



ANALYTICAL TOOLKIT

As called for in the 2012 Financial Surveillance Strategy, the Fund has taken part in broader efforts in the economics profession to upgrade the analytical and empirical techniques used for analyzing macrofinancial linkages and financial stability risks.³⁵ Considerable advances have been made since the GFC in macrofinancial modeling, in building risk indicators, and in developing tools to assess financial stability, although there is a widespread sense that this agenda remains a work in progress. The post-crisis academic literature began to model systemic financial crises by granting a more important role to financial intermediation and liquidity risks.³⁶ The U.S. Federal Reserve and other AE central banks continued to introduce financial factors into their forecasting models as exogenous shocks to risk premia and started to develop new models to study specific questions at the frontier of macroeconomics and finance. Separately, the BIS was a pioneer in research suggesting that excessive credit growth is a robust early indicator of future economic and financial trouble, and its measure of the credit gap is widely used.

A background paper for this evaluation (Jeanne, 2018) assessed the extent of the Fund's contribution to this developing field. It found that the Fund has made important contributions in areas such as macrofinancial modeling, indicators to monitor financial risks, and tools for stress testing, but that its cutting-edge contributions have been limited compared to work done in central banks of the major AEs—a perception broadly shared by academics and senior officials interviewed for the evaluation.

An important point of attention for Fund research has been macrofinancial modeling. For example, MCM has developed a Global Macrofinancial Model for use in the *GFSR* and elsewhere, while RES has incorporated financial frictions into its Global Integrated Monetary and Fiscal Model and other models used for scenario analysis in the *WEO*. Meanwhile, the IMF has been at the forefront of research on the relationship between excess credit growth and future financial or macroeconomic problems. The MAPMOD framework, building on this line of research, was specifically designed to study vulnerabilities associated with excessive credit expansions and asset price bubbles, and the consequences of different macroprudential policies that attempt to guard against with such vulnerabilities. More recently, the October 2017 *GFSR* introduced the Growth-at-Risk approach, discussed above.

Notwithstanding areas of excellence, the IMF macrofinancial modeling has not advanced as quickly as that in several AE central banks. IMF models have not been widely used: the MCM model is generally seen as too much of a “black box,” while the Global Integrated Monetary and Fiscal Model's inclusion of financial frictions is quite ad hoc. The general approach of central banks has been to develop a “suite” of relatively complex, country-specific models that

³⁵ This chapter draws on Jeanne (2018).

³⁶ See, for example, Gertler and Karadi (2011); Brunnermeier and Sannikov (2014); Gertler and Kiyotaki (2015) for academic contributions; Chung and others (2010) from the Federal Reserve; and Drehmann and Tsatsaronis (2014) from the BIS.

can be used to analyze particular macrofinancial linkages. The IMF has also developed a variety of tools, for example, a DSGE model was used to examine how the impact of a housing price correction in Canada could be magnified if combined with tighter financial conditions, and a model that combines standard macroeconomic relationships with the stress testing approach was used to study the interplay between banking stability and the macroeconomy in Brazil. However, more typically the IMF research program focuses on developing generic tools that can be used across different countries—a more difficult task especially since these tools need to be accessible to desk economists with little guidance from researchers. The Growth-at-Risk framework, while still work in progress, is an example of such a tool.

A second area of focus for IMF staff has been to develop a growing battery of indicators to monitor financial risks at the global and country levels, but using these effectively has proven a challenge. The IMF toolkit now contains more than 20 such indicators that are used in multilateral surveillance and in Article IV consultations. But these tools are not applied consistently or coherently, in part because their use requires experience and judgment as to which approach to use in which circumstance. Also, IMF staff interviewees indicated that for some tools there are only a handful of people who really know how to implement them. In an IMF staff survey, mission chiefs asked about how IMF staff could strengthen their understanding of macrofinancial linkages pointed at the need to better disseminate best practices and analytical toolkits (60 percent and 62 percent, respectively) (IMF, 2018a). Ongoing efforts to improve knowledge management may help, but hands-on training and better interdepartmental cooperation are also needed. In addition, it may be helpful to streamline the set of tools. In this respect, the work done to enhance the internal Vulnerability Exercise provides an example of an integrated approach that can be applied consistently across countries to give a sense of relative risk exposure.

The IMF was a leader in developing and using stress testing following the 1990s EME crises, but many central banks have now caught up or taken the lead. The Fund's core approach relies on a top-down solvency stress test based on similar stressors across countries and over time, allowing for cross-country comparisons. Since the GFC, central banks in many of the S29 have developed their own stress test tools. Often, they devote considerably more resources to the

development of these tools than the IMF could, and the tools take into account the characteristics of their own financial sectors. Also, stress tests conducted by central banks take advantage of their access to confidential supervisory data from individual banks, and they focus on stressors that are most relevant to their own economy, e.g., changes in monetary policy or developments in their domestic housing market. As a result, in many AEs and some EMEs, stress tests conducted by IMF staff (usually as part of FSAPs) are sometimes seen by country officials as less informed and less relevant than those conducted by national authorities.

The Fund has responded to the challenge by focusing research on innovations in its stress testing tools in areas that do not require confidential information on individual institutions. For example, it has developed stress tests that make greater use of market-price-based, publicly available data and has emphasized cross-sectoral stress tests to check for vulnerabilities that can fall between the cracks in the national context. Another area of potential comparative advantage for the IMF would be cross-border stress testing, for example, global liquidity stress tests that examine the extent to which liquidity shortfalls in particular financial markets are transmitted across markets, institutions, and countries, and the resilience of national and global financial safety nets to such stresses—but the feasibility and value of such work would depend on increased access to granular data on G-SIFIs.

Over the past couple of years, the IMF has been working hard to gain expertise in new fintech areas, although it is not generally regarded as a cutting-edge source of analysis and expertise and its precise role remains to be established (Demekas, 2018). Given the rapidly evolving fintech ecosystem, there is significant demand from a wide range of countries for advice and assistance in designing their policies, regulations, and monitoring of risks in these areas. The IMF has worked with the World Bank to develop the Bali Fintech Agenda (IMF, 2018b) that sets out a framework to help members consider how they will be impacted by fintech developments and how they should respond. An important next step will be to determine precisely what the IMF itself can and should contribute. Senior IMF officials stressed that the lead on rulemaking would lie with the FSB and SSBs, while the IMF would focus on developing the knowledge and techniques to advise its membership on how to handle the risks and opportunities from fintech in areas

of IMF comparative advantage, such as controlling financial risks, assessing implications for monetary policy and financial stability, and analyzing cross-border aspects.

The Fund's work developing its financial toolkit would benefit from more integration across departments and from building a larger pool of expert financial economists. RES and MCM run largely separate research programs, which in

part complement each other. But they have not developed shared research goals, nor do they work together to facilitate the absorption and integration by area department staff of the tools that they develop. The IMF needs to invest more resources to facilitate the development and peer review of analytical tools such as the Global Macroeconomic Model to make these tools more credible in the macrofinancial stability community.