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Kuala Lumpur, Malaysia, 15 November 2014

The information model at Bank of Portugal – using micro data to face challenges for central banks¹

João Cadete de Matos, Bank of Portugal

¹ This presentation was prepared for the meeting. The views expressed are those of the author and do not necessarily reflect the views of the BIS or the central banks and other institutions represented at the meeting.
The information model at Banco de Portugal: using micro-data to face central banks’ challenges

João Cadete de Matos • Director, Statistics Department
17 November 2014

ISI Regional Statistics Conference
Kuala Lumpur
1. Introduction

2. Integrated management of information

3. New responsibilities of the Statistics Department

4. Micro-databases for statistical purposes

5. The relevance of micro-data for users and for analytical purposes
1. Introduction

2. Integrated management of information

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1. Introduction

Data acquisition model for statistical purposes typically relied on traditional aggregated reporting schemes.

- Forms were designed to answer pre-defined requirements
- Lengthy preparation time
- Zero flexibility
- Heavy transformation rules imposed to respondents
- Classifications are “black boxes”
- Difficult to perform a reliable and efficient data quality management
Over the last 15 years significant changes were introduced in the statistical compilation processes at BdP

- Item-by-item reporting
- Approaching the granularity of the internal and external data at the respondents’ level
- Multi-purpose reporting ("data reported only once")
- Use of administrative data
- Micro-databases
- Integration of data
1. Introduction

A new paradigm

Integrated management of micro-databases
1. Introduction

2. Integrated management of information

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The three dimensions of the model

Governance Structure

The Information Model

Relationships Management
A governance structure to ensure a proper alignment between the strategic and operational levels of decision, which are mediated by the information management level.

The relationships management to introduce greater efficiency in the internal communication process. Based on two principles:

- Information is a fundamental asset of the Bank so it must be managed in an integrated way.
- The exploration and analysis of data are distributed activities, typically related with the needs and tasks of each department.

An information model based on the BI architecture for statistics.
2. Integrated Management of Information

The Information Model

Data Acquisition | Data Production | Data Exploration | Data Dissemination

Micro - Data | Data | Staging Data | Operational Data Store | Statistical Data Warehouse | Published Data Marts

Reference Tables, Metadata, Catalogues

João Cadete de Matos 15 May 2014
2. Integrated Management of Information

The Information Model

- **Recipients**: Bdp, ECB, Financial Institutions, International Organizations, Companies, ...

- **Dissemination**: Web Clients, Fat Clients, Data Exportation, ...

- **Exploration of Information**: Reports, Analytical Solutions, Data Mining, Knowledge Discovery, ...

- **Data Warehouse**: Data Mart (Inf. Domain 1), ...

- **Operational Data Store**: ...

- **Acquisition Data Bases**: Fin. Inst., Companies, International Organisations, ...

- **External Sources**: CCR, CBSDB, Market Operations, Payments Operations, ...

- **Internal sources (incl. Micro-databases)**: ...

Layer 1: Information factory

Layer 2: Layer 3: Information boutique

Layer 4: Layer 5
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3. New responsibilities of the Statistics Department

The Statistics Department will be in charge of the operational management of information

Expertise in managing data efficiently and performing reliable DQM

The Statistics Department will become a provider of information services to the Bank

A multi-step approach will be followed
The first phase will be integration of the regular reporting for Banking Supervision purposes
### Operational management issues

<table>
<thead>
<tr>
<th>Coordinating and monitoring the process of collecting quantitative information from external entities</th>
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<tr>
<td>Ensuring the central point of contact of the Bank with external entities on the reporting of quantitative information</td>
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<td>Monitoring the interaction and timely reporting of information to and from external entities</td>
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<td>Analysing the changing needs of quantitative information identified by other departments</td>
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3. New responsibilities of the Statistics Department

- Ensuring the quality of information, defining indicators of their use and ensuring its relevance and auditability
- Promoting, in conjunction with the IT Department and the user departments:
  - The organisation of information architectures, namely by identifying objects, features and respective relationships and configuring the domains of integration to manage
  - The definition of concepts and creation of metadata associated with different information objects in order to avoid duplication and facilitate the understanding/utilization of information
  - The creation of catalogues / dictionaries / repositories of information available on particular operating systems
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Statistics and IT Departments worked together to define a Business Intelligence (BI) architecture for statistics

- The BI architecture implied:
  - Defining the different layers of data according to the different levels of its usage
  - Building a robust ground layer with common reference data, metadata and catalogues
  - Choosing the appropriate tools to explore the data efficiently

The BI architecture should be adopted by all statistical domains using an incremental approach
4. Micro-databases for statistical purposes

- Securities Statistics Integrated System
- Central Balance Sheet Database
- Central Credit Register
- BoP/IIP Database
- Other databases

MICRO-DATA

BI Platform

ENHANCED STATISTICAL OUTPUT
Where do we come from?

Micro-data integration

4. Micro-databases for statistical purposes
Direct data integration
4. Micro-databases for statistical purposes

Where do we want to arrive at? Where do we want to arrive at?

Micro-data integration

Where do we want to arrive at?
4. Micro-databases for statistical purposes

Fully integrated data warehouse
4. Micro-databases for statistical purposes

Pre-requisites

<table>
<thead>
<tr>
<th>Securities</th>
<th>BoP</th>
<th>Loans</th>
<th>CBSD</th>
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Unique Key identifier

Shared reference tables

Complete ‘virtual’ micro-database

Fiscal Number

Entities

- Fiscal Number
- Inst. Sector
- Econ. Activity
- Size
- ……
Micro-data integration

How to proceed?
Incremental approach

From direct data integration ...
4. Micro-databases for statistical purposes
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... to integration via a central repository of coherent and consistent information.
4. Micro-databases for statistical purposes

**Micro-data – Strengths and Opportunities**

- Potentially improving or validating existing data sources
- Producing more disaggregated information for measures where some information currently exists
- Potentially reducing respondent burden
- Compiling new or enhanced statistics
- Improving responsiveness to users’ requirements

Carrying out research using composite micro-data covering a wider range of variables for a larger number of units than available from any single data source
### FINANCIAL ASSETS AND LIABILITIES, INSTITUTIONAL SECTOR AND INSTRUMENT

<table>
<thead>
<tr>
<th>Goal</th>
<th>NFC</th>
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<td>Currency and deposits</td>
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<td>SSIS</td>
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<td>SSIS</td>
<td>SHARES AND OTHER EQUITY</td>
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<tr>
<td>FEASIBLE</td>
<td>INSURANCE TECHNICAL RESERVES</td>
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<td>Other accounts</td>
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**Legend:**
- **CBSD:** Collection Branch Service Database
- **BSI:** Balance Sheet Information
- **FEASIBLE:** Feasible
- **BOP/IIP:** Balance of Payments/International Investment Position
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A micro-data application: The Statistical Bulletin’s table on...

Non-financial Sector Indebtedness

It provides information about the indebtedness of the non-financial sector, combining several different dimensions of analysis, namely:

- Debtor and creditor sector
- Size of the company
- Type of financial instrument
- Economic activity
- Original maturity
5. The relevance of micro-data for users and for analytical purposes

- Monthly data @ T+45 days
- New chapter to the Statistical Bulletin

- Firm size and activity sector (NACE)
- Debt – new dimensions of analysis
- By creditor
- Type of instrument
  - Domestic and external loans
  - Debt securities
  - Trade credits

- Private vs. state-owned

- Domestic loans (CCR)
- CBSD

- Statistical databases
- Securities (SSIS)
- External operations (BoP / IIP)
- Fiscal number
Concluding...Innovative and flexible data solutions

- Micro-databases for statistical purposes
- Development of a statistical data warehouse

Improved quality standards
More detailed/complex and tailor-made statistics
Higher consistency across different statistical domains
Thank you for your attention