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Central Bank's Data Sources and Resources: The Challenges

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Introduction

From its inception, the Central Bank of Barbados (CBB) has played a key role in the dissemination of economic information. It collects data from several sources, processes it and distributes it through its various publications. The volume of data collected and processed over the years has increased with the demand for more in-depth analysis of economic issues. The Bank's ability to cope with these demands rests partly with enhanced methods of data processing, the result of technology improvements. Data at the Central Bank of Barbados is now stored in an electronic database making it easier to produce timely, consistent publications. Prior to this, older technologies such as calculators and manual recording limited the amount of data compilation. Ensuring consistency and accuracy of the data was a tedious time-consuming process. The availability of data in an electronic form gives analysts access to the most up-to-date information at all times. Users now have greater opportunities for data manipulation, including the creation of new series, easy updating of time series observations, data transfer and graphics, etc.

This article outlines the procedures the Bank adopted in moving from processing a few reports manually to the almost fully automated system of producing hundreds of tables and other reports on a regular basis. It highlights the sources and resources at the Bank as well as indicates the challenges faced and the methods adopted to overcome them. Section 1 gives the background to the CBB data collection and processing. While Section 2 highlights the challenges.

1. Data Collection and Processing

Information on money and banking for Barbados was published by the East Caribbean Currency Authority (ECCA) during the period October 1965 to November 1973. Other statistics relating to trade, balance of payments and tourism were previously published by the Barbados Statistical Service. But from 1973, the Bank gradually undertook the role of providing economic and financial statistics.

1.1 *Data Collection*

The Research Department, the main data collecting centre of the Central Bank, commenced operations in March 1973 and produced the first Economic and Financial Statistics (EFS)¹ publication in November 1973. This first publication consisted of twenty-six (26) tables mainly on the assets and liabilities of commercial banks and the Barbados Savings Bank, public finances and retail prices. New tables were added from time to time as the Department increased its institutional collection. The tables increased from 31 in May 1974 to 38 in July 1975. At this time the contents were reviewed and the tables grouped in sections. There are now 65 tables in the EFS. In addition, the series were extended to include more historical data. Almost all the tables from the EFS are reproduced in the Bank's Annual Statistical Digest (ASD), showing the annual and quarterly data. In addition, the ASD also provides information on the operations of some Statutory Bodies, Insurance Companies, Gross Domestic Product and real sector indicators.

Initially, commercial banks and other financial institutions were advised to submit financial data to the CBB in the same format they had submitted to ECCA. This data comprised three schedules, a monthly balance sheet, data on consumer credit and a quarterly sectoral break down on loans and advances. The Barbados Savings Bank also provided data on Assets and Liabilities. As the Research Department grew and the economists sought to provide greater in-depth analysis of the economy, more information was required from the financial system

¹The EFS is a monthly digest of statistics subdivided into nine groups corresponding to major sectors in the country such as the financial sector, international trade, interest rates, exchange rates, government operations and government securities, retail prices and labour force and employment.

and a number of attachments containing a further breakdown of deposits or loans were requested along with the schedules.

The Bank also started collecting monthly information from key Government Departments such as the Ministry of Finance and the Accountant General. In addition, information on trade, tourism, prices and employment were received from the Barbados Statistical Service for publication since that department discontinued publishing information on a regular basis. However, balance of payments information for activities other than trade and tourism are collected through an annual survey carried out by the Bank.

1.2 *Data Processing*

Initially, data was recorded manually. Calculators were used to tabulate the source data and the series for the publications were extracted from workbooks and written up. For typing, the acquisition of an IBM Mag Card typewriter around 1976 facilitated faster processing of documents as tables did not have to be retyped every month and the process of cutting and pasting was eliminated. The tables were typed on the machine and stored on magnetic cards since the Mag Card had an electronic memory. Every month the cards were "read" into the machine and tables updated and printed out. The production of the publications was further enhanced in 1983/84 when the IBM Mag Card was replaced by the CPT (Central Processing Terminal). The data on the machine was now stored on large floppy disks.

The advent of personal computers in the Bank in the late 1980s led to a gradual shift away from the manual processing of source data to a fully automated process using Lotus 1-2-3. Processing of data was speeded up and correction of current and historical data became a simple task. However, methodologies had to be formalized and documented. But checks were still done manually. The printouts from the spreadsheets were used to update the publication tables in the word processor. The information was retyped since there were no links between the spreadsheet files and word processing files. Historical information was only available in hard copy form, and as a result, data required for economic analysis had to be retyped into a spreadsheet or other software. It was to this end that a statistical database was set up which would meet most of the Bank's needs. The database stores all the economic data collected by the Bank's statistical section. Its structure provides information on a disaggregated basis as well as the aggregates found in the Bank's publications. The database was created using the AREMOS

(Advanced Retrieval Econometric and Modelling System) software which allows the storage of time series data in databases which are easily accessible to the user.

The Statistical database is updated using the source data supplied to the Bank. Command files and procedures created within AREMOS are used to manipulate the data to generate aggregated monthly, quarterly and annual series. Tables, grouping the resulting aggregates according to Economic Sectors, are printed and used in the monthly, quarterly and annual publications.

Most tables are now produced directly from the Statistical Database which eliminates the secretarial stage of re-keying information. To reach this stage tables mirroring those in the publication were created to extract the data directly from the database. Each table was checked against previous publications to ensure that the aggregates pulled from the database captured all the elements required for each item. This was not easy, since under a manual system classification changes were not always captured in the historical series, but in a statistical database the formula had to be the same from the beginning to the end of the series. In most cases the additional information had to be researched and keyed into the database to complete the series.

In 1996, the CBB put plans in place to transfer data from external sources to the CBB and vice versa in an electronic medium. Currently, information from sources are supplied in paper form which necessitates the re-entry of data into the CBB computerized environment. This means that data entry is prone to human error and is time consuming. The CBB is also using this electronic technology to reduce the time spent answering queries from the public by introducing a voice menu system which gives the public access to recorded information via the telephone.

2. Challenges

2.1 *Financial Data*

Initially, the financial data collected and compiled for circulation by the CBB was based along the lines established by ECCA. But the introduction of new schedules and attachments provided analysts with more detailed financial information. However, processing and compiling the statistics proved to be more tedious since much more checking had to be done to ensure there were no mechanical errors and that the data made economic sense. The new forms also posed a few problems to the financial institutions since in the initial stages the size of the forms could not be accommodated on their typewriters. However, the banks bought new typewriters to accommodate the size of the forms. The banks also

received a set of instructions which assisted them in the compilation of the new forms.

The requests for finer details brought to light a number of inconsistencies in the commercial banks' classifications of loans and deposits. This meant officers of both the Research and Bank Supervision Departments had to be involved at a micro level visiting the institutions to ensure correct classification.

2.2 Non-Financial Data

The collection and compilation of non-financial data also was problematic for the CBB's staff. Compilation of aggregates for the government operations statistics proved to be a fairly tedious exercise. Firstly, Government departments were asked to report to the CBB. Next, codes were established to extract data according to functional classification. However the coding system had to be redone every year since some categories were changed or some were added. The process was very manual and therefore prone to mistakes.

The compilation of Government debt statistics also proved to be fairly tedious, since the information was not housed in anyone department. It was very difficult to compute the stock of debt since some departments were tardy in reporting their transactions or the loans contracted by them. The reporting has improved with the acquisition of computers and the centralisation of loan contracts and payments.

Processing of the trade statistics was fairly straightforward since the Bank used the international codes to group items. The main problem was the large amounts of data which had to be re-keyed to generate the aggregates for publication. As a result maximum use could not be made of the information available, such as queries on specific items imported from or exported to a particular country.

The Balance of Payments (BOP) are published in a separate document which is distributed once a year. The data is obtained from the BOP survey which is conducted every year between February and May. One of the main problems encountered in the BOP compilation has been the low response to the survey from companies. Since more than 600 companies are surveyed, the Bank has in recent years been employing three persons to undertake the survey process. In addition, the partial computerisation of the survey has made it impossible to break down the foreign exchange contribution of each sector in Barbados. This will be rectified in the future.

2.3 *Statistical Database*

The centralised location of all data within the bank is seen as a desirable feature, but achieving such a goal was not without a number of difficulties. The major challenges included the selection of the software, defining the parameters of the database to take account of the current and future needs. It was also necessary to define and document the database to provide easy access to users and to reproduce consistent data while at the same time maintaining the interlinkages.

The search for a statistical database began after many requests for the centralisation of all available data in the bank. All parties involved felt that the programme selected should satisfy the following aims:

- i. facilitate storage and manipulation of time series data;
- ii. produce the tables for publication: ASD, EFS and BOP (annual, quarterly and monthly series);
- iii. provide graphics;
- iv. provide basic statistical functions for data analysis;
- v. enable programme links - data transfer to and from other programs; and
- vi. support the construction of a Macro-Economic Model.

With these in mind the Bank began the task of searching the market for a programme which could meet all or most of the needs. Based on the written information available, AREMOS was chosen even though it was not very user-friendly.

At the outset we established the global requirements and usages of the database. Since the new computerised database was intended to replace the manual system, a careful study of all elements of this operation provided an insight into the Bank's needs. In an effort to anticipate any future requirements of the system a number of users were interviewed. During the survey we established the quality, quantity and accountability of information. In completing our needs analysis, a set of source documents was analysed, thus providing a list of data items needed for data entry. Analyses of all the publications were undertaken to determine what the expected and desired results were. We also

examined the procedures employed in the Bank to enter and manipulate information as well as produce publications.

Based on the analysis of the above parameters the various calculations or transformations required from the system were identified. It was decided to store most of the source information as monthly series while instituting procedures to convert to annual and quarterly series. The survey indicated the need to provide easy access to most of the key economic indicators - numerical, as well as graphical displays.

Following discussions with the statisticians, and examination of the source documents and the publication tables, a document containing all links between source items and publication series was created. In addition to the links, the document contains source information and specifies the items extracted from the source to give the aggregated series. The document provides a means for cross checking the information to ensure consistency since it lists all the tables containing a particular series.

2.4 *Electronic Linkage*

To undertake transfer of data in an electronic medium the Bank's staff visited institutions providing source data. It was soon discovered that the major challenge facing the Bank was how to reconcile the different computer environments and different means of producing information used by each institution. The Bank is working with these institutions to set up a system where the information sent to the Bank is grouped according to the classifications used by the Bank. The information can be exported to a software which is compatible with that of the Bank. Electronic transfers, however, raises the issue of security of information.

2.5 *Voice Menu*

Given the volume of information processed by the Bank, the major problem with the implementation of the voice menu was finding an early way to disseminate information. It was decided therefore to provide only current information on a limited range of variables.

3. *Conclusion*

The Central Bank of Barbados is one of the major sources of economic and financial statistics in Barbados. Over the years it has managed to widen its scope

in the data collection process and now boasts of a very well structured database which provides very detailed information. By utilizing the advances in technology in the storage and manipulation of data the Bank has enhanced its ability to expand its research effort by reducing the time needed for data collection.