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Topic (ii): From local to corporate perspective (industrialization and standardization)

Economic Data Management at the IMF

Supporting Paper

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I. Introduction

1. The International Monetary Fund collects Economic Data from member country authorities during their surveillance missions and other times. Data collected are per country and the data are stored mostly in Excel spreadsheets. Most of the analysis and calculations are done using Excel. Data stored did not have much of a structure, with little or no metadata. Data management and data sharing were extremely cumbersome.

II. Background

- 2. In order to address the above issue, over the last several years, IMF has developed many versions of the Data Management Guidelines (DMGs) for their economists and research assistants. One of the important guidelines is that the data collected is stored in a structured database for ease of use, maintenance, and sharing. However, these were guidelines and were not adopted as a standard. The absence of a sophisticated tool for data management was also a factor in the non-adoption of these standards.
- 3. As Excel is neither a database nor a time series data management tool, maintaining and manipulating data in Excel can become quite difficult and unwieldy over time, and open the door for introducing data errors. Data stored in unstructured form in Excel is not retrievable, difficult to find, and prone to errors. Without proper metadata it is difficult to ensure correct understanding and seamless sharing of data within country teams. Therefore, tools are needed to help staff move towards using structured databases that better facilitate storage, manipulation, documentation, and sharing of time series data.
- 4. Since early 2008, migration of data out of Excel workbooks and into structured databases has been a key element of IMF-wide efforts to improve data management. Economic data and supporting documentation

are essential inputs for the organization's work. As recommended by the DMGs, economic data need to be maintained in structured databases to preserve the institutional memory of the IMF, and to facilitate improvements in data quality and data sharing among desk economists in support of their operational work across the organization and to the outside world more generally.

III. The Evolution of Data Management for Excel (DMX)

- 5. To support the need of a structured data base at the IMF, the Information Technology group of the IMF developed a tool called Data Management for Excel (DMX) as an initial prototype for a few country desk data management. Over the years, this product has become quite sophisticated and robust.
- 6. DMX is developed using Microsoft Visual Studio (.Net) tool set and uses MS Access and SQL Server 2008 as database store. Excel if the front-end GUI for this application, which is the overwhelming choice of the IMF's economists and research officers and data managers.
- 7. Initially, the development of DMX was sponsored by the African Department of the IMF to support their data management needs. This department had stored their country data in many spreadsheets which had become quite cumbersome over the years. To assist this department, the IT department developed and deployed the DMX software and also provided support for cleansing and migrating the data from the spreadsheets to the DMX database as an initial deployment. The economists and data managers were then able to use the system on their own.
- 8. In early 2011, in the context of the Economic Data Management Initiative (EDMI) at the IMF, the overseeing task force recommended and endorsed the use of DMX as the standard tool for maintenance and management of country desk data at the Fund. With the selection of DMX as the data management tool, the use of Excel would be limited to data manipulation, analysis, and presentation, while the structure of Excel files should be designed to facilitate the transfer of data from Excel to DMX and vice versa.

IV. What is DMX?

- 9. Database Management for Excel (DMX) is an Excel add-in that provides time series data management capabilities to end-users thus facilitating the adoption of the data management guidelines. DMX combines the **best of both worlds** the **familiar Excel interface** with **time series data management capabilities** that overcome the limitations of Excel as a time series management system. The result is a *portable* system that facilitates management and sharing both at the IMF headquarters and on while on mission to member countries.
- 10. With DMX, you still use Excel but in addition, you can do the following:
 - Store data as series in a database, thereby eliminating the need to maintain large datasets in Excel workbooks
 - Share data through the database, while eliminating the need to establish links between workbooks and worksheets
 - Convert high frequency data to lower frequencies, thereby eliminating the need to maintain and link separate worksheets for each frequency
 - Perform manipulations in the database, thereby eliminating the need to create and maintain links between worksheets and workbooks; manipulated data are automatically updated when the component values are updated

- Import data from CEIC and Haver directly into DMX
- Access data in different data sources, such as DMX and the IMF Data Warehouse
- Track changes made to the data over time
- Use Excel-like functions for statistical calculations, such as splicing, rebasing, percentage change, compound growth, HPFilter, and seasonal adjustment
- Maintain documentation of data through metadata such as source, descriptor, scale, and units,
 thereby making it easier to share data over time and between different members of a country team
- Organize data into smaller chunks called Tables for easy access and viewing
- Clone time series within or across databases
- Create links between databases

V. Adoption

- 11. Two of the IMF's five area departments have already made substantial progress in migrating country databases to structured databases, using DMX. Currently, over 60 countries have migrated their data from Excel to DMX. Twenty more countries will be completed in the next year. Other departments have engaged in the migration with the intent to migrate their respective countries within the next three years.
- 12. At this stage, migration of data to DMX is intended to be largely limited to country desks in area departments. This reflects the need to preserve the operational flexibility of Excel commonly used by desk economists, which is fully compatible with DMX. Functional departments, and at some level area departments, use alternative database management tools (e.g., EcOS Economic Outlook Suite A software developed by Prognoz Inc, http://www.prognoz.com) which are better suited for manipulating large volumes of cross-country data (including enhanced statistical functions) and powerful graphical capabilities frequently used for professional standard publications.

VI. User Feedback

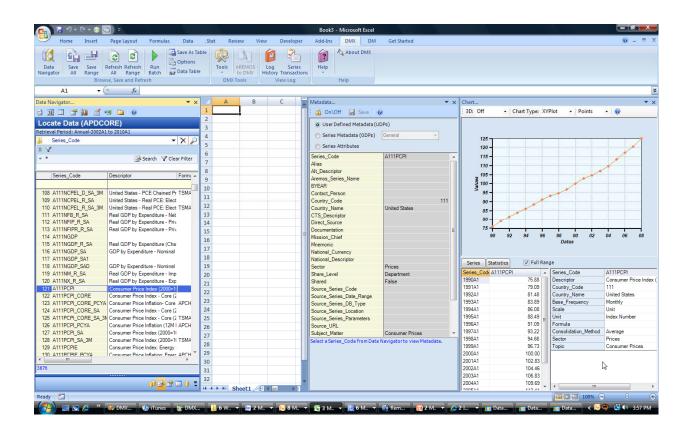
- 13. A user survey was conducted to evaluate the benefits of the migration to structured databases using DMX as the platform in early 2011. Some of the key findings are:
 - Over 90 percent of respondents said that the DMX migration greatly or somewhat improved data management in their Department. Only, 9 percent said it somewhat or greatly worsened data management practices
 - 45 percent of the respondents rated their DMX expertise as excellent or above average.
 - Reduced workload or data requests
 - Improved Data Quality
 - Improved Data Management for country desk
 - Consistency across data in country data bases

VII. Dmx Outside of IMF

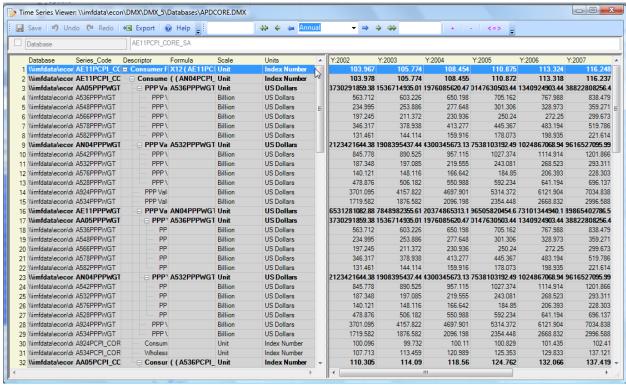
- 14. An earlier version of DMX has been distributed to Central Banks in member countries for their data management work. Countries include Brunei, The Islamic Republic of Iran, Libya, Papua New Guinea, and a few others.
- 15. DMX is a Microsoft Visual Studio (.Net) based tool with a small footprint on the desktop or a laptop. The latest version of DMX needs Excel 2007 for proper functioning. The software is distributed on a CD-Rom.

VIII. Sample Screen Shots of DMX Application

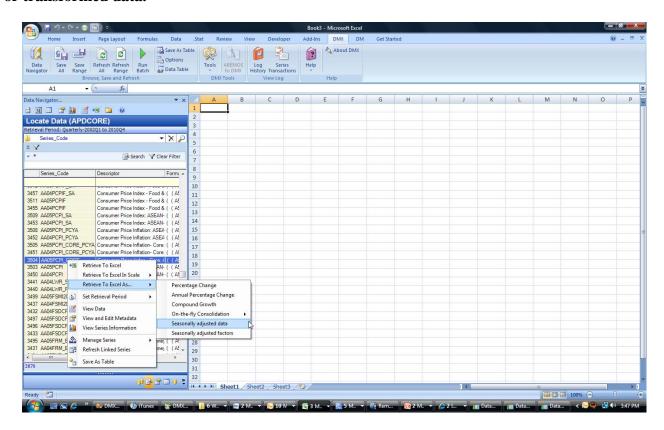
Simple interface within Excel to search and browse series and their metadata



Interface within Excel to view the data stored in the database.



Interface within Excel to transform data as needed – retrieve just the data, retrieve rescaled data or transformed data.



Easy access to commonly used statistical functions

