities noted that when stress events had actually occurred in their countries after the FSAP, the magnitude of actual stress was close to or even larger than the scenarios used in the FSAP.

35. **Almost all country authorities emphasized that more effort should be made to conduct early discussions with the authorities on the stress testing methodology, data requirements, and scenarios.** It was also agreed that the quantitative results of the stress tests should not be overemphasized in the FSAP in light of data limitations and the difficulty in formalizing the macro-financial linkages or the linkages within a financial system.

36. **Feedback received from FSAP mission leaders and area department and region mission chiefs indicates that they viewed stress tests as an effective tool in bringing out the linkages between macroeconomic developments and the financial sector,** and the methodologies used and scenarios selected were adequate in taking into consideration the structure and the degree of development in the financial sector (Table 5). Acknowledging the value of updating stress tests for future Article IV consultations, the Fund's area departments consider it useful to encourage the authorities to perform stress-tests on an ongoing basis.

37. **Experience with stress tests suggests that it is more important for a stress test to aim to identify the likely significance of losses in a systematic and intuitive manner than to attempt to quantify the magnitude of losses with "scientific" accuracy.**⁵ Limitations in

⁵ For more details see Paul Kupiec, *Stress Testing and Financial Sector Stability Assessments: A Basic Recipe for an FSAP Stress Test*, 2002, MAE memorandum.

methodology and data were cited as the main impediments to a more effective implementation of the stress tests in the FSAPs. The absence of a macro/financial sector model in many countries has precluded the stress tests from explicitly taking into account the interaction among shocks. In addition, four types of data limitations have been encountered: (1) the lack of basic balance-sheet data, especially in countries where supervisory systems were underdeveloped; (2) an inability of the existing data reporting systems to isolate the desired exposures in a financial institution, especially in the case of large and complex financial institutions (LCFIs); (3) the lack of risk data (e.g., duration or default measures), especially in countries where the financial institutions' risk measurement techniques are underdeveloped; and (4) confidentiality issues—limitations on what the authorities can legally share with the mission. When confidentiality issues have arisen, FSAP missions have requested the authorities to conduct the stress testing based on agreed assumptions and methodologies and to share the results in a form that was sufficiently informative of risk exposures but did not breach confidentiality laws or protocols.

38. **The current stress testing methodology, which relies almost exclusively on balance-sheet data, has serious shortcomings as regards the assessment of the risk exposures of complex institutions with substantial derivatives positions.** These risks cannot be assessed adequately because stress tests, and particularly sensitivity analyses, largely do not take account of the effects of derivatives positions. Even the direction of exposures to financial shocks derived from balance-sheet positions can be misleading because off-balance-sheet positions can qualitatively and quantitatively alter on-balance-sheet risk exposures. For example, open net foreign exchange exposures could be hedged, more than offset, or even amplified by the use of derivatives. Similarly, in light of the substantial credit derivative activities of some large institutions and risk transfer between different sectors of the financial system domestically and internationally, it is not clear where credit risk ultimately resides.

Box 1. Stress Tests in the FSAP: Selected Country Experiences

Gabon: Among the developing countries, the recent FSAP to Gabon exhibited an improvement in the design of stress tests in a number of areas. The mission consulted with the authorities and commercial banks on data requirements and on the selection of scenarios and the size of shocks. In conducting the scenario analysis, the main focus was to explore the linkages between macroeconomic developments and the financial sector by examining the effect on commercial banks' solvency or liquidity of various types of risks. These included the effect on banking sector liquidity as a result of a government default on domestic debt payments arising from low oil production, and the effect on bank solvency resulting from an increase in loan defaults as a result of a negative shock to the forestry sector or a devaluation of the local currency. The mission also performed contagion analysis to measure the risk stemming from a reduction in oil production by tracing its effect on the government's ability to service its debt (which is a function of oil income) and the corresponding impact on commercial banks' income. Main findings from the stress tests suggest that, in some institutions, minimum regulatory solvency ratios were low and even relatively small shocks to macroeconomic variables could place individual institutions at risk. However, with limited domestic interbank exposures, there was no indication of contagion risk across banks. Although data limitations confined stress tests to simple calculations, they were viewed useful for providing some quantification of perceived vulnerabilities and anchoring the discussions with the authorities.

Mexico: Mexico is one of the few countries where the national authorities (the Bank of Mexico and the National Banking and Securities Commission) performed stress tests prior to the FSAP mission. The mission relied on feedback from the authorities on the stress testing methodology and data requirements. Stress tests were conducted on the aggregate banking sector and examined the potential losses of the sector as a result of extreme macroeconomic events such as a decline in the rate of economic growth, liquidity shocks, external debt spreads, and shocks to international capital flows. Scenario analysis was based on the probability distribution of each of the risks (at the 10, 5, and 1 percent significance levels) and also on extreme historical events (e.g., the Tequila crisis and the Russian crisis). The credit risk analysis was performed using regression analysis (i.e., using a Generalized Vector Autoregression model) to examine the impact of macro shocks on credit quality. The results of the stress tests showed that a scenario combining a significant and prolonged slowdown in the U.S. economy and a depreciation of the peso would have a large affect on the banking system's capital and profitability. There was a low probability, however, for this to result in a systemic banking crisis as the banking sector was well capitalized and has become more resilient in recent years. The mission found that the stress testing exercise was extremely useful in bringing out the linkages between macroeconomic development and the financial sector and in assessing the resilience of the banking system to a variety of shocks.

Sweden: The FSAP to Sweden benefited from substantial involvement of the authorities and the individual financial institutions both in formulating and implementing the stress testing exercise and in conducting contagion analysis on interbank exposures. The mission took new initiatives in developing a preliminary basic framework for designing the stress test scenarios for four major financial groups with substantial cross-border activities. The nonbank financial institutions of the groups were stress tested as part of the consolidated groups. However, due to data limitations and the lack of appropriate methodology in specifying shocks relating to the foreign exposures of the groups, only domestic shocks were specified. In stress testing credit risk, the Riksbank's macroeconomic model was used to help calibrate the macro variables that were then used to estimate credit loss using regression analysis. Stress testing of the four major financial groups indicated that they were robust to equity and real estate price shocks, as well as to shocks to exchange and interest rate shocks, and to a temporary economic slow down. However, a combination of these shocks would represent significant challenges for their life insurance subsidiaries, and a prolonged economic downturn could lead to vulnerable capital positions, especially if the economic slow down had an impact on a major counterparty of the groups. Since the groups have fairly large concentrations of exposures to each other and to certain common counterparties, the contagion risk was found to be high. The results of stress tests were useful in identifying risk exposures of major banks. The mission suggested that further improvement in measuring credit risk can be made with better data at the institution level, such as data classifying loans by industry.

Table 5. Summary of the FSAP Stress Testing Experience: Usefulness 1/

Questions and Answers	Number of FSAP assessments
<i>Reason for conducting stress tests</i>	
1. What was the main reason for conducting the stress test?	
To corroborate weaknesses already identified:	15
To identify weaknesses:	19
Other (please specify):	3
<i>Adequacy of Scenarios 2/</i>	
2. Were the scenarios used for stress testing adequate?	
Yes	12
No	3
Can't Judge	5
<i>Macroeconomic linkages</i>	
3. How do you evaluate the usefulness of the exercise in bringing out the linkages between macroeconomic developments and the financial sector? 3/	
High	11
Medium	9
4. Was the stress testing exercise useful in bringing out the linkages between macroeconomic developments and the financial sector? 4/	
Yes	10
No	6
Can't Judge	5
<i>Contribution to overall vulnerability assessment</i>	
5. Did the stress test factor in the overall vulnerability assessment?	
Yes	16
Can't judge	12
<i>Usefulness of the FSAP stress tests</i>	
6. Please comment on the usefulness of the stress tests as part of the FSAP/FSSA exercise.	
High	24
Medium	4
7. Was the methodology used in stress testing adequate in taking into consideration the structure and the degree of development in the financial sector? 5/	
Yes	13
No	2
Can't Judge	
<i>Update of FSAP-ST</i>	
8. Based on the experience in the FSAP, are you likely to replicate the stress testing exercise on your own (i.e., w/o MAE assistance) in the future Article IV consultations for the country? 2/	
Yes	7
No	13

1/ The table is based on responses from MAE mission chiefs for 28 FSAPs, unless noted otherwise. Some missions used more than one approach indicated under each category. Accordingly, the number of FSAP under each category does not necessarily add up to 28.

2/ Based on the responses from area department mission chiefs for 20 FSAPs.

3/ Based on the responses from area department mission chiefs for 19 FSAPs.

4/ Based on the responses from area department mission chiefs for 21 FSAPs.

5/ Based on the responses from area department mission chiefs for 13 FSAPs.

D. Progress and Issues Moving Forward

39. **More emphasis has been given in recent FSAPs to involving the authorities in the implementation of stress tests.** In particular, recent FSAP missions have conducted early discussions with the authorities on the stress testing methodology, data requirements, and scenarios. Such discussions assist both the mission and the authorities in better identifying the data needed for the exercise and the scenarios to be used. They also enhance the authorities' ownership of the exercise and help in transferring the know-how when the authorities express an interest in replicating the exercise on periodic basis. Stress tests can also be facilitated by encouraging countries to develop macro-models with linkages to the financial sector to help better calibrate the effect of macroeconomic shocks on the financial system and to further develop risk data reporting commensurate with the development of the country's financial system.

40. **In light of caveats in the construction and implementation of FSAP stress tests, more attention has been given to the interpretation of stress test results.**⁶ It has been recognized that the results of stress tests alone are not sufficient for predicting the magnitude or likelihood of losses and defaults of a financial institution, partly because they do not fully take into account any potential dynamic responses of an institution (or of the authorities) to a shock. Rather, stress test results provide an indication of the magnitude and direction of the potential effect, thereby assisting in evaluating the resilience of the financial system and identifying of steps that financial institutions and supervisors could take to reduce risk exposure and conserve capital.⁷ Improvements in the interpretation of the results are being considered.

41. **In the case of large and complex financial institutions, a comprehensive risk assessment requires information about the effective risk exposures implied by derivatives—information that is only available to institutions internally.** The participation of key financial institutions in the stress testing exercise therefore is essential in more advanced countries and financial centers with complex institutions. In many cases, the authorities would need to encourage large private institutions to participate in the stress testing exercise. Since large and complex financial institutions have a comparative advantage in regard to data needed to isolate risk exposures, feeding common scenarios through their own risk data and models contributes to optimizing the information flow and improves the quality of the results, especially in countries where supervisors have examined and

⁶ Some common caveats in the construction and interpretation of stress tests are noted in Kupiec (2002).

⁷ For a parallel discussion on the role of stress tests in banks with internal risk models, see Basel Committee on Banking Supervision, Amendment to the Capital Accord to Incorporate Market Risks, Basel (April 1998).

implemented certification procedures of institutions' risk management techniques.⁸ Indeed, the quality of FSAP stress tests has been improved in countries where financial institutions were involved in implementing scenarios specified by FSAP missions and the authorities.

42. **The Bank and the Fund have benefited from ongoing dialogue with the international community in this area, including in the context of FSAP missions to industrialized countries, and through participation in international fora on the issue.** In addition, work is ongoing at the Bank and the Fund to further improve stress tests through internal training seminars, involvements of external experts, and ongoing research efforts. Moreover, an MAE working group was established to promote good practices and to provide guidance on the design and implementation of stress tests. Future work will focus on the following areas:

- **Increasing the use of regression methods that relate credit quality to macroeconomic shocks and financial stability indicators.** Given the difficulties in analyzing the impact of macroeconomic shocks on credit risk and the relatively weak state of credit risk management at the institution level in many countries, regression methods could be utilized to provide a more systematic approach to measuring credit risk. Regression methods linking macro variables and financial soundness indicators at an aggregate level or for peer groups of institutions also provide a useful consistency check on the results obtained by aggregating the results of stress tests applied to individual institutions.
- **Developing a basic framework for determining the scope of stress tests that could best capture potential systemic risks arising from contagion.** To date, the institutional coverage mostly depends on data availability, the financial institution's ownership structure, and, where foreign subsidiaries are considered, the extent of support from the foreign owners of locally incorporated institutions. However, the linkages among different financial institutions are often complex and little understood, especially in advanced financial systems, and there is a risk that potential systemic vulnerabilities related to linkages among subsectors or non-financial institutions may be overlooked.
- **Designing stress tests to monitor interbank contagion through money markets and payment systems.**
- **Improving the design of FSAP stress test scenarios for large and complex financial institutions with substantial cross-border activities.** Presently, the design of the FSAP stress test scenarios focuses almost exclusively on domestic markets, and

⁸ A caveat should be noted in that compiling the results of FSAP stress tests by individual banks may present difficulties in comparability, since each institution is likely to employ different methodologies and modeling assumptions.

does not specify possible stress scenarios for foreign markets, in which major financial institutions may have substantial exposures. For example, while stress testing four large banking groups in an FSAP, only domestic shocks were specified, and an ad hoc assumption was used for factors relating to foreign exposures.

- **Exploring the usefulness of stress tests to MAE’s quarterly financial sector vulnerability report, as standardized sensitivity analyses could provide an additional early warning tool.** For example, applying a three standard deviation shock to the historical trend level of the interest rates in a peer group of emerging-market financial systems could provide a useful benchmark for assessing potential systemic vulnerability of a certain system to interest rate risk, especially if it is identified as an outlier.
- **Developing methodologies for stress testing nonbank financial institutions.**
- **Identifying “good practices” for stress tests (in terms of recommended operational modalities and methodologies) for groups of similar countries.** While it is often necessary to tailor an FSAP stress test to data availability and the sophistication of a financial system, it would be useful to form country peer groups based on some criteria related to the complexity and sophistication of a financial system. Standardizing a core set of sensitivity analyses (e.g., for interest rate and exchange rate) within the peer group could lead to the development of common benchmarks for cross-country comparisons, thus facilitating vulnerability analyses. Work could also include designing simpler stress tests to be used in smaller countries or countries with less complex financial systems, where the sources of risks to bank balance sheets can be more readily assessed and measured at an aggregate level. The process of stress testing, involving the discussions with authorities and the demonstration of the methodology, might be useful even in those cases, but the nature of the system, its risks, and the availability of data argue for somewhat reduced focus on the quantitative results of stress tests.

III. THE ASSESSMENT OF FINANCIAL SECTOR STANDARDS UNDER THE FSAP: MAIN FINDINGS

A. Introduction

43. **One objective of the assessment of standards in the context of the FSAP is to examine whether the regulatory and supervisory frameworks are adequate to address the identified vulnerabilities and risks, and thereby provide an input in formulating the overall assessment of financial system stability.** Another key objective of the assessments is to provide an input into formulating development needs and priorities in the assessed sectors, which are then used as a basis for a corrective action plan, if needed.

44. **The FSAP missions typically conduct detailed assessments of key international standards and codes in three areas:** (i) financial sector regulation and supervision; (ii) institutional and market infrastructure; and (iii) policy transparency. The standards routinely assessed consist of the: (i) IMF Code of Good Practices on Transparency in Monetary and Financial Policies (MFP Code); (ii) Basel Core Principles for Effective Banking Supervision (BCP); (iii) Core Principles for Systemically Important Payment Systems (CPSIPS); (iv) International Organization of Securities Commissions (IOSCO) Objectives and Principles of Securities Regulation (IOSCO Principles); (v) International Association of Insurance Supervisors (IAIS) Insurance Core Principles (ICP); and more recently, (vi) the Financial Action Task Force (FATF) Recommendations for Anti-Money Laundering and Combating Financing of Terrorism (AML/CFT). In addition, other standards, principles and In addition, other standards, principles and guidelines may be used to inform the FSAP analysis, including: (i) the OECD Corporate Governance Principles; (ii) World Bank Principles for Effective Insolvency and Creditors Rights;⁹ (iii) CPSS-IOSCO Recommendations for Securities Settlement System (RSSS); and (iv) International Accounting and Auditing Standards.¹⁰ The specific set of standards assessed in a country from the full range of standards varies according to country specific circumstances. The number of standards assessed per FSAP has increased from two to four in the pilot cases (average of 3.7 per FSAP), to three to six more recently (average of 4.9 per FSAP in FY 2003), excluding AML/CFT assessments.

45. **In response to the increased demand for standards assessment and the awareness of the need to increase the effectiveness of the standards assessments themselves, the Bank and the Fund have put substantial efforts into analyzing and reviewing the experience with the assessment of individual standards.** This review is provided in several documents prepared for the Executive Directors.¹¹ Bank and Fund staff

⁹ The IMF's Orderly Effective Insolvency Procedures are also used to facilitate FSAP analysis.

¹⁰ In cases where issues relating to domestic debt management and/or reserves management are judged to be relevant for the well-functioning of the financial system, use is made of Bank-Fund Public Debt Management Guidelines and Reserves Management Guidelines for informing the analysis in these areas. In recent FSAPs, staff have begun to assess security settlement systems formally using the RSSS assessment methodology issued in November 2002. These assessments have served as a component to CPSIPS and IOSCO Principles assessments.

¹¹ The experience with the assessments of standards and codes has been reported to the Bank and Fund Boards in several documents. The review of the experience with the BCP (SM/00/77), the MFP (SM/00/269), the ICP (SM/01/266), the CPSIPS (SM/02/124 and SecM2002-210), and the IOSCO Principles (SM/02/121 and SecM2002-209) have already been completed, and several consequent changes have been affected in the assessment

(continued)

are also actively involved in work to further develop these standards (see Box 2). In addition, the Bank and the Fund staffs jointly with the external FSAP assessors from the Cooperating Official Institutions carried out a technical review of the standards assessment process in Paris in November 2001. The discussions provided useful feedback on how to strengthen the process under the FSAP and improve the quality of the assessments and their role in determining supervisory, regulatory, and oversight vulnerabilities. Three separate technical review meetings were held covering the BCP, CPSIPS, and IOSCO Principles. In addition, a technical review of the MFP Code was held in Washington, D.C. in February 2002. The remainder of this paper provides a summary of the Paris meeting conclusions and a description of the status and findings of the main financial sector assessments covered in the FSAP.

B. Results of the Paris Technical Review on Strengthening the Assessment of Financial Sector Standards

46. **The assessors acknowledged that the comprehensive scope of the FSAP provides a meaningful context for the standards assessment work.** While the assessments have helped to highlight regulatory and supervisory vulnerabilities, several improvements have been needed to permit a better use of standards when analyzing supervisory and overall sectoral vulnerabilities.

- **Consistency in assessments.** The assessment of adherence to financial sector standards requires substantial judgment and experience in order to apply effectively the relevant assessment methodologies. Beyond this necessity, however, there has been a need to ensure greater consistency in the assessments through the strengthening of pre-mission briefing, availability of relevant documents (including self-assessments), headquarters' support to assessors on technical matters, and a stronger review process. Of course, this drive for consistency should not tie the hands of the assessor, who should continue to exercise judgment based on factors, such as the level of development, regulatory and supervisory traditions, and the overall financial sector environment. Properly conducted self-assessments were identified as being useful to the assessment process.

framework for these standards. An update of the experience with the BCP assessments was presented to the Bank and Fund Boards in late 2002 (SM/02/310 and SecM2002-0489).

Box 2. FSAP: Development of Selected Standards and Assessment Methodologies

Insurance supervision. The IAIS is one of the Cooperating Official Institutions under the FSAP and is facilitating the assessment process by identifying practicing insurance experts who can undertake assessments. To assist in monitoring the implementation of the IAIS Insurance Core Principles, the IAIS has set up a *Task Force for Monitoring the Implementation of Standards*, with representation from the Fund and Bank. The Fund and Bank staffs are also members of the IAIS Task Force revising the Insurance Core Principles and the assessment methodology. The revised principles are expected to be adopted in September 2003.

Securities regulation. The IOSCO is one of the Cooperating Official Institutions under the FSAP. A guidance note for assessors has been developed by the Bank and the Fund, the aim of which is to improve consistency and quality in assessments of the IOSCO Principles and Objectives. IOSCO has embarked on the development of a comprehensive assessment methodology to complement its self-assessment process; the Bank and the Fund are participating in this process, which will build on the joint Bank-Fund guidance note mentioned above and is expected to be finalized in 2003.

Payment and Securities Settlement Systems. The Bank and the Fund took the initiative to develop a guidance note, *Guidance Note for Assessing Observance of Core Principles for Systemically Important Payment Systems*—available since August 2001. This work was done in collaboration with the CPSS, and also included the development of a *Questionnaire and Assessment templates*. The guidance note can be used by central banks for the self-assessment of their systemically important payment systems. The Bank and the Fund also participated in the development of an assessment methodology for the *Recommendations for Securities Settlement Systems*, finalized in November 2002. The RSSS identify minimum requirements for securities settlement systems. Currently, the Bank and the Fund are in the process of producing a guidance note—*Guidance Note for Assessing Observance of Recommendations for Securities Settlement Systems*—which will include the development of a *Questionnaire and Assessment templates*.

Transparency. To ensure the consistency and quality of MFP Code assessments across countries, Fund staff have developed a guidance note for assessors that outline organizational responsibilities and explain the tools for evaluation as well as those practice-specific factors and examples to consider in order to enhance consistency across the varying institutional frameworks in member countries.

Anti-Money Laundering and Combating the Financing of Terrorism. The Bank and the Fund have collaborated closely with the FATF to develop a comprehensive methodology to assess the FATF Recommendations. The methodology provides a consistent framework for conducting assessments, whether carried out by Fund/Bank, FATF, or the FATF-style bodies. The FATF endorsed the comprehensive methodology on October 11, 2002. On the basis of the comprehensive methodology, AML/CFT assessments of the FATF Recommendations conducted by the FATF and the FSRBs can also be used to prepare Reports on Standards and Codes (ROSCs), in addition to ROSCs based on Bank-Fund assessments.

- **Assessment of actual implementation.** The assessors agreed that the evaluation of actual implementation of standards has proved extremely difficult, especially in light of the severe time constraints placed upon experts to produce the final output in the field. They felt that what was needed was adequate information and preparation time, prior to the mission, to be able to properly assess the actual implementation of a standard. Another point that was made was that the assessment methodologies and guidance notes should go further in indicating more clearly the implementation issues that should be taken into account for assessment purposes.
- **Links between the standards assessments and the diagnosis of sectoral risks and vulnerabilities.** The assessors suggested that further analytical work is needed to link measurements of adherence to financial sector standards with financial stability. Banking assessors, in particular, thought that access to stress test methodologies and results, and discussions with the team members carrying out the stress test, could

facilitate a better integration of supervisory issues with the quantitative analysis. Some argued that the standards assessments should follow the analysis of the relevant sector so that the assessors would have a more informed view of the analytical issues. Others felt that the standards assessments should precede the work of the larger team to provide guidance on where to look for sectoral vulnerabilities.

- **Management of the overall assessment process.** The assessors in each group felt that more preparation time and guidance on what was expected from the assessments were crucial. Several suggestions were made to strengthen the assessment process, including information on the purpose and scope of the assessment, as well as the assessors' specific tasks, arrangements for providing headquarter support on technical issues during the mission, and closer coordination among the assessors from other relevant sectors.

C. Banking Supervision

47. **The Basel Core Principles (BCP) assessments remain a standard component of the FSAP.** The assessments: (i) support the development of sound banking systems in member countries; (ii) identify deficiencies and opportunities for development in the banking regulatory and supervisory systems in the assessed countries; and (iii) help set priorities for Bank and Fund technical assistance (TA). As of December 2002, 63 assessments have been conducted under the FSAP, of which, 41 assessments have been completed and 22 assessments are undergoing. The assessment program has been implemented with the assistance of many cooperating banking supervision authorities and central banks.

48. **The assessments have shown that effective supervision and full compliance with the BCP are not possible unless the preconditions for effective banking supervision are met,** i.e., stable macroeconomic policies, a well developed legal and judicial infrastructure, effective market discipline, procedures for the effective resolution of banks, and effective safety nets. Currently, the preconditions are not part of the BCP, and are not included in the detailed assessments, although the methodology states that the assessors should "form a view" of whether the preconditions are in place. Additionally, especially compliance with BCP 1, notably with regard to the independence of the supervisory authority, is critical in achieving effective banking supervision.

49. **Those BCPs where improvement in compliance is particularly needed include the principles on credit policies and connected lending, as poor lending practices remain by far the most dangerous threat to banking stability.** Furthermore, loan evaluation and loan provisioning practices tend to be weaker in practice than they are on paper, thus threatening the accuracy of capital and capital adequacy figures for banks. Country risk, market risk, foreign exchange risk and interest rate risk tend to be underestimated in many developing countries, even if at the current time, these risks may not be a main threat. Also, in light of the heightened attention for AML/CTF problems, many countries will need to speed the introduction of the necessary rules and procedures. The actual implementation of remedial measures against banks, especially when the supervisory

authority does not have full independence, are also still an area that requires attention, even if the regulations theoretically provide sufficient options. A key area, with a view to the effectiveness of prudential standards, and the need to supervise effectively large and complex financial institutions, is the consolidation of accounts and supervision on a consolidated basis. In general, future assessments will need to increase the focus on the actual implementation of laws and regulations.

50. **With regard to the process, experience has also highlighted the need for more guidance from the standard setter on how to assess certain BCPs, but also the need for more guidance from the Bank and the Fund to the assessors and the assessed countries with regard to the assessment process, methodology and deliverables.** Staff have taken action, and will continue to do so, to address these concerns. The consistency of assessments across countries has been a concern for a number of countries. Although the assessments are not intended for comparison, they can provide a benchmark for further upgrading of the supervisory systems for individual countries.

51. **Work is ongoing with the Basel Committee on Banking Supervision (BCBS) to improve the quality and the consistency of the assessments.** While recognizing that the preconditions are not part of the BCP, as they relate to work of other national agencies and are not the primary responsibility of the supervisory authority, it is important that they be included in the assessment process, in view of their overriding importance. This could require that a methodology for the assessment of the preconditions be developed, in addition to the methodology for the assessment of the BCP themselves, and might involve staff other than the bank supervisors doing the BCP assessment. Periodic review meetings of the Bank, Fund and BCBS with BCP assessors and assessed countries will be continued, with a view to exchange experiences and to address issues arising from the assessments. These inputs can help keep the assessment process optimally relevant and beneficial.

D. Insurance Regulation

52. **The assessment of the insurance regulatory and supervisory systems, based on the Insurance Core Principles (ICP), began in 1999 under the aegis of the FSAP.** The International Association of Insurance Supervisors (IAIS) is one of the Cooperating Official Institutions and is facilitating the assessment process by identifying practicing insurance experts who can undertake assessments. As of December 2002, 45 assessments have taken place, of which, 31 assessments have been completed and 14 are ongoing. The assessments have proven useful in identifying insurance-related supervisory vulnerabilities, as well as development issues such as legal processes, market discipline, and strengthening insurance skills and resources.

53. **The assessments revealed satisfactory observance by countries with respect to the ICP in the areas of:** financial reporting; cross-border business operations; capital adequacy and solvency; sanctions; prudential rules—liabilities; and confidentiality. **However, they revealed common weaknesses in a number of areas including:** (i) weak organization of the insurance supervisor, characterized by weak institutional and inadequate

supervisory skills; (ii) no clear criteria for denying changes in control; (iii) weaknesses in corporate governance and internal controls; (iv) weak prudential rules on investment and exposure limits for assets; (v) the inadequacy of the supervisors' power to review or set standards for the use of reinsurance by direct-writing companies; (vi) inadequate market conduct and a complaint-handling system; and (vii) weak rules for the use of derivatives and the disclosures made by insurance companies in respect of their use of these instruments.

54. **While the supervisory deficiencies identified do not appear to pose serious risks to the insurance systems in the countries assessed, a potential systemic impact on the insurance sector can arise**, with the most common source being exposure to equity or guarantees (including credit and mortgage guarantee insurance) to the banking sector. In addition, the growth of liberalized and competitive insurance markets is posing new and more complex challenges for the supervisory authorities. In this context, the FSAP has emphasized the need for approaching insurance supervisory issues in an interdisciplinary way.

55. **While the use of the ICP in the broader context of the FSAP has provided better insights on the overall financial system supervisory vulnerabilities, there are a number of areas in which the assessment process needs to be enhanced.** The supervisory principles need further work in terms of clarity and scope. A more structured approach is also required with respect to assessing the preconditions for effective insurance supervision. Also, the use of the ICP within the FSAP process should include a more thorough pre-FSAP evaluation of the significance of insurance to the financial system, a structuring of the assessment more specifically to the local environment, and better coordination, where appropriate, for a more systematic consideration of overlapping insurance, banking, and pension system issues.

56. **To assist in monitoring the implementation of the ICP, the IAIS has set up a Task Force for Monitoring the Implementation of Standards, with representation from the Fund and Bank.** The Fund and Bank staff are also members of the IAIS Task Force revising the ICP and its assessment methodology. The revised principles are expected to be adopted in October 2003. There are two key future tasks, the first of which is to provide feedback and provide ongoing support to the IAIS as the principles evolve. Specifically, the areas identified for further improvements in the principles are already being considered by the IAIS as part of a re-examination. The second task is to continue developing the assessment methodology (with the IAIS) and the templates to ensure that the assessments are appropriate and relevant, and carried out in a consistent manner.

E. Securities Regulation

57. **As of December 2002, 48 assessments of the IOSCO Principles and Objectives of Securities Regulation have taken place in the context of the FSAP, of which 31 assessments have been completed and 17 are ongoing.**

58. **The assessments reveal a number of common weaknesses in the regulatory and supervisory systems for securities markets including:** (i) institutional weaknesses particularly as a result of limited resources available to the supervisory authorities; (ii) a spread of regulatory responsibilities across several agencies or the lack of clarity of roles; (iii) lack of independence of the regulator including from a budgetary point of view; (iv) weaknesses in the ability of regulators to enforce compliance with the law and administer appropriate penalties; (v) the inability of the regulator to share information with other domestic regulatory bodies; (vi) the lack of adequate powers—and the administrative capability—to prevent the issue of a prospectus if minimum content requirements were not met; (vii) shortcomings in continuous disclosure regimes with respect to the content and timeliness of reporting obligations; (viii) weaknesses in provisions relevant to the protection of minority shareholders' interests; (ix) weaknesses regarding the role of auditors in ensuring appropriate financial reporting and corporate disclosure; (x) weaknesses in aspects of the regulation of intermediaries, such as risk management and internal organization of firms, capital adequacy and other prudential controls, and procedures in the event of the failure of an intermediary; (xi) weaknesses in the detection and prosecution of manipulation and other unfair trading practices; and (xii) weaknesses in the oversight of clearing and settlement systems in some assessments. The absence of an investor protection (guarantee) fund, to mitigate losses and ensure the orderly winding up of an intermediary in the event of a failure, was a concern to assessors in some jurisdictions.

59. **While the assessments based on the IOSCO Principles contributed to a better understanding of the strengths and weaknesses of securities markets regulation, caution should be exercised in the interpretation of the findings in view of two limitations.** The absence of an assessment methodology has contributed to inconsistencies in the outcomes of the assessment process as it relates to the Principles, and to preconditions for effective supervision. In addition, the Principles were not designed with the FSAP in mind and an assessment based on them may therefore not capture all relevant vulnerability issues. In particular, the Principles are not currently geared to exposing short-term vulnerabilities, as might arise for example in the context of a delivery failure in the clearing and settlement system of a jurisdiction.

60. **The assessment process would benefit from further elaboration of the basis on which preconditions are to be evaluated, taking into account the various regulatory and policy mechanisms available.** The absence of an assessment methodology has also contributed to inconsistencies in the outcomes of the assessment process as it relates to the Principles. The general nature of the Principles, the ongoing development of their implementation, and the varying degrees of market development evident in the jurisdictions surveyed, require that additional guidance be provided to FSAP assessors.

61. **A number of improvements to the process that would address assessors' concerns have been initiated.** The Bank and the Fund have recently finalized a guidance note for assessors, the aim of which is to improve consistency and quality in assessments of the IOSCO Principles and Objectives. In addition, IOSCO has embarked on the development of a comprehensive assessment methodology to complement its self-assessment process; the

Bank and the Fund will participate in this process, which will build on the joint Bank-Fund guidance note mentioned above.

F. Payment Systems

62. The assessment of systemically important payment systems in Bank-Fund member countries began in 1999 under the FSAP. As of December 2002, 57 assessments have been undertaken, of which 37 have been completed and 20 are ongoing.

63. Overall, the assessments reveal weaknesses in many systemically important payment systems (SIPS). These weaknesses suggest that many SIPS may be vulnerable to shocks—internal or external—that could lead to instability in the system as a whole and pose potential systemic problems. The extent of observance of each core principle (CP), and of each of the central banks' responsibilities for applying the principles, varies widely among systems. It is clear, however, that SIPS in the advanced economies are generally robust—meeting most principles in full—and appear to be the least vulnerable to systemic shocks. Also, systems in most transition countries are showing robustness, while systems in many developing countries indicate a number of serious deficiencies and are, therefore, vulnerable to potentially widespread problems. This fact may be a consequence of different priorities, lack of adequate skilled resources and the need for enhanced understanding of payment system risks. It has potentially important implications for central banks as lenders of last resort, and for their conduct of monetary policies.¹²

64. Many of these systemically important payment systems do not meet the principles for the participants' understanding, management, and control of the risks they incur as members of those systems. An inability to settle may be caused by liquidity or a solvency problem, as well as other problems, including operational or technical failures at a single member or at a central facility. Many systems fail to ensure prompt final settlement on the day of value, and a multilateral net settlement system cannot ensure that it will settle on the due day if one of the participants is unable to meet its payment obligations. A problem with one participant could rapidly spread to other participants and, ultimately, force the central bank to step in as emergency lender of last resort.

65. The relatively large proportion of systemically important payment systems that do not have a well-founded legal basis compounds the weaknesses. Where a system has an uncertain legal basis—as in some systems in transition countries—the impact of a settlement problem for one participant is more liable to be compounded by steps taken by the other participants to protect their own interests.

¹² It should, however, be noted that in certain of these countries, payment systems reform projects are already in progress and that successful implementation of these projects will reduce the systemic vulnerabilities in their SIPS.

66. **The vulnerabilities and potential instabilities of many systemically important payment systems (notably, again, in transition countries) are also reflected in the fact that almost half of the systems do not have effective governance.** A less effective governance structure itself reflects failures by a majority of the central banks to observe in full their responsibilities relating to the oversight of a SIPS.

67. **To improve the quality and consistency of assessments, the Bank and the Fund took the initiative to develop a guidance note—***Guidance Note for Assessing Observance of Core Principles for Systemically Important Payment Systems*. This work was done in collaboration with the Committee on Payment and Settlement Systems (CPSS), and also included the development of a *Questionnaire* and *Assessment templates*. The guidance note can be used by central banks for the self-assessment of their systemically important payment systems.

68. **Experience suggests that the CPSIPS provide a satisfactory framework for assessing and grading SIPS.** However, three important issues that should be considered by the assessors were not fully brought out in the Interpretation and Implementation notes prepared by the CPSS to accompany the principles, or in the guidance note: (i) the context within which liquidity risks can be managed by the SIPS participants; (ii) the scope for a SIPS to be adversely affected by problems in a settlement system, which is linked to that payment system; and (iii) the scope for reducing risks in a check system by diverting some of its larger payments through a Real Time Gross Settlement (RTGS) system.

69. **Determining whether each individual systemically important payment system has a sound legal basis, is secure and reliable, and is efficient for the economy has proved particularly problematic for assessors.** Assessors are experts on general payment system issues, but may not have in-depth knowledge in all areas. Therefore, the assessor should judge the level of observance, but should also identify the questions that need to be addressed by, for example, the central bank's legal department, its external legal advisers, and its information technology area in relation to the technical operation system and environment, as time and resources permit. Future work will attempt to address these issues.

G. Policy Transparency

70. **The Code of Good Practices on Transparency in Monetary and Financial Policies (MFP)** aims to evaluate observance of desirable transparency practices for central banks in their conduct of monetary policy and for central banks and financial agencies in their conduct of financial policies. Within the Fund, the *Guidelines for Foreign Exchange Reserves Management*, the *Guidelines for Public Debt Management*, and *Safeguards Assessment: Staff Operational Guidelines* have all used the *MFP Code* as part of their guidelines. As of December 2002, 63 assessments were undertaken, of which, 41 assessments have been completed and 22 assessments are ongoing.

71. **The detailed assessments of the MFP Transparency Code have provided guidance for improving the transparency framework.** In some cases, they have served to

reveal issues that, while outside the scope of the Transparency Code, have highlighted monetary and financial policy shortcomings relevant to the broader evaluation undertaken as part of the FSAP program. The assessments have assisted national authorities in identifying factors limiting openness and initiating steps to improve the transparency of monetary and financial policies. The development and enhancement of institutional websites are an example of a particularly important tool used in the dissemination of data and information on policies and operations.

72. **In addressing weaknesses identified in the assessments, recommendations have focused on both the content and forms of disclosure.** In monetary policy, recommendations have included the need for improved disclosure and explanation of the monetary policy analysis, framework and procedures; and more public consultations on proposed technical changes to monetary regulations. Financial policy issues have focused on the public disclosure of relationships between financial agencies, information sharing, and improving the frequency of data reporting by financial agencies. An emphasis on achieving greater accountability and integrity of monetary and financial institutions is common to both monetary and financial policies.

73. **Ensuring the consistency and quality of MFP Code assessments across countries remains problematic.** In an effort to address these shortcomings, staff is currently working on two documents that would provide guidance in conducting the assessment. The first is an MAE operational paper that provides further detail and analysis of the assessment experience with the *Code*, based on a selection of country experiences. The second is a guidance note that will outline the organizational responsibilities, the tools for evaluation, and practice-specific factors and examples to consider in order to enhance consistency across the varying institutional frameworks in member countries.¹³ These documents will complement the existing *Supporting Document to the Code*. Work is also under way on a review of the MFP Code.

H. The Use of Other Standards and Guidelines in the FSAP—Public Debt Management

74. **Guidelines for Public Debt Management were developed by the Fund and the Bank in close collaboration with a broad group of member countries and international institutions in a comprehensive outreach process.** The guidelines are designed to assist

¹³ These documents are being developed based on directions given by the Executive Board on the MFP Transparency Code (BUFF/99/27), in which it was stated, “Directors cautioned against making a manual too detailed and prescriptive, suggesting that rather it provide practical suggestions and case studies for guidance.” The Board reiterated this point in a later meeting stating, “Directors cautioned against making the proposed manual to accompany the Code prescriptive. It should focus on providing a range of examples of how to implement broad principles...” (BUFF/99/50)

policymakers in considering reforms to strengthen the quality of their public debt management and reduce their country's vulnerability to international financial shocks. They are being used as a framework to discuss debt management issues, including in selected FSAP countries: Bulgaria, Costa Rica, Croatia, Korea, Mexico, Philippines, Sri Lanka, Tunisia, Uganda, and the U.K. They will also be used in the forthcoming FSAP mission to Japan.

75. **The guidelines are used as a focal point for informed discussion with the authorities on key areas requiring improvements in debt management, and not as a mechanical check-list to verify countries' compliance in a standardized way.** As a result, the assessment of country debt management practices does not rely on standardized guidance notes and templates that are used with internationally-accepted standards and codes. Rather, with country consent, the guidelines provide a structure for discussion of debt management issues as part of a general review of each country's systemic liquidity management arrangements. Given the limited experience to date in using the guidelines in the context of FSAPs, it is too soon to draw any meaningful cross-country conclusions from these discussions.