BREAKOUT SESSION 3 - Analytical tools supporting debt management strategy development: In-house or off-the-shelf tools?

A number of countries have developed their own analytical models to support the development of their medium term debt management strategies, while other rely on off-the-shelf models. The session explored the experience of Turkey, a country that has developed and applied its own model, reviewed the application in Nigeria of the Medium Term Debt Management Strategy (MTDS) tool developed by the World Bank and the IMF, and offered a more general discussion of issues in model development (Denmark).

Mr. Ejsing (Denmark) discussed alternative approaches to developing models for cost-risk analysis of government debt portfolios, including deterministic versus stochastic models. He noted that the typical starting point for any model is the spreadsheet program Excel, which has several advantages, such as its flexibility in presenting data. As complexity increases, however, spreadsheet models can become messy and hard to document and further develop. The alternative is a programming approach (such as Matlab and Python) which allows for development of tailor-made data structures that are easy to maintain. Mr. Ejsing noted that a programming approach requires staff with knowledge of software development practices, which are skills that may be scarce in a debt office. Rather than choosing either a spreadsheet or programming approach, Mr. Ejsing suggested a combination, where Excel could be introduced as a user-friendly interface, while simulations were undertaken in Matlab or similar. He noted that while developing and working with stochastic models is very time consuming, these models provide output that allows for analysis of statistical distributions of cost. As insights gained from working with simpler deterministic models are very useful as well, Mr. Ejsing recommended working with both types of models.

After looking at off-the-shelf models, the Turkish Treasury decided in 2003 to develop deterministic and stochastic models in-house. Mr. Balibek described the development of the Turkish Debt Simulation Model\(^1\), highlighting the model’s usefulness, specifically to assess the sensitivity of public debt to market movements, and to provide assistance in developing strategic guidelines for debt management. A dedicated team in the middle office was tasked with model development, and the core team is still in place. The starting point was a simple deterministic scenario analysis model built in Excel. The next step involved developing a stochastic model constructed in Matlab to facilitate a large number of simulations. The current model uses a number of alternative cost measures – interest expenditures, the level of debt, and the level of inflation adjusted debt. Conditional cost-at-risk is the main risk metric, and has as its main objective provision of input to the choice of strategic benchmarks for the composition of the debt.

To ensure success of the model, Mr. Balibek highlighted the need to have dedicated and technically capable staff, appropriate software, training to develop and apply the models, and strong management support. He noted that building confidence in the model takes time--models have to prove themselves. In Turkey, while model development started in 2003, it was only after 2009 that decision makers started

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believing in the model’s results. Mr. Balibek noted some challenges going forward for further developing the model, including dealing with changing regimes, short historical time series, and event risk.

Mr. Olekah provided insights from the Nigerian experience with quantitative cost-risk analysis in a staffing and resource constrained environment. A main factor driving the need for quantitative analysis was the fear of unsustainable debt levels. The Government decided to apply the WB-IMF MTDS tool for deterministic scenario analysis, because in-house development would have been a resource intensive effort, and because the MTDS tool is widely used in practice. Following two WB-IMF technical assistance missions focusing on the MTDS toolkit, the DMO, with support from WAIFEM and a resident consultant, applied the model and prepared a detailed report for management designed to function as the basis for deciding on the medium term debt management strategy. Mr. Olekah mentioned that it was important for staff to understand in detail how the tool works, and that this capacity building is quite time consuming. An important output was a better understanding of the logic behind the cost-risk trade-offs available to the government. At the moment, there are no concrete plans to develop deterministic and stochastic models. Such decisions will await experience with using the MTDS tool.

A number of suggestions were made by session participants during the Question and Answer period. Suggestions included the idea that the Bank and the Fund develop standards for cost-risk models to help software developers meet the high and increasing demand for such analytical tools, and for developing a simpler version of the MTDS tool with the purpose of supporting countries in building their own models.