

How to increase quality in the Central Banks statistical business process? The experience of Banco de Portugal

Agostinho, António¹, Miguel, Alexandra²,

¹ *Banco de Portugal, Lisboa, Portugal, afagostinho@bportugal.pt*

² *Banco de Portugal, Lisboa, Portugal, mamiguel@bportugal.pt*

Abstract

Over the last decade the statistical function of European Authorities, and Central Banks in particular, has been particularly challenged. During this period Banco de Portugal has been developing several initiatives to ensure a statistical production with high quality standards aiming at fully meeting users' needs. This paper provides an overview of the main initiatives currently being developed by the Statistics Department of Banco de Portugal to improve the statistics data quality and to provide a more efficient data quality management in statistical systems. These new developments comprise: i) reduction of reporting burden for economic agents; ii) implementation of solutions based on elementary data to allow an integrated exploration for different purposes; iii) implementation of systems based on Business Intelligence architecture; and, iv) development of solutions for more efficient statistical communication.

Keywords: data quality management, business intelligence, production integration, statistical communication.

1. Introduction

One of the most significant features of our times is the constantly changing environment. The financial world is perhaps one of the most affected areas by the increased pace of innovations. This calls for central banks to be particularly attentive in the fields of regulation and financial supervision but also in the statistics' field as a mean to feed those two fields.

This document gives an overview of the main initiatives currently being developed by the Statistics Department of Banco de Portugal to improve the statistics data quality and to provide a more efficient data quality management in statistical systems. These new developments comprise: i) reduction of reporting burden for economic agents; ii) implementation of solutions based on elementary data to allow an integrated exploration for different purposes; iii) implementation of systems based on Business Intelligence architecture; and, iv) development of solutions for more efficient statistical communication.

2. Micro-databases in Banco de Portugal

The financial innovation and the globalization experience created new and more demanding challenges to the statistical function of central banks. On the other hand, we have learned with the global financial crisis that aggregate figures are not sufficient to fully grasp developments in the global economy and they must be complemented with micro-data, which enable to explore and drill down the heterogeneity hidden behind aggregate numbers. This new involvement leads to new requirements, such as, what kind of sources, collecting systems and statistical procedures could be particularly helpful to reduce the burden of data collection and speed up the relevant information without compromising the quality and the coverage of the statistical production.

Banco de Portugal has been confronted with the need to adapt to these new requirements and has developed a number of initiatives in order to increase the efficiency of its statistical systems management without compromising the quality and the coverage of the statistical production. The use of micro-data, i.e. individual data, and transaction-by-transaction reporting, covering different statistical areas, as well as the integration of different reporting systems, are approaches that have generally been followed by Banco de Portugal aiming at improving the availability of timely information and leaving behind some of the shortcomings associated with the conventional data collecting systems.

The granular nature of such information, together with a good coverage of the relevant sources, offers increased flexibility as regards the compilation of new statistics and getting on-time responses to ad hoc data requirements and users' requests. This flexibility is manifold, both for respondents and compilers since it:

- (i) Allows for a significant reduction of the reporting burden based on an integrated system for the collection of elementary information;
- (ii) Increases the ability of the system to deal with changes in the statistical requirements, especially in cases where further details in existing breakdowns are needed (in most cases these situations do not imply any intervention in the reporting system);
- (iii) Facilitates changes in the reporting scheme as they typically consist of additional granular items (new dimensions) that will not need to be transformed or aggregated by respondents;
- (iv) Prevents data redundancy, promoting in practice the principle that "data should be collected only once";
- (v) Leads to the definition of more efficient mechanisms for exploring data and compile statistics;
- (vi) Enables a more efficient data quality management; and, above all,
- (vii) Improves dramatically the responsiveness to *ad hoc* requests.

There are several micro-databases available in the Statistics Department of Banco de Portugal, namely:

- (i) the Securities Statistics Integrated System (SSIS) with security-by-security and investor by investor database of both securities holdings and issuances;
- (ii) the Central Credit Register (CCR) which contains granular information about credit on a borrower-by-borrower basis;
- (iii) the Central Balance Sheet Database (CBSD) which holds accounting and financial information covering the population of non-financial corporations;

- (iv) the database to collecting individual data about the new bank loans and respective interest rates to better assess current credit conditions of the sector and monetary policy transmission;
- (v) the balance of payments system with a transaction-by-transaction database for the non-financial corporations with transactions with non-residents;
- (vi) the information reported for supervision purposes which contains elementary accounting data.

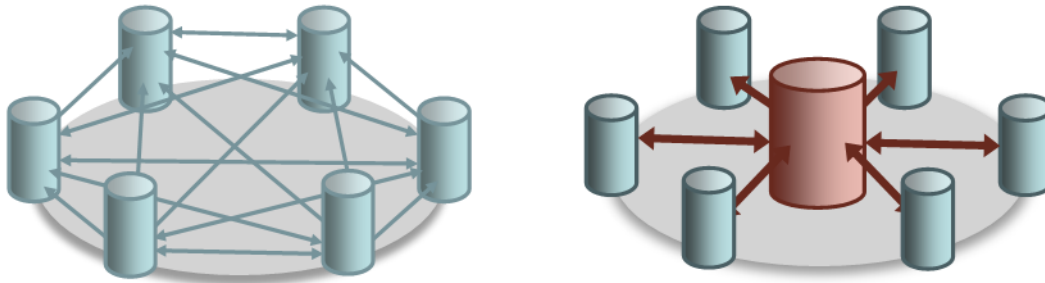
Beyond the statistical function, the micro-data can be used in many different fields of central banking like economic and financial research, financial stability and supervision activities, monetary policy and risk assessment.

3. How to integrate micro-databases

The micro-databases provide very complete information concerning their respective domains and are extremely rich. However, to obtain the maximum potential of these databases, it is essential to take the additional step and, instead of viewing them as an isolated data repositories, linking them in a single fully integrated high granular data system. By joining the information contained in each individual database, this data system will increase the potential associated with each one, enabling the crossing and combination of data, supported by the use of a common identifier for the economic agents.

In the context of the information systems developed in the framework of the statistical function, the Banco de Portugal has decided to implement an integrated information system, which helps to integrate data from various statistical fields, making it possible to cross-check and share data from different statistical sources and ensuring the linkage, coherence and quality of the compiled statistical results, as can be illustrated by the following diagram (Figure1) moving from multiple information links to a centralized data warehouse approach.

Fig. 1 Data warehouse approach



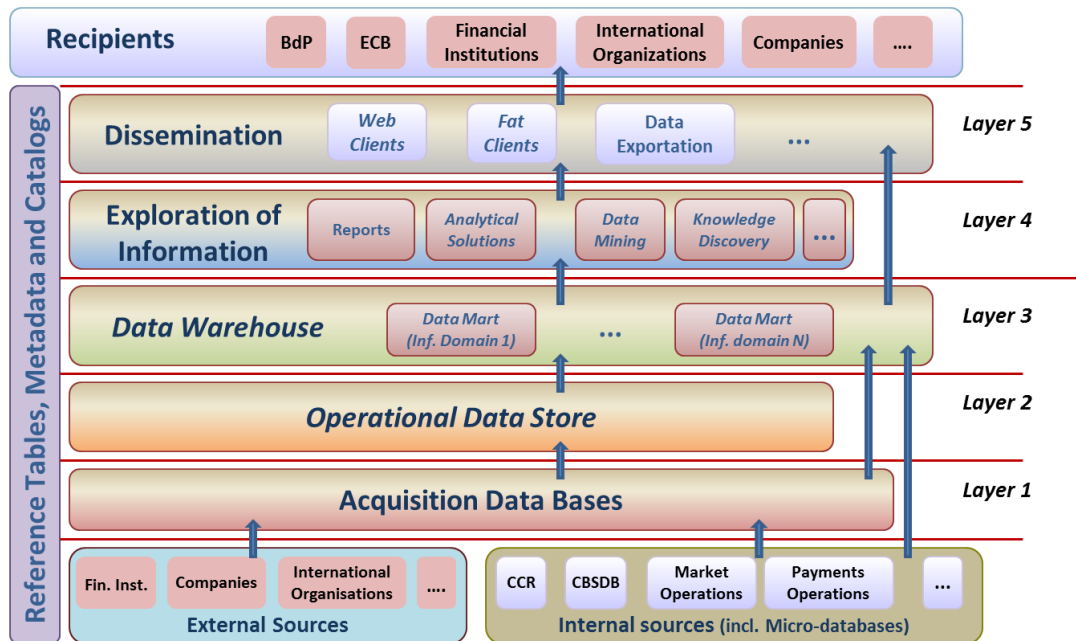
This integrated statistical information system is supported by a Business Intelligence (BI) architecture that covers the full statistics workflow since the collection of data till the exploration and the statistics dissemination.

The core issues of this system are the statistics data warehouse, where data is organized and stored following similar rules, the centralized reference tables (Reference Data Management System - SPAI) and a common IT platform where the systems for statistical production are developed.

This solution allows for greater integration and consistency between the statistical information from various sources (a central access point to every statistical data), common reference data and crosslinking information (reference tables and catalogues) and consistent IT solutions, enabling statistical production systems to be developed on a common technology infrastructure.

Given the crucial importance of the information for most of the activities of the Banco de Portugal, an information management model was developed to ensure the quality, auditability and manageability of the data. It establishes the levels of responsibility in the management of information, separating the activities related to the organization and processing of information from the analysis and exploration activities. The information architecture is based in five layers where the division between the information management and the exploration and analytic activities occurs from the 3rd to the 4th layer, as it can be seen in Figure 2.

Fig. 2 The information architecture



4. Exploring micro-databases and their integration to increase quality

The use of micro-database and transaction-by-transaction reporting enables a better data quality management. In the case of administrative sources, where the information is collected for other purposes than statistics, the nature of the information requires to be previously approved or certified, to guarantee a good approximation to statistics concepts and a minimum level of quality in the information since the beginning of the process, in line with principle 8 of the “Public commitment on European Statistics by the ESCB”. One illustrative example where this kind of data prove to be useful is in the analysis of the information reported to the CBSD by companies within the scope of Simplified Corporate Information (in Portuguese IES) that gives a complete view on the non-financial sector assets and liabilities. The IES is a joint electronic submission of accounting, fiscal and statistical information by companies to the Ministry of Finance, the Ministry of Justice, the Statistics Portugal and the Banco de Portugal and allows companies to simultaneously fulfil four reporting obligations, in a single electronic form, removing the duplication of requests and minimising the reporting burden

(under principle 9 of the public commitment). Another example concerns the information reported to prudential supervision data (accounting elementary data) reported to the Banco de Portugal and also explored for statistical purposes.

The fact that the information is reported on an individual basis enables an easier and a more efficient and effective exploration of the elementary data among different sources (within principle 10 of the public commitment). Thus, and considering that all these databases are managed in the Statistics Department of Banco de Portugal, it is quite evident the enormous potential for quality control through micro data cross-checking, of which we have been increasingly making use.

This cross-assessment can be performed either on elementary data, or on aggregated data. In this context, one should highlight the work that has been developed in terms of monitoring and controlling the overall consistency of the data reported to the Banco de Portugal within the scope of the different statistical production systems. These procedures have been set up with the purpose of promote more efficient global compilation processes and to control the overall quality of the individual statistics (enhancing principle 8 of the public commitment) and the cross-checking of the information reported to the Banco de Portugal on monetary and financial statistics, balance of payments statistics, securities statistics and central credit register. As a final level of quality control, the compilation of financial accounts, which is also under the responsibility of the Statistics Department of Banco de Portugal, may be considered as the overall cross-checking test on the consistency among the various statistics produced in the Statistics Department.

All these approaches have allowed:

- (i) changes in the organization of the financial institutions themselves in order to cope with the high quality reporting requirements of the Banco de Portugal, which, subsequently, improve the quality of the statistical information submitted to the Bank;
- (ii) to minimize the reporting burden;

- (iii) a better data quality management;
- (iv) a greater efficiency to statistical exploration supported in more flexible tools;
- (v) to enhance the overall consistency of the statistics produced in the various domains in the Statistics Department;
- (vi) to lead to higher quality standards and efficiency.

5. Statistical communication

One of the main purposes of the Statistics Department of the Banco de Portugal is to ensure the production of high quality statistics aiming at fully meeting users' needs. By providing more complete and detailed statistics and the necessary tools to answer to users' needs, the Banco de Portugal increases transparency and promotes statistical communication. However, the dissemination of statistics based on micro-database, requires that the Banco de Portugal ensures that statistical dissemination is in accordance with the confidentiality rules in order to preserve confidence in the statistical system by reporters of this elementary information (in line with principle 5 of the public commitment).

In this context, Banco de Portugal has started a new project to disseminate statistical information to allow an easy and quick access to a wide range of statistical series and indicators produced by the Bank and other national and international institutions. The Statistical Portal aims to disseminate statistical data and metadata based on the standardization of all the statistics domains around the same concepts and information structures, so that the statistical information disclosed should be clear and comprehensible, in charts, tables and infographics that facilitate the analysis and allow a correct interpretation of the economic results (enhancing principle 15 of the public commitment). The new Statistical Portal is planned to be released towards the end of 2016 and will put together 32 statistics domains, 48 dimensions of analyse, over 4 thousand of classifications, disclosing more than 5 million of series.

6. Conclusions

The use of micro-databases and transaction-by-transaction reporting, covering different statistical domains, has entailed several and enormous advantages, in particular in terms of good population coverage, reduction of the reporting costs, more efficient data quality management, greater efficiency to statistical exploration, more complete and detailed statistics and faster response to ad hoc data requirements.

To properly manage this information a robust data information solution based on a data warehouse system supported by a BI architecture is essential to lead to higher quality standards and efficiency and respond to the challenges ahead.

Finally, another aspect that must be highlighted is that the shared use of these databases and more flexible exploring tools gave a strong impetus to deepen the coordination among all staff in charge of the statistical production in the Statistics Department, which was translated into an increasingly cooperative work, with positive impact on the quality and consistency among the various statistics produced in the Banco de Portugal.

Bibliography

Agostinho, A. and Valério, J. (2010), Exploring micro-databases for statistical quality control: the experience of Banco de Portugal, Q2010, Helsinki

Almeida, A. and Damia, V. (2013), Challenges and prospects for setting up a European Union shared system on credit, Workshop on Integrated Management of Micro-databases, Porto

Matos, J. C. (2015), Reaping the benefits of using integrated micro-data for statistical purposes ... and beyond, STATISTIKA – Statistics and Economy Journal, Vol. 95 (3) 2015

Lima, F. and Drumond, I. (2015), How to keep statistics' customers happy? Use micro-databases!, Irving Fisher Committee Workshop, Warsaw