ANNEX

5 Additional Background on Stress-Testing Methodologies Used in FSAPs

This annex provides additional information to supplement the discussion in Chapter 3, section on "Macroprudential Risk Analysis," drawing on a review of stress-testing approaches in the 25-country sample that was examined in depth. It begins with a brief summary of the approaches most often encountered in FSAPs, proposes a possible approach to providing "benchmarks" of methodological approaches that different country peer groups could aim for, and concludes with some comments on key areas that require greater attention.

Current Stress-Testing Methodologies

FSAPs incorporate stress-testing approaches of varying degrees of sophistication. However, in reporting results, most FSAPs rarely discuss the limitations of the methodologies used and the consequent need for caution in interpreting results. We summarize here the most common approaches used.[1]

FSAPs in low-income countries and some emerging market countries have frequently used credit-risk methodologies based on a simple static exercise that assumed (relatively arbitrary) increases in levels of banks' nonperforming loans together with assumptions on different provisioning levels. Usually the assessment is supplemented by a simple analysis of the direct effect of exchange rate risk, based on the application of different exchange rates to the net open position of the entire banking system. The results that can be extracted from these models are very limited.

Methodologies based on individual portfolios have been used in more advanced economies, which use highly disaggregated data from individual financial institutions (bottom-up approach). In order to conduct stress testing, one of the challenges of these models is to be able to translate the effect of a broad macroeconomic shock into a balance sheet of a financial institution. Usually this exercise requires a mapping of macro variables into a set of common risk factors that can be applied to stress individual balance sheets. Typically, institutions require two steps, one mapping from macro adjustment scenarios to a set of common risk factors, and another mapping from a set of common risk factors into all of the instruments in a portfolio. The results that can be extracted from these models are more precise in the risk measurement.

Methodologies based on aggregated portfolios have been used in some emerging market economies (top-bottom approach), that typically derive common parameters from all financial institutions in the data set through regression analysis. However, important differences have been found among the use of stress testing according to this methodology that seems to reflect a lack of a common view on certain issues such as the way in which the corporate sector or household sector risks should be included in the evaluation of the financial sector vulnerabilities.

A Possible Approach: Country Peer Groups

Stress-testing methodologies differ substantially among FSAPs, which can be attributed in large part to data constraints, relative sophistication of the financial system, cooperation from the authorities, time available for the analysis, and the judgment of the FSAP team.

While the need to tailor stress tests to country conditions is understandable, in our examination it has not been easy to find common elements among FSAPs' stress tests, except for many cases in which methodologies converge toward the most simple approaches.

From a more dynamic perspective, in a number of cases there are no significant methodological improvements between the FSAP and its Update three or four years later.[2]

[1]See Bank for International Settlements (2005); Blaschke, Jones, Majnoni, and Peria (2001); Jones, Hilbers, and Slack (2004); Sorge (2004); and International Monetary Fund and World Bank (2003).

[2]For example, Ghana, Kazakhstan, and Slovenia.

One possible approach to strengthening the methodological approach, and building greater cross-country knowledge, would be to develop good practices for conducting stress tests among various country peer groups. Such country peer groups would reflect common macroeconomic conditions, as well as the degree of sophistication of the financial sector of a country. This approach could help countries adapt their methodologies to good practices within groups with comparable capacity and data limitations. It would also help to recognize that stress testing practices can substantially differ between countries with widely varying levels of financial complexity. Standardizing a core set of methodologies, data sets, and sensitivity analysis within country peer groups could also help to develop benchmarks for cross-country comparisons, thus facilitating vulnerability analysis.

In addition, there is some room for standardization of certain shocks under certain circumstances. For example, one possibility would be that all noninvestment grade countries evaluate the potential effects of sovereign downgrade scenarios. Similar approaches could be used for shifts in exchange rate pegs. Greater standardization of such approaches across countries could help reduce their political sensitivity and help avoid an inadvertent signal that the IMF thinks such events are more probable in certain countries.

It would be useful for the FSAP to provide advice in the design of a road map for reaching the relevant country peer benchmark for stress testing, beginning with recommendations on the data that are necessary in order to run more appropriate stress testing. This could help countries to build financial infrastructure, collect data, and allocate resources to foster a better understanding of the vulnerabilities of the financial system.

Areas That Require Some Attention

Credit risk is the most important risk from the banking sector. In measuring credit risk, emerging markets should make efforts to move from static models to regression models that relate credit exposure to macroeconomic events in a systematic manner. It would be necessary to establish good practices for including corporate and household sectors' exposures within the regression approaches. Although the scenarios or events may not have an associated probability of occurrence, the interpretation of the stress testing results should provide an opinion of the relative importance of the different vulnerabilities (credit risk, market risk, commodity risk, etc.) of the financial system.

The size of the shocks should reflect exceptional but plausible events. In the 25 country cases, we found that, even in recent vintages, there is insufficient explanation for the size of the shocks and insufficient use of macro models to simulate the effects of the certain scenarios and events on economic and financial variables as outputs.[3] Although it is desirable that shocks be derived from macro models, some countries are not yet in a position to do so. In these cases, good practices should also be established for the simulation of scenarios and events, for example by considering methodologies that look at the joint empirical distribution of risk factors.

[3]For example, one scenario might include a sudden reversal of capital flows and a rapid depreciation of the exchange rate. Macro simulations of this scenario could produce effects on GDP growth, price level, interest rates, and the exchange rate. These outputs would serve as the basis of a stress test of balance sheets for individual institutions.