

SUPPLEMENT TO THE STATISTICAL BULLETIN

3|2012



Papers presented by the
Statistics Department in national
and international fora

December 2012



Banco de Portugal

EUROSISTEMA

SUPPLEMENT TO THE
STATISTICAL BULLETIN
3|2012

Papers presented by the
Statistics Department in national
and international *fora*

December 2012

The analyses, opinions and findings of the following papers
represent the views of the authors, which are not necessarily
those of the Banco de Portugal or the Eurosystem

Lisbon, 2012

Available at
www.bportugal.pt
Statistical Publications



Banco de Portugal
EUROSYSTEM

BANCO DE PORTUGAL

Av. Almirante Reis, 71

1150-012 Lisboa

www.bportugal.pt

Edition

Statistics Department

Edifício Adamastor Torre A

Av. D. João II, Lote 1.12.02

Design, printing and finishing

Departamento de Serviços de Apoio

Área de Documentação, Edições e Museu

Serviço de Edições e Publicações

Lisbon, 2012

Number of copies

500

- ISSN (print) - 1646-8007

- ISSN (online) - 2182-1747

- Legal Deposit 262419/07

TABLE OF CONTENTS

GENERAL PAPERS PRESENTED BY THE STATISTICS DEPARTMENT IN NATIONAL AND INTERNATIONAL *FORA*

5 *Foreword*

11 **I. A COMMITMENT TO QUALITY**

13 - Statistical Quality Control and the Operational Risk Management
Framework | António Agostinho, Manuela Raminhos and Alexandra Miguel

19 - Data quality management in statistical systems: the importance
of Business Intelligence | Maria do Carmo Aguiar and Isabel Lavrador

27 - Drawn to Excellence - A sample of issues critical for compiling
and disseminating Central Bank Statistics | João Cadete de Matos

35 **II. GOOD PRACTICES IN COMMUNICATING STATISTICS**

37 - Understanding central banking statistics to enhance statistical
and financial literacy in Europe | Luís Teles Dias and Per Nymand-Andersen

47 - Statistical information in mobile devices | José Faustino

51 **III. STATISTICAL SYSTEMS' DESIGN**

53 - Innovative solutions to compile balance of payments statistics
minimizing costs and ensuring quality | João Cadete de Matos
and Carla Marques

63 - Business Intelligence in Statistical Systems: a stepwise
approach | Maria do Carmo Aguiar and Rita Sanchas

67 **IV. THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS**

69 - Identifying holding companies and special purpose entities
in the wake of the ESA 2010 implementation: a contribute
from *Banco de Portugal* | Ana M. de Almeida, Teresa Crespo,
Paula Menezes and Lúcia Nunes

79 **V. MICRO-DATABASES: POTENTIAL FOR STATISTICAL DATA**

81 - Data validation methods and tools in the framework
of a security-by-security / investor-by-investor system | Maria do Carmo Aguiar

87	- Reaping the benefits of integrating the micro-databases available at the <i>Banco de Portugal</i> Paula Menezes and Luís D'Aguiar
93	VI. COMPILING STATISTICS: SPECIFIC CASE STUDIES
95	- Statistics on securitisation in Portugal – Compilation issues and data assessment Ana M. de Almeida and Teresa Crespo
105	- Compilation and measurement issues for the financial sector: the cases for FISIM and securitisation in Portugal Ana M. de Almeida, Teresa Crespo and Sílvia Fonte Santa
123	Supplements to the Statistical Bulletin

GENERAL PAPERS PRESENTED BY THE STATISTICS DEPARTMENT IN NATIONAL AND INTERNATIONAL FORA

FOREWORD

The present issue of the Supplement to the Statistical Bulletin collects a number of technical papers prepared by the Statistics Department of *Banco de Portugal* and recently featured in various national and international *fora*.

The selected papers reflect the diversity of the statistics currently under the responsibility of the Statistics Department. The issue is divided into six main sections: quality, good practices in communicating statistics, statistical systems' design, the implementation of the new international manuals, micro databases and its potential use for statistical data and specific case studies.

To guide the reader through the collection of papers included in this Supplement, a brief summary for each paper is provided.

I. A COMMITMENT TO QUALITY

António Agostinho, Alexandra Miguel and Manuela Raminhos, "Statistical Quality Control and the Operational Risk Management Framework", Athens (Greece), May 2012¹

One of the main purposes of the Statistics Department of the *Banco de Portugal* is to ensure a statistical production with high quality standards aiming at fully meeting user's needs, in particular those of the European Central Bank (ECB), the Eurostat and other national and international organisations. Statistical quality control is chiefly concerned in making sure that several procedures and working arrangements are in place to provide for effective and efficient statistical processes, to minimise the risk of errors or weaknesses in procedures or systems or in source material. Operational risk management (ORM) is the entire process of continuously and systematically identifying, analysing, responding to, reporting on and monitoring operational risks. The statistical quality control and the ORM in the framework of national central banks' statistical activities are "two sides of the same coin": one focuses on the means to deal with the risks of errors, data mismatching and information' gaps (by controlling) and the other focuses on the objectives (by managing risks). A definition of statistical quality, as well as the various possibilities of assessing it, is also described, focusing specially on statistical quality reports.

Maria do Carmo Aguiar and Isabel Lavrador, "Data quality management in statistical systems: the importance of business intelligence", Athens (Greece), May 2012²

The financial turmoil of 2007-2009 highlighted the importance of timely, efficient and reliable financial data to support monetary policy and financial stability decisions. Furthermore, the new demands and requirements for the compilation of statistics also revealed that most of the traditional statistical methods of compilation and analysis do not meet all the data quality requirements. Since then, the development of new methods and tools to manage and improve data quality in financial statistics has been a reality in Statistical Units in many countries. The new generation of Business Intelligence (BI) tools has proved to be extremely helpful in providing a more efficient data quality management in already existing systems. These tools support organisation-wide analysis, the integration of different statistical domains, and enable complex analysis to be made available to decision making bodies. This paper describes the

¹ European Conference on Quality in Official Statistics (Q2012)

² European Conference on Quality in Official Statistics (Q2012)

strategy followed in some of the European System of Central Banks (ESCB) statistical systems. First, it is highlighted the experience of the *Banco de Portugal* with the Securities Statistics Integrated System (SSIS) and its integration in a BI architecture that combines a data warehouse, centralised reference tables, and a common IT platform. Next, it is described the work in progress regarding the securities holdings experimental statistics developed by the ESCB and the challenges to fulfil data quality management requirements. In an environment in permanent change these databases are used as examples to describe the undergoing developments concerning the evolution towards a BI architecture.

João Cadete de Matos, "Drawn to Excellence – a sample of issues critical for compiling and disseminating central bank statistics", Almada (Portugal), July 2012³

The speaker⁴ expressed his views about the importance and the uses of central bank statistics, on the basis of his own experience as head of the business area in charge of statistics at the *Banco de Portugal*.

He started by stating the nature and purpose of the Bank's mission and on the way it impacts its statistical function. From there, he explained the reasons why statistics do matter, particularly as they provide the foundation for the conduct and development of economic analysis and policy-making and are essential for the economic agents to make their own decisions. He then moved to the issue of quality in statistics, particularly the need to observe the best practices and to procure highly qualified staff that adheres to the utmost ethical and professional standards, for the central bank to be credible and effective.

The broad spectrum of statistical products for which the Statistics Department of the *Banco de Portugal* is responsible and their main uses were also addressed by the speaker. He was most emphatic as regards the re-use of the available micro-data to help the central bank's statistics in keeping up with the rapid changes of modern time: He expressly referred the potential of micro-data to support the drilling down of the most summarised levels of data to the most detailed ones, thus helping to confirm (or invalidate) trends and developments conveyed by macroeconomic statistics. Other issues tackled by the speaker were the need to actively foster interagency cooperation, both at national and international levels, and to define an effective statistical communication policy.

He concluded his keynote speech by saying that producing and disseminating high-quality statistics on the financial sector remains a core task of the central bank and an important input not only for decision-making processes but also for the communication of the Bank's decisions, and thus, for the credibility of its actions as the Portuguese central bank and a member of the Eurosystem.

II. GOOD PRACTICES IN COMMUNICATING STATISTICS

Luís Teles Dias and Per Nymand-Andersen (ECB), "Understanding central banking statistics to enhance statistical and financial literacy in Europe", Visegrád (Hungary), June 2011⁵

The perceived remoteness of the statistical function within national and European institutions is likely to continue in the future and has been amplified by the current financial market turmoil. European citizens demand that national and European institutions justify their existence and be transparent in, and accountable for, their actions, for example on the basis of impartial and reliable statistics. This paper argues that the national and European statistical function must step up efforts and proactively provide tailored and enhanced statistical information useful for European businesses and citizens. Enhancing statistics and financial literacy in Europe is necessary as the world becomes smaller and citizens are flooded with ever-increasing volumes

³ Joint Meeting of the y-BIS and the JSPE

⁴ Keynote speech at the 2012 y-BIS & JSPE Joint Meeting

⁵ Conference on "'Communication: a tool to enhance statistical culture'" organised by the Hungarian EU Presidency

of information from private and public sources and with ever more advanced technologies. In such a fast-changing and complex world, statistical and financial literacy is becoming increasingly important in order to enable citizens to participate efficiently in the society in which they live. This paper addresses the challenges statisticians face in order to enhance statistical and financial literacy within European democracies. It provides examples of ways of presenting statistical facts to the general public using statistics from the central banking community as part of fostering transparency on monetary policy decisions and their underlying evidence-based statistics.

José Faustino, "Statistical Information in mobile devices", Tomar (Portugal), March 2012⁶

As Einstein said, "information is not knowledge": knowledge is a complex and dynamic process involving cognitive mechanisms. Two of the main goals of the Statistics Department in *Banco de Portugal* are: (i) to improve statistical communication; and (ii) to increase statistical literacy, helping the users to get knowledge from the information. The main purpose of this paper is to describe two actions taken recently to increase people's interest in statistics, aiming to play a key role in activating the cognitive mechanism. Firstly, the publication of the "Main indicators" (started in 22 June 2011) and, secondly, the launch of BPstat mobile (in 13 February 2012).

III. STATISTICAL SYSTEMS' DESIGN

João Cadete de Matos and Carla Marques, "Innovative solutions to compile Balance of Payments minimising costs and ensuring quality" Luxembourg, February 2012⁷

Currently, statistical compilers face the challenge of implementing efficient and integrated statistical systems that can adapt to constantly changing reality, not only in terms of data requirements and outputs but also in terms of data sources. Other matter of concern is the adequate balance between costs (both for the compilers and, most importantly, for the reporting entities) and quality, measured as the relevance and accuracy of the data provided to users. This paper presents the Portuguese experience in designing a new system for the collection and compilation of balance of payments and international investment position statistics, based on an integrated approach combining settlements' data with other data sources, e.g. Payment Systems Statistics, and reinforcing direct reporting.

One major cornerstone of such system will be a new framework for the articulation between non-financial corporations and the *Banco de Portugal*, via the internet, which transcends the reporting of information for external statistics purposes. This framework will also support the feedback to reporting entities and, concurrently, will promote the value of statistics near those entities that tend to neglect the usefulness of statistical data. The new framework will also support and enhance the articulation with other relevant domains, such as the existing direct investment survey, the central balance sheet information or the data originated from the central credit register.

Rita Sanchas and Maria do Carmo Aguiar, "Business Intelligence in Statistical Systems: a stepwise approach", Tomar (Portugal), March 2012⁸

Statistics compilation comprises several challenges: from data collection to data processing, quality management and output production and dissemination. Business intelligence (BI) architectures include features that are fundamental to statistical systems, namely integration and visualisation. This paper describes the strategy followed by *Banco de Portugal* towards BI which relies on the definition of an

⁶ XIX Jornadas de Classificação e Análise de Dados (JOCLAD2012)

⁷ Seminar on Business Related Statistics, 28-29 February, 2012

⁸ XIX Jornadas de Classificação e Análise de Dados (JOCLAD2012)

architecture framework to be followed by new statistical systems, built upon three pillars: a data warehouse, centralised reference tables and a common IT platform.

IV. THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS

Ana M. de Almeida, M. Teresa Crespo, Paula Menezes and Lígia Nunes, "Identifying holding companies and special purpose entities in the wake of the ESA 2010 implementation: a contribute from Banco de Portugal", Paris (France), October 2012⁹

The new international methodological manuals aim to provide a more adequate statistical treatment to special purpose entities (SPEs) identifying their main characteristics. Simultaneously, the scope of the financial sector will enlarge encompassing the holding companies; taking into account that the new European System of National and Regional Accounts – ESA 2010 – aims to distinguish more accurately holding companies from head-offices, which will be reclassified from the non-financial corporations, a sector shift impacting the macroeconomic aggregates is expected. On the basis of the ongoing work in Portugal, the construction of a decision tree upon the international manuals guidelines provides an overview of the SPEs sector classification; and the preliminary results for Portugal indicate, at this stage, that within the SPEs universe using specific parameters and thresholds quantitative criteria is mostly focused for characterising holdings. In operational terms, difficulties exist when trying to clearly identify these entities and it would be appropriate to discuss at an international level the adoption of harmonised criteria to be applied by the several countries.

V. MICRO-DATABASES: POTENTIAL FOR STATISTICAL DATA

Maria do Carmo Aguiar, "Data validation methods and tools in the framework of a security-by-security / investor-by-investor system", Copenhagen (Denmark), September 2011¹⁰

The Securities Statistics Integrated System (SSIS) is an information system created in 1999 and managed by the Statistics Department of *Banco de Portugal* that stores data on securities issues and portfolios (holdings) on a "security-by-security" (s-b-s) and "investor-by-investor" (i-b-i) basis (in the case of investors belonging to the households' institutional sector, data is aggregated by the investor's country).

The use of micro-databases and item-by-item reporting, covering different areas of the economy and the financial markets, has been helping National Central Banks worldwide to overcome a number of shortcomings related to the conventional data collecting systems. The use of such data for statistical purposes can deliver significant reductions in respondent burden, higher data quality and enhanced responsiveness to ad hoc information requests from the users. There is a shift of the burden from the respondent to the compiler and therefore the need for efficient tools and procedures in order to minimise this burden.

Data quality management is one of the most resource consuming tasks in the statistical value chain. Good statistics depend on good data and this implies efficient data control mechanisms in order to timely detect and correct data errors or inconsistencies. This paper describes the current data validation methods and procedures used in the production of securities holdings statistics at *Banco de Portugal*.

⁹ 11th biennial session of the Group of Experts on National Accounts of the United Nations Economic Commission for Europe

¹⁰ Workshop on optimising the data checking process of banking statistics

Paula Menezes and Luís D'Aguiar, "Reaping the benefits of integrating the micro-databases available at the Banco de Portugal", Tomar (Portugal) March 2012¹¹

Data are critically important to good decision-making. In an increasingly complex economy, conventional data collecting schemes are no longer sufficient. To deal with the challenge of maintaining its statistics relevant to the users in an ever-shifting environment, the *Banco de Portugal* decided to explore the largely unused statistical potential of the available micro-databases and to integrate the existing administrative and survey data, thus enhancing the basic information infrastructure while protecting confidentiality.

Currently, data used for the compilation of external statistics is largely provided by the resident banking system which reports all the transactions – on their own account and also on behalf of clients - that pass through this system and additionally, by a group of non-financial corporations which reports transactions that occur in accounts held outside the resident banking system. Thus, the current system relies on almost census data. However, each firm has itself the ability to provide exhaustive and full detailed information on the operations with the rest of the world, namely those that are settled outside the resident banking system. In this respect, under the new report system each firm is considered to play the main role as data provider.

This paper identifies a sample of the representative firms which will be future core data providers. The definition of this sample aims to maintain a high level of quality statistics' standards. The sampling is based upon a mixed design that ensures the commitment between an optimal allocation, the exhaustive selection of a key group firms and the representativeness for all reporting items and relevant geographical areas. In general terms, the sampling strategy must ensure adequate levels of quality for a maximum of 308 reporting items, broken down by geographical area. The sampling frame was obtained through the existing sources which are currently available, namely the settlement's data reported by the resident banking system and other non-monetary direct reporters. The results of the performed analysis is a sample size of about 5,000 entities from a universe of close to 47,000 firms. In addition, these firms were distinguished in approximately 100 strata.

VI. COMPILING STATISTICS: SPECIFIC CASE STUDIES

Ana M. de Almeida and M.Teresa Crespo, "Statistics on securitisation in Portugal – Compilation issues and data assessment", Nazaré (Portugal), October 2011¹²

This document summarises the securitisation process in Portugal from 2000 to 2010 and its emphasis on the compilation of statistics by *Banco de Portugal*. The legislative framework is presented, identifying the main regulations establishing the Portuguese legal framework for this type of transaction. Thereafter the securitisation sector is described, and the two types of Portuguese securitisation entities are identified – the Securitisation Funds (FTCs, under the Portuguese acronym) and the Securitisation Companies (STCs, under the Portuguese acronym) – as well as the main differences in securitisation transactions as carried out by each of these entities. Also, the main features of securitisation transactions are shown, depending on whether or not they are derecognised from the originator's balance sheet, with the due statistical implications.

The process for compiling securitisation statistics is subsequently reported, identifying the basic information from accounting data sent to the Securities Market Commission (CMVM, under the Portuguese acronym) for supervisory purposes. These data are complemented with information from various administrative sources and statistical data available at the *Banco de Portugal*. A number of statistical outputs for the most recent years are also shown, notably the different stages identified over the last ten years in the securitisation sector in Portugal, particularly as a reflection of a number of events observed in international

¹¹ XIX Jornadas de Classificação e Análise de Dados (JOCLAD2012)

¹² XIX Congress of Sociedade Portuguesa de Estatística, in a session of Econometrics

financial markets. In addition, securitisation played an increasingly relevant role in the Portuguese financial sector's balance sheet, accounting for 8% of the total at the end of 2010. The document ends with a reference to the different media through which FTCs and STCs statistics are released by *Banco de Portugal* and to the dissemination of European Central Bank (ECB) information on the size of this phenomenon in the European Monetary Union.

Ana M. de Almeida, M. Teresa Crespo and Sílvia F. Santa, "Compilation and measurement issues for the financial sector: the cases for FISIM and securitisation in Portugal", Genève (Switzerland), May 2012¹³

In the wake of the financial crisis, this note addresses a number of issues affecting the compilation and measurement of the financial sector activity in the Portuguese economy. The approach that has been adopted for measuring the service charges implicit in the financial intermediation activity brought about some theoretically surprising outcomes, like the occurrence of negative FISIM and the high volatility of FISIM allocation, which have consequences on GDP measures. Considering these developments, the revised European System of Accounts advocates steps forward in the FISIM computation in order to have a more reliable measure of financial activity. This note advocates the use of different interbank reference rates conferring the maturity and currency in which loans and deposits are denominated. Regarding the Portuguese economy, the adoption of this methodology, as an alternative to the one based solely on Euribor, leads to an increase of the impact on the GDP justified by the FISIM allocated to the final consumption of households. With regard to securitisation, after a brief reference to the applicable legal framework, the note subsequently depicts some of the main features of Portuguese securitisation structures, describes the sources and methods used in the compilation of related statistics and offers a quantitative assessment of the securitisation market in Portugal. To conclude, a few short remarks on data dissemination and institutional reporting are put forward.

¹³ 11th biennial session of the Group of Experts on National Accounts of the United Nations Economic Commission for Europe

A COMMITMENT TO QUALITY



Statistical Quality Control and the Operational Risk
Management Framework

Data quality management in statistical systems: the importance
of business intelligence

Drawn to Excellence – a sample of issues critical
for compiling and disseminating central bank statistics

I A COMMITMENT TO QUALITY

STATISTICAL QUALITY CONTROL AND THE OPERATIONAL RISK MANAGEMENT FRAMEWORK¹

Agostinho, António

Head of Statistics Audit Unit

Banco de Portugal, Statistics Department

E-mail: afagostinho@bportugal.pt

Raminhos, Manuela

Economist-Statistician

Banco de Portugal, Statistics Department

E-mail: mraminhos@bportugal.pt

Miguel, Alexandra

Statistician

Banco de Portugal, Statistics Department

E-mail: mamiguel@bportugal.pt

1 THE BANCO DE PORTUGAL EXPERIENCE IN THE FIELD OF STATISTICAL QUALITY CONTROL

The *Banco de Portugal's* strategy to further enhance the overall quality management procedures along all the phases of statistical compilation and dissemination processes underwent a restructuration of its organization. To cope with the rising demand of resources emerging from statistical production requirements, it was decided to centralize the statistical function in one specific Department of the *Banco de Portugal*, the Statistics Department, fully committed to statistical processes (conception, development, compilation and dissemination), which centralized the entire statistical function, including its dissemination, and, in the beginning of 2004 by creating a special Unit - the Statistics Audit Unit (SAU) - an innovation in the ESCB, covering the following main functions:

- Data quality and legal provisions' full compliance assessment
- Audit operations to the statistics produced in the Statistics Department
- Support to the Head of the Department in the field of Internal/ECB Audits.

Besides all the internal quality control procedures that are implemented in each statistics compilation domain of the responsibility of the Statistics Department, one of the ways to address Statistical Quality Control is through the development of statistics audit operations. In this context, it should be referred that, to assess the quality of the statistical procedures in place, the quality dimensions, as laid down

¹ Presented at the European Conference on Quality in Official Statistics (Q2012), Athens (Greece), May 2012.

in the IMF Data Quality Assessment Framework (DQAF), are used. This framework provides a flexible structure for statistical quality assessment along the different phases of the statistical process from data collecting through processing up to dissemination. At European level, a reference should also be made to the European Statistics Code of Practice by the European Statistical System (ESS) and to the Public commitment on European statistics by the European System of Central Banks (ESCB).

Once analysed and evaluated the different phases of statistical production procedures, the organizational and functioning aspects and the efficiency of the procedures in place, SAU issues, when it applies, suggestions / recommendations on current practices or suggests new procedures and/or organizational arrangements.

Moreover, after each statistics audit operation SAU defines a considerable set of structured quality indicators, to be compiled on a regular basis (generally on a yearly basis), on the quality of the statistical production performing regularly Statistical Quality Reports. These indicators are conditional to the specific nature of each statistic and to the corresponding milestones in its statistical production process and are systematized and presented to the compilation unit and to the Head of the Statistics Department under the form of a “Statistical Audit Report” and a “Statistical Quality Report”, whose investigations on recommendations and suggestions will further consolidate the management indicators that are currently used to monitor the quality of the statistical compilation processes in the *Banco de Portugal*.

2 OPERATIONAL RISK MANAGEMENT (ORM)

ORM is an integral part of the ESCB/Eurosystem governance and management processes. It is part of the overall risk management within the ESCB/Eurosystem. The objectives of ORM in the ESCB/Eurosystem are to better manage uncertainty and to enable a better-informed decision-making process with regard to risk management. ORM does not cover the management of financial risks (i.e. credit and market risks).

Operational risk management is the entire process of continuously and systematically identifying, analysing, responding to, reporting on and monitoring operational risks.

Within the scope of this policy operational risk is defined as the risk of negative financial, business and/or reputational impacts resulting from inadequate or failed internal governance and business processes, people, systems, or from external events.

To facilitate harmonised risk assessment and response and consistent reporting, a common language, i.e. the operational risk taxonomy, and a common risk tolerance policy should be used by all the national central banks (NCBs).

The operational risk management process comprises the following steps:

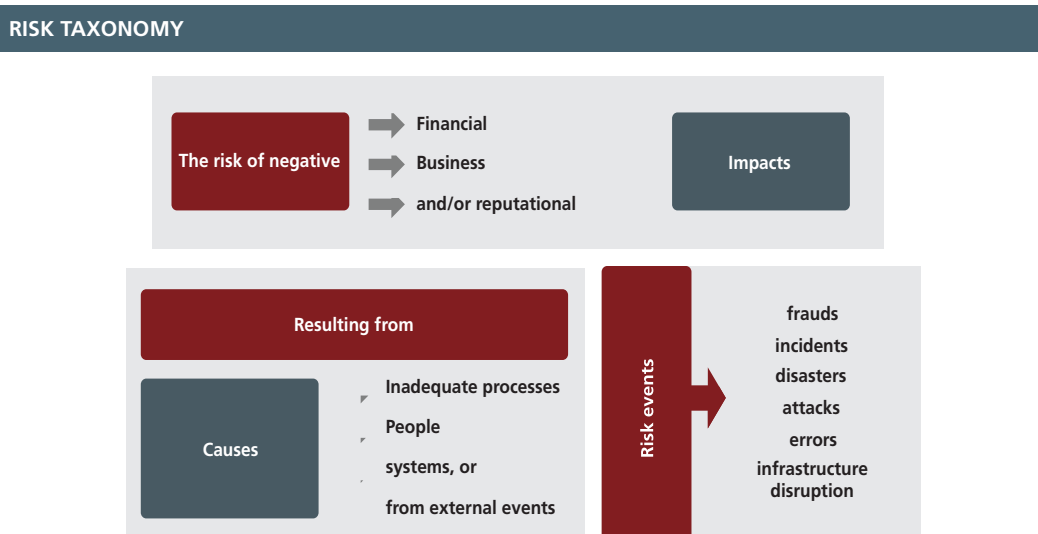
- risk identification – Identification and record of all the risks related to all the tasks, processes and objectives
- risk assessment - The risk assessment considers both impact and likelihood as well as existing controls/ control objectives as a basis for determining how the risks should be managed
- risk response - Different risk response strategies can be applied to a specific risk: risks can be avoided, mitigated, transferred, or accepted
- risk reporting – It aims to present an overview of the risk situation at a given point in time
- and monitoring - It is an ongoing process that continuously checks the status of the key operational risks and related controls/ control objectives, verifies that they remain in line with the operational risk

tolerance policy, ensures that action plans are implemented according to agreed schedules, scans the business environment and best practices to detect emerging new operational risks and define control objectives, and ensures that incidents are proactively monitored and reported.

The ESCB/Eurosystem risk taxonomy, which provides a clear and common language for all operational risks, is based on three interlinked components: root causes, risk events and risk impacts. Each risk event may have multiple root causes and impacts.

- The taxonomy of root causes distinguishes four categories of level 1 (people, governance and business processes, systems and external events) complying with the operational risk definition

Figure 1



- The risk events taxonomy is divided in seven categories (errors or failures, infrastructure disruption, occupational incidents, frauds, disasters, attacks and other events)
- The ESCB/Eurosystem ORM policy distinguishes three types of impact: business, financial and reputational impact.

The ORM assessment exercises imply the conduction of the following steps, in a first stage:

- Step 1: identify the tasks and processes
- Step 2: conduct a criticality assessment of each task and process, and
- Step 3: conduct a "quick scan" analysis.

Only high-level processes, i.e. those leading to ultimate deliverables, should be identified.

The criticality assessment is mainly a "one-off exercise" that is to be updated in case that new processes are implemented and/or existing processes are subject to major changes. The criticality assessment aims at prioritisation of tasks and processes to provide focus in subsequent risk assessments. This is achieved by categorizing and ranking the processes by determining in a structured manner the risk impact in terms of the achievement of business and/or financial and/or reputational objectives if one or several of the worst case scenarios would materialise. The "quick scan" is performed on the ESCB/Eurosystem processes assessed as most critical according to the criticality assessment mentioned above.

3 STATISTICAL QUALITY CONTROL VERSUS OPERATIONAL RISK MANAGEMENT

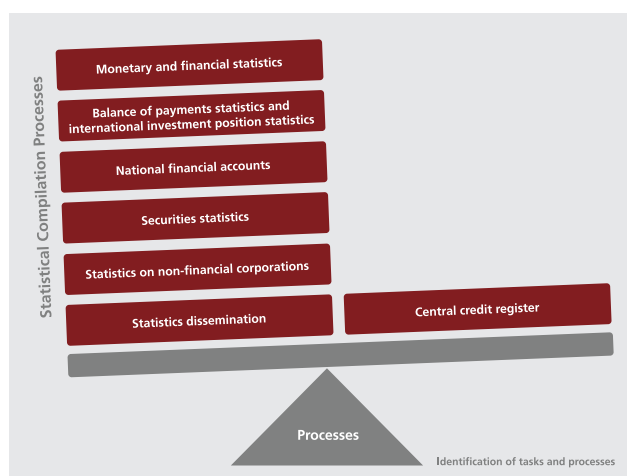
The operational risk associated with the statistical function was identified as being basically:

- the risk of reputational and impact image (credibility and confidence) damages to the Central Bank; and/or
- the inability to achieve its business objectives (satisfaction of the users' statistics needs and fully compliance with statistical commitments towards national and international organizations).

In keeping with ORM line of action, the Statistics Department of *Banco de Portugal* has identified and characterised, in a first step, seven high level processes: Monetary and financial statistics; Balance of payments statistics and international investment position statistics; National financial accounts; Securities statistics; Non-financial corporation's statistics from the Central balance-sheet database; Statistics dissemination; and, Central credit register (CCR). The first five processes concern the compilation of statistics and the last two regard, respectively, the dissemination of statistics and a special service in connection with an administrative database storing credit-related information.

Figure 2

STATISTICS DEPARTMENT HIGH LEVEL PROCESSES



For each of the first five statistical compilation processes identified in the Statistics Department five sub-processes were identified: i) Methodological design; ii) Collection of raw statistical data; iii) Quality control; iv) Data processing; and, v) Analysis of the results for each of the process outputs. For the statistics dissemination process three additional sub-processes were also identified: i) Statistical information repositories; ii) Consistency analysis of the results; and, iii) Dissemination of the statistical outputs.

The Central Credit Register is an administrative database storing credit-related information supplied by the participants (financial institutions that grant credit) on an individual basis that is used for their assessment of the risks attached to granting/extending credit. For this process four additional sub-processes were also identified.

In a second step *Banco de Portugal* has conducted a criticality assessment considering the worst case scenarios categorised and ranked for each task and process, identifying the worst possible scenarios for each one. The scenarios considered have been measured according the risk of negative financial, business and/or reputational impacts. *Banco de Portugal* identified for each one what would be the worst consequence, considering that controls have failed, which are abbreviated presented as follows:

- Integrity => loss of quality information and correctness of the output
- Confidentiality => intentional or unintentional use or dissemination of raw data
- Availability => total or partial unavailability of statistical compilation or dissemination
- Internal events => intentional or unintentional use or dissemination of data with loss of confidentiality.

External events were considered unlikely in the statistical compilation or dissemination context.

Moreover, for each phase of the cycle of evolution of each process (sub-processes) the potential risks have been identified, namely:

- Errors or failures in internal and/or external data reporting with impact on loss of quality information and correctness of the output
- Errors or failures in the quality requirements of data reporting with impact on loss of quality information and correctness of the output
- Human errors or failures in compilation, processing, validation, analysis and delivery of output with impact on loss of quality information
- Lack of confidentiality due to intentional or unintentional use or dissemination of elementary data
- Deliberate acts manipulating, concealing or damaging elementary confidential data
- Errors or failures in the communication, reporting, validation, exploratory analysis and delivery of output with impact on loss of quality information
- Lack of skilled staff or expertise
- Natural catastrophes.

On the national level, for each of the mentioned potential risks were identified: i) its descriptions, ii) its possible causes, and iii) the respective mitigation factors.

However, implicit in the different phases of statistical production procedures, and as part of the compilation cycle, a set of quality control procedures and working arrangements are already implemented covering all the phases of statistical production process – data collecting, data processing and analysis and statistical dissemination – which contribute to the mitigation of the several risks identified and mentioned above.

4 WORK AHEAD IN THE FIELD OF ORM APPLIED TO STATISTICS

The statistical quality control and the ORM in the framework of national central banks' statistical activities are "two sides of the same coin": one focuses on the means to deal with the risks of errors, data mismatching and information' gaps (by controlling risks) and the other focuses on the objectives, identifying, analysing, responding to, reporting on and monitoring operational risks (by managing risks).

To enhance the quality statistical control, the Statistics Department, in particular the Statistical Audit Unit follows the approach of:

- Identifying all statistical processes and tasks that may be subject to statistical auditing
- Using the Self Assessment Questionnaire (SAQ) – first step of a statistic audit operation - to assess the respective processes and tasks
- Identifying the risk events to be considered in the ORM (from the above information along with other sources)
- Identifying the risk treatments/mitigation (issuing recommendations, namely in the Statistical Audit and Statistical Quality Reports that are conducted on an yearly basis following each of the statistical audit operations performed by SAU, and sharing the good practices among the various units)
- Monitoring the risk (assessment of the implementation of the recommendations included in the Statistical Audit Reports through regular follow-ups).

In fact according to *Banco de Portugal*' experience in Statistical Quality Control some common fields were found with ORM. Moreover, the statistical quality assessment along the different phases of the statistical process, from data collection up to dissemination, proved to be a valuable tool to achieve the objectives of ORM in the ESCB/Eurosystem, to better manage uncertainty and to enable a better informed decision-making process with regard to risk management.

REFERENCES

Agostinho, A. & Valério, M. J. (2007), Statistics Audit: the experience of Banco de Portugal.

Agostinho, A. & Valério, M. J. (2008), Statistical Quality Control: the experience of the Banco de Portugal.

Banco de Portugal (2012), *Suplemento ao Boletim Estatístico 1/2012, A Gestão da Qualidade nas Estatísticas do Banco de Portugal*.

ESCB/Eurosystem (2008) Operational Risk Management Guiding Principles.

ESCB/Eurosystem (2008) Operational Risk Management Policy.

DATA QUALITY MANAGEMENT IN STATISTICAL SYSTEMS: THE IMPORTANCE OF BUSINESS INTELLIGENCE¹

Aguiar, Maria do Carmo

Head of Securities Holdings Statistics Unit

Banco de Portugal, Statistics Department

E-mail: mcaguiar@bportugal.pt

Lavrador, Isabel

Economist-Statistician

European Central Bank

E-mail: isabel.lavrador@ecb.europa.eu

1 INTRODUCTION

The financial turmoil of 2007-2009 highlighted the importance of timely, efficient and reliable financial data to support monetary policy and financial stability decisions. Furthermore, the new demands and requirements for the compilation of statistics also revealed that most of the traditional statistical methods of compilation and analysis do not meet all the data quality requirements. Since then, the potential of Business Intelligence (BI) tools has been discussed and assessed in Statistical Units in many countries. The benefits of using these tools range from a more efficient production process and data quality management up to a higher flexibility in producing outputs.

Nelson (2007) describes Business Intelligence as *“a broad category of applications and technologies for gathering, storing, analysing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support systems, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining”*.

Making use of the experience of the Banco de Portugal with the Securities Statistics Integrated System (SSIS) and the European System of Central Banks (ESCB) Securities Holdings Experimental Statistics (SHES) database we examine how the production of statistical output on holdings of securities can benefit from a BI framework. In particular, we illustrate how these tools and methods can improve the quality of statistics and help to meet users' needs. For instance, using BI tools data quality checks that are usually done using manual procedures could be automatised, mainly due to the existence of a common

¹ Presented at the European Conference on Quality in Official Statistics (Q2012), Athens (Greece), May 2012.

framework and high degree of integration among statistics. In addition, the use of centralised reference tables would pave the way towards an harmonised and consistent approach across statistics (both at national and ESCB level). Finally, a BI solution would provide a more efficient data quality management and increase the flexibility in compiling statistical output.

The remainder of this paper is structured as follows: Section 2 briefly describes the SSIS set up by the Banco de Portugal for the production of securities issues and holdings statistics; Section 3 describes the approach followed by the ESCB in the compilation of SHES and the links between national and ESCB systems; Section 4 provides some evidence on the advantages of a BI architecture for the fulfilment of data quality management principles on securities holdings statistics; Section 5 summarises the main benefits and challenges in developing a BI framework.

2 THE SECURITIES STATISTICS INTEGRATED SYSTEM (SSIS)

The SSIS is an information system set up in 1999 which is managed by the Statistics Department of the *Banco de Portugal*. This system stores security-by-security (s-b-s) data on securities issues and s-b-s and investor-by-investor data on securities portfolios². Data on securities issues and holdings are mainly identified by international securities identification number (ISIN code) and include monthly stocks and transactions of securities other than shares (short- and long-term) and shares and other equity (*Banco de Portugal*, 2008; Aguiar, 2007).

In the segment of issues, data regarding securities issued by resident entities in Portugal, either issues taking place in the Portuguese market or in external markets are pooled in a reference database and follow the methodology defined in the European System of National and Regional Accounts (ESA 95)³. This database allows for the collection, validation and production of statistics on securities issued by resident sectors in Portugal and abroad. Regarding the segment of securities holdings, micro-data on investments by resident entities in domestic and foreign securities, as well as on the portfolios of non-resident investors in domestic securities are collected⁴. SSIS is an input for the compilation of statistics on monetary and financial institutions (MFI), investment funds statistics, balance of payments and international investment position (b.o.p./i.i.p.), and of financial accounts.

It is worth mentioning three reference components of SSIS that are used for the compilation of securities issues and holdings statistics. First, the “entities table” enables the classification of issuers and investors according to a centralised and harmonised approach across the different statistics produced by the *Banco de Portugal*. Second, the “database on domestic securities issues” is used for the classification of domestic securities; in addition, this database is also a data source for the Centralised Securities Database (CSDB) set up by the ESCB, in what concerns securities issued by Portuguese entities. Finally, foreign securities are classified according to the data available in the CSDB, via ISIN code. This database stores information on the characteristics of individual securities and issuers, with the aim of providing complete, accurate, consistent and up-to-date information on all individual securities relevant for the statistical purposes of the ESCB. The attributes in the CSDB include type of instrument, name, sector or sub-sector and country of the issuer, issue date, redemption date, the currency of denomination, the issue price, the redemption price and the outstanding amount or the market capitalisation (ECB, 2010; Mink *et al.*, 2012).

² Except in the case of investors belonging to the households' institutional sector, which data is aggregated by investor's country.

³ Data on issues are collected from several sources such as the Ministry of Justice, the Securities Market Commission, the General Government, National Numbering Agency (Interbolsa) and Euronext.

⁴ Information on holdings of securities is reported by custodians (banks, dealers and brokers), the Securities Market Commission, and other resident entities.

The existence of reference databases with individual information on securities and issuers allows for the collection of statistical information from reporting entities on a s-b-s basis. This approach implies lower reporting costs, given that there is no need for reporters to aggregate background information according to multiple criteria. Furthermore it enables a better information monitoring and a greater flexibility when exploring data and building statistical analyses (Lavrador, 2010).

2.1 Data Quality in the SSIS

Apart from the reference databases described above, the core SSIS relies on three databases. First, collected data are stored and validated (first level of quality control) in the “transactional database”. Data estimation of missing information is also done in this database. Second, validated and “enriched” data are daily copied to the so called “exploration database”. A second level of quality control is made in this database on aggregated data, by carrying out consistency tests and comparisons with other information sources, enabling also coverage assessment. Finally, statistical outputs are produced from the “exploration database” as well as from the “multidimensional database”, which enables user friendly multidimensional analysis of the information (Aguiar and Martins, 2011).

In the securities issues segment, several comparisons are performed. For instance, issues from MFIs are compared with their liabilities on securities reported in their balance sheet. In the securities holdings segment, in addition to the confrontation between positions and transactions, comparisons are also made between the total amounts reported in portfolios and end-of-period positions of domestic securities issued, as well as with other information sources, both internal and external, at an aggregated level. In the context of internal sources, comparisons are made with data from MFIs’ balance sheet reported to MFI statistics, data from non-financial corporations’ balance sheet received by the central balance-sheet database, and with information from external transactions reported to b.o.p./i.i.p. statistics. Within the scope of external sources, comparisons are made with data from several sources, namely the Securities Market Commission, the Portuguese Treasury and Government Debt Agency, the Portuguese Civil Servants Retirement and Survivor Pensions Funds and the Portuguese Insurance and Pension Funds Supervisory Authority.

The final check regards the comparison between SSIS “From-whom-to-whom”⁵ tables and Financial Accounts “From-whom-to-whom” tables, in which there is a hierarchy of sources (e.g. MFI data comes from MFI statistics; rest of the world data comes from b.o.p./i.i.p. statistics) (Aguiar, 2011).

2.2 Moving towards a BI architecture

In 2008, the Information Technology Department and the Statistics Department of the *Banco de Portugal* worked together to formalise a definition of a common BI infrastructure to be the basis for all statistical processes. This framework considers three main pillars, upon which future developments in statistical systems should rely: a shared IT platform, common reference tables and a statistical data warehouse.

In the context of these BI improvements, the architecture of SSIS is currently under a modernisation project. Therefore, all data processes in the statistical value chain will be revised according to the three main pillars mentioned above. Following a stepwise approach, the implementation of this architecture framework will contribute to the construction of a coherent and truly integrated statistical system as opposed to having multiple systems that coexist but are not connected in an efficient way (Aguiar and Martins, 2011).

⁵ Double-entry matrices that allow evaluating which institutional sectors are financing the economy, in terms of securities. These tables show the holdings of various financial instruments by the different institutional sectors, both on the asset and the liability side.

Shortly, the acquisition step, which consists of collecting and gathering information, will be split from the data processing step, in order to prevent new/updated data from interfering in the ongoing work. Thereafter, two independent databases will coexist and validated data will migrate to the production database under specific circumstances. At this stage, the centralised reference database is highly relevant to ensure consistent data classification and conciliation with already existent information.

The production step includes performing quality checks as well as data estimation. It will rely on an autonomous database that will keep information related to each statistic production cycle and be accessed only for this purpose. When data is deemed to be ready for exploration, it becomes part of the common data warehouse, so as to become available for different users, possibly grouped by profiles of permissions. The statistical analysis will benefit from other information made available in the common source. To access it and extract the intended data, analytical IT tools provided by the defined common platform will play a major role.

The dissemination of predefined data is achieved by selecting a subset of the final information in the statistical data warehouse, which depends on the final recipient, either official entities or public in general.

3 THE SHES: INTEGRATION BETWEEN NATIONAL AND ESCB SYSTEMS

With the purpose of overcoming the need of statistics on financial linkages between countries and sectors and to improve transparency of sectoral exposures regarding securities, the ESCB launched an initiative to enhance the coverage of securities holdings statistics, and therefore has started the collection of experimental data on holdings of securities, reported by euro area (and some European Union) National Central Banks (NCBs), in 2009.

As explained by Sola and Strobbe (2010), s-b-s data are collected on a quarterly basis, in the form of micro statistics, aggregated by holder sectors or sub-sectors, as defined by the ESA95⁶. This experimental data collection scheme aims at identifying the holdings of securities by all euro area investor sectors. Detailed data on securities holdings include stocks of short- and long-term debt securities, quoted shares and investment fund shares. The methodological framework applied to this experimental database follows the national accounts statistical standards (SNA93, ESA95, supplemented by the BIS/ECB/IMF Handbook on Securities Statistics).

An ESCB project was launched to set up an experimental IT infrastructure in which securities holdings data could be pooled together. This experimental database has been used as a testing platform that merges individual security data on euro area holdings of securities identified by ISIN code, with reference data from the CSDB, for the classification of financial instruments and issuer entities (including institutional sectors). In addition, this database has been used to compile both national and euro area aggregates on an experimental basis.

The compilation process starts with the transmission of national statistics from NCBs to the ECB on a best effort basis. Regarding the data on securities holdings available in the SSIS at the *Banco de Portugal*, a sub-dataset is transmitted to the experimental database. For a certain reference quarter, s-b-s data identified by ISIN code are aggregated by institutional sector of the holder, and are then transmitted to the experimental database.

Data reported by countries participating in this experimental exercise are compiled and testing output is produced. In addition, this database has proved to be extremely useful in assessing the harmonisation between different statistical domains (namely with euro area accounts statistics, i.i.p. statistics and MFI

⁶ The main sectors and sub-sectors considered in the compilation of SHES are: Monetary Financial Institutions; Insurance Corporations and Pension Funds; Other Financial Intermediaries and Financial Auxiliaries; Non-Financial Corporations; and Households.

statistics), in measuring the coverage of holdings data by country and euro area level and in evaluating the quality of data and the fulfilment of some user needs in a timely and efficient manner.

4 DATA QUALITY CHECKS AT ESCB LEVEL

The quality of the data transmitted is regularly monitored through internal ECB consistency checks. In addition, a cross-checking with alternative sources is performed, in order to assess the consistency of the experimental dataset.

Macro-checks on euro area and national aggregates on holdings of securities can be performed, namely comparing these data with published data on euro area and national accounts, in order to assess the coverage and consistency of experimental data. Moreover, combining euro area accounts data with i.i.p. data provides an additional comparison test to evaluate the coverage and completeness of experimental data on holdings by participant countries and the rest of the world⁷. In addition, comparison with MFI statistics is also possible, namely regarding some segments of securities (e.g. monetary assets). Furthermore, a comparison between securities issues (outstanding amounts) and securities holdings (holdings at market values) can be performed, with the purpose of assessing the coverage, plausibility and consistency of certain types of securities. This database also enables the compilation of experimental "From-whom-to-whom" tables not only for the euro area as one entity, but also with an identification of each national holding and issuing sector. Data can be compared and aggregated across countries, detailed by certain breakdowns (e.g. type of instrument, currency and maturity), and for the creditors and debtors (by residency, sector and sub-sector). Finally, given the granularity level of this experimental database, checks on s-b-s data can also be performed.

In the experimental database some data quality checks are done following manual procedures, mainly due to the fact that the SHES and other related statistical domains are not completely integrated, making the compilation process less flexible and not efficient from the long term perspective. Therefore, future developments should consider a solution that enables the development of an integrated approach for the compilation of securities holdings statistics and all related statistics in a consistent, comparable and objective manner. In addition, the availability of multidimensional and visualisation tools would increase the accessibility and flexibility of the overall system and would allow the development of tailor made analyses. In short, the quality principles defined in the ECB Statistics Quality Framework (2008) would be accomplished in a more efficient manner. A proposal of such a solution, based on BI tools, is presented in the next section.

5 DEVELOPING NATIONAL AND ESCB SECURITIES HOLDINGS STATISTICS FOLLOWING A BI ARCHITECTURE

The development of new methods and tools to manage and improve data quality in financial statistics has been a reality in Statistical Units in many countries. The new generation of BI tools has proved to be extremely helpful in providing a more efficient data quality management, especially to deal with the evolution of methodologies and statistical demands.

Making use of the experience of the *Banco de Portugal* in compiling securities holdings statistics and given that the ESCB compilation of securities holdings experimental statistics follows a significant degree of integration with other statistics, the optimal solution for building statistical systems should follow a BI framework.

The existence of statistical systems built upon BI tools, both at national and ESCB level is a strategy to deal with the production of statistics in a timely manner, due to the increase in the overall efficiency of the

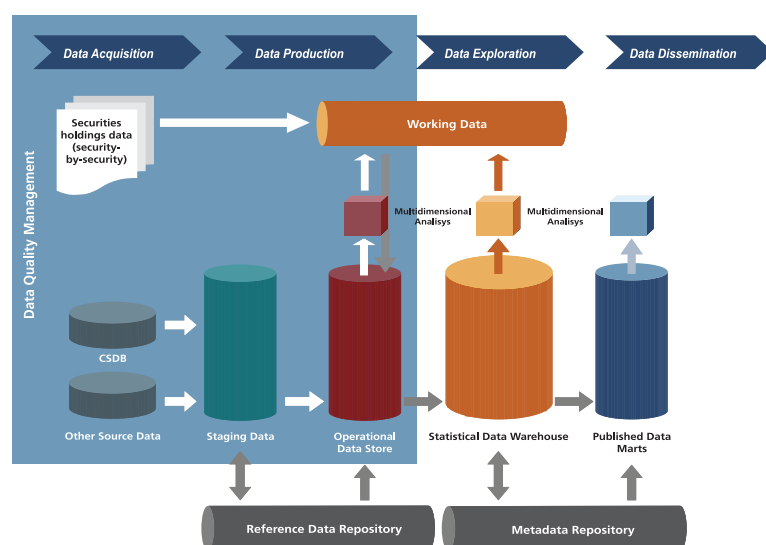
⁷ The term "rest of the world" on an euro area perspective consists of all the countries outside the Eurosystem.

systems in terms of data acquisition, processing, exploration and dissemination. Moreover, it is a way to harmonise the production of statistics, to improve consistency and coordination of methodological concepts and, finally, to improve the data quality management.

Figure 1 presents a proposal regarding the process for the compilation of securities holdings statistics following a BI framework.

Figure 1

PRODUCTION PROCESS OF SECURITIES HOLDINGS STATISTICS FOLLOWING A BI ARCHITECTURE



First, the compilation process is centralised in an IT platform shared by all statistics produced in one Statistical Unit. This would ensure the integration between different statistical domains that have a significant level of interdependency (namely securities holdings statistics, euro area and national accounts statistics, b.o.p./i.i.p. statistics, MFI statistics), would improve the access to these statistics and would increase business and IT expertise in compiling statistics.

Second, the use of reference databases, such as the CSDB would be an improvement at both national and European level, allowing synchronisation and standardisation in terms of characterisation of reference data. Furthermore, once the classification of information is in line with common reference tables, the data compiled are consistent, coherent and comparable.

The data acquisition and data processing would also benefit from the existence of a statistical data warehouse that would work as input for some statistics used in data quality control (such as euro area and national accounts statistics, b.o.p./i.i.p. statistics, MFI statistics). In addition, the data quality management could be improved and the data quality checks described in previous sections would be simplified if data from different statistical domains are centralised in the same statistical data warehouse, where the interrelations between the different statistics could be explored.

Moreover, the existence of a multidimensional infrastructure would contribute to the development of robust and complex statistical analyses with different levels of granularity, and would enable the transformation of granular data on securities holdings (s-b-s) into a statistical output used for further analysis. In addition, ad-hoc requests and tailor made analyses on securities holdings could be developed, by country or aggregated by a group of countries. Furthermore, this exploration tool increases visualisation and flexibility in compiling various statistics in a short time frame.

Finally, from the dissemination point of view, the access to a statistical data warehouse would increase accessibility and clarity, subject to the filtering of confidential data by pre-defined rules.

6 FINAL REMARKS

The importance of statistics on holdings of securities has been in the spot light since the financial crisis of 2007-2009, especially due to the need to identify linkages between countries and sectors and the lack of information on counterparty exposures. For this reason, a new experimental database on securities holdings was set up by the ESCB, with the aim of combining information available on holdings by different institutional sectors in euro area countries with information on individual issuers around the world.

The experience acquired with this database, including the integration of a national system (SSIS managed by the *Banco de Portugal*) into the ESCB framework revealed the need to examine the possibilities to improve the overall efficiency of the statistical framework.

Therefore, this study puts forward a definition of a BI framework for the compilation of securities holdings statistics and all related statistics. This approach would pave the way towards an integration and interconnection of different statistical domains both at national and ESCB level, with significant gains in terms of consistency and comparability, an integrated production of national and ESCB statistics and an improvement in the harmonisation of compilation methodologies. Furthermore, the availability of BI exploration tools would increase visualisation and flexibility in compiling different statistics in a short time frame and would enhance responsiveness to ad hoc data requests from the users. The flexibility of such IT systems would also permit to derive new integrated statistics in response to financial developments and innovations.

However, the implementation of a BI framework is not straightforward. The main challenges comprise setting up a complex IT system, where structured and unstructured data with different levels of detail and granularity could be combined. Furthermore, the development of standardised reference tables could not be treated as a simple add up of micro-data collected by different sources, but compounding and priority rules should be established to build these tables. The same concept applies to the integration between national and ESCB statistical systems: methodological rules and frameworks should be agreed and followed by all reporting agents, in order to have harmonised, consistent and comparable statistics. Finally, costs constraints should be taken into account.

First and foremost, BI tools applied to statistical systems enable a more efficient and effective production of statistical data and grant an enhanced data quality management. Extended to a global scale, with the development of such IT systems across national data producers and the combination of different statistical domains, the benefits could be spread out worldwide.

REFERENCES

- Aguiar, M. (2007), Integrated statistical systems: evolution or revolution?, Irving Fisher Committee, IFC Bulletin No. 28: The IFC's contribution to the 56th ISI Session, Lisbon, August 2007.
- Aguiar, M. (2011), Data validation methods and tools in the framework of a security-by-security/ investor-by-investor system, Workshop on optimising the data checking process of banking statistics, Danmarks Nationalbank, Copenhagen, September 2011.
- Aguiar, M., Martins, C. (2011) Adding business intelligence to statistical systems. The experience of Banco de Portugal, NTTS 2011 – New Techniques and Technologies for Statistics, Brussels, February 2011.
- Banco de Portugal (2008), Supplement 2/2008 to the Statistical Bulletin - Securities Statistics: Integrated System Features and Main Results.

Bank for International Settlements, International Monetary Fund, and European Central Bank (2010), Handbook on Securities Statistics.

European Central Bank (2008), ECB Statistics Quality Framework.

European Central Bank (2010), The Centralised Securities Database in brief.

European Commission/Eurostat (1995), European System of Accounts.

Lavrador, I. (2010), Exploring the statistical potential of micro-databases, Irving Fisher Committee, IFC Bulletin No. 34: Proceedings of the IFC Conference on "Initiatives to address data gaps revealed by the financial crisis", Bank for International Settlements, Basel, August 2010.

Mink, R., Fassler, S., Shrestha, M. (2012), An Integrated Framework for Financial Positions and Flows on a From-Whom-To-Whom Basis: Concepts, Status, and Prospects, IMF Working Paper No. 12/57.

Nelson, Greg (2007), Introduction to the SAS® 9 Business Intelligence Platform: A Tutorial, SAS Global Forum 2007.

Sola, P. Strobbe, F. (2010), Addressing data gaps revealed by the financial crisis: European Central Bank statistics on holdings of securities, Irving Fisher Committee, IFC Bulletin N. ° 34: Proceedings of the Fifth IFC Conference on "Initiatives to address data gaps revealed by the financial crisis", Bank for International Settlements, Basel, August 2010.

DRAWN TO EXCELLENCE - A SAMPLE OF ISSUES CRITICAL FOR COMPILING AND DISSEMINATING CENTRAL BANK STATISTICS¹

Cadete de Matos, João

Director

Banco de Portugal, Statistics Department

E-mail: jcmatos@bportugal.pt

Colleagues, fellow statisticians, ladies and gentlemen,

It is my pleasure to take part in this joint meeting of international young business and industrial statisticians and young Portuguese statisticians. I should like to begin by thanking the organisers for inviting me to speak and all the participants to this meeting for their valuable and engaging contributions.

Allow me to use this opportunity to express some views on the importance and uses of central bank statistics that I will draw on my own experience as head of the business area in charge of statistics at the Banco de Portugal.

1 THE MISSION

But first, a few words on the nature and purpose of the Bank's mission and on the way it impacts its statistical function.

As you all know, the *Banco de Portugal* (hereinafter referred as "the Bank") is the central bank of the Portuguese Republic. But is also an integral part of the European System of Central Banks, which means that our primary mission has to be fully in line with its objectives and that we must participate in the performance of the tasks entrusted to it, namely by (i) contributing to price stability, through the decentralised implementation of monetary policy, defined by the Governing Council of the European Central Bank and by (ii) ensuring the stability of the financial system, in cooperation with the domestic and international structures assuming responsibilities in this field. The European System of Central Banks is entitled to collect statistical information necessary for fulfilling these tasks, either from national authorities or directly from economic agents. Its statistical function is based on a legal mandate to collect all necessary and relevant data in order to produce and disseminate impartial, reliable, appropriate, timely, consistent and accessible statistics in the areas under the European System of Central Banks' responsibility. In addition, the European System of Central Banks cooperates closely with the European Statistical System – an operational partnership that comprises Eurostat (the Statistical Office of the European Union), the national statistical institutes and other national or regional statistical authorities –, both systems sharing responsibilities in the field of European Statistics.

To carry out its mission, the Bank acts in strict compliance with the principle of independence as laid down in the *Treaty on European Union*, as well as with the provisions of the *Statute of the European System of Central Banks and of the European Central Bank*, and follows the guidelines and instructions issued by this latter institution.

¹ Presented at the Joint Meeting of the y-BIS and the JSPE, Almada (Portugal), July 2012

The Bank ensures the collection, compilation and dissemination of monetary, financial, foreign exchange and balance of payments statistics, particularly within the scope of its cooperation with the European Central Bank. For this purpose, the Bank is entitled to require of any public or private body the direct supply of whatever information deemed necessary. At the same time, the Bank ensures an efficient interaction with the information providers and the full satisfaction of users, strictly in line with its commitments to the European Central Bank and other national and international bodies and in compliance with the strictest international standards.

Improving the quality of the services rendered to the community is also one of the priorities of the Bank. Besides the production of economic and statistical information of high quality for the various economic agents, the Bank promotes statistical and financial literacy and provides specialised information related to the Central Balance-Sheet database, the central credit register and the list of cheque defaulters, among others.

2 WHY STATISTICS MATTER?

Considering that I'm addressing an audience of current and future statisticians, I don't think I need to go into much detail here to justify the usefulness of statistics. I'd rather quote instead the wise words written by Ms. Shaïda Badiée, Director of the *World Bank's Development Data Group*, in her Preface to the World Development Indicators, in March 2000:

"Why do statistics matter? Put simply, they are the evidence on which policies are built. They help to identify needs, set goals, and monitor progress. Without good statistics, the development process is blind – policy-makers cannot learn from their mistakes, and the public cannot hold them accountable".

This citation is particularly fitting in making the case for having good central bank statistics: they provide the foundation for the conduct and development of economic analysis and policy-making and are essential for the economic agents to make their own decisions.

Indeed, statistics is a core activity of central banking. The availability of reliable, accurate and timely euro area monetary and financial statistics, as well as balance of payments and other external statistics, is a precondition for an effective and correct assessment of the monetary and economic situation and future prospects – and is of critical importance for the European Central Bank's decision-making, not only as regards the single monetary policy, but also to the other tasks of the European System of Central Banks, including those in the area of financial stability. That said, euro area statistics are mostly based on the data that each of the national central banks of the Economic and Monetary Union Member-States currently submits to the European Central Bank, which is the main recipient of national central bank statistics.

3 A COMMITMENT TO QUALITY

The Bank attaches great importance to the quality of its statistics. In carrying out its statistical function, the *Banco de Portugal* has built a reputation of competence and effectiveness, by observing the best practices and procuring a highly qualified staff that adheres to the highest ethical and professional standards.

Actually, the statistics disseminated by the central bank must be credible to be effective. If the statistical information that the Bank puts out is not trusted, or is constantly being called into question by the recipients, such effectiveness is seriously undermined.

When communicating its statistics to the public at large, the Bank should be in a position whereby the normal reaction of users, knowing that data originate from the *Banco de Portugal*, is to assume that the information is trustworthy, objective, as accurate as the Bank asserts, and therefore fit-for-use. In addition, users should expect that, if they do have any concerns about the data, the Bank will be ready and willing to answer those concerns openly and to take corrective action if necessary.

Therefore, to ensure high levels of user confidence in its statistics, the Bank guides its statistical tasks by the principles of impartiality, scientific independence, statistical confidentiality, cost-effectiveness and prudence in the requests to reporting entities, as well as high quality standards in statistical production and dissemination. For this purpose, (i) procedures are in place to plan and monitor the quality of the various aspects related to data collection, and (ii) processing and statistical communication are constantly assessed against the best practices and internationally accepted concepts, definitions and standards. It therefore takes into consideration internationally agreed quality standards, such as those formulated in the International Monetary Fund's *Special Data Dissemination Standard and Data Quality Assessment Framework*, which are in turn rooted in the United Nations' *Fundamental Principles of Official Statistics*.

The Bank also seeks to be an organisation with state-of-the-art processes and technologies, which uses its resources in a rational and efficient manner and with a sense of social responsibility.

This commitment to quality is unambiguously assumed within the organisational structure of the Bank's Statistics Department, which includes a technical unit for statistical auditing, specifically in charge of verifying compliance with the laws and regulations applicable in the field of statistics. For now, no such service is formally provided by the statistics departments of the other euro area national central banks.

4 A BROAD SPECTRUM OF STATISTICAL PRODUCTS

The Statistics Department of the *Banco de Portugal* is the business area responsible for the collection, compilation, validation and dissemination of, inter alia, the monetary and financial statistics, the balance of payments and the international investment position, and the national financial accounts, particularly within the scope of its cooperation with the European Central Bank.

These statistics are used both internally – e.g., in research or in estimates and forecasts for the Portuguese economy – and externally – e.g., as regards the statistical commitments arising from the Bank's participation in international organisations, particularly the European Central Bank.

Monetary and financial statistics cover a wide array of time-series and indicators in the following main segments:

- Balance sheet statistics concerning the monetary financial institutions sector.
- Interest rate statistics of monetary financial institutions, relating to loans and deposits denominated in euro to/from households and non-financial corporations that are resident in countries participating in the European Monetary Union. These statistics cover interest rates on new businesses and stocks and the respective associated amounts.
- Statistics of non-monetary financial institutions other than insurance corporations and pension funds, relating to the balance sheet and income and expenses by type of non-monetary financial institutions.

Securities statistics are a particularly important instrument for the analysis of the financial markets within the framework of the economy's financial investments and financing sources.

The **balance of payments** records of the value of Portugal's transactions with the rest of the world in goods, services, income, and transfers, as well as the changes in country's financial claims on, and liabilities to, the rest of the world. The **international investment position** is basically a statement setting out the value and composition of the country's international financial assets and liabilities, at a particular point in time.

National financial accounts by institutional sector constitute, so to say, the capstone of central bank statistics, presenting a comprehensive overview of economic and financial developments in the economy, including a consistent breakdown by institutional sector. Financial accounts transactions describe the financial investments and financing sources of the different institutional sectors of the economy and of the total economy vis-à-vis the rest of the world, allowing for the calculation of the respective financial savings during a given period. Financial accounts stocks make it possible to determine the net financial worth of the different institutional sectors, i.e. the difference between stocks of assets and of liabilities in the different financial instruments at a given moment in time.

The Bank also contributes to the **government finance statistics** by compiling the public debt figures.

The statistics currently produced by the *Banco de Portugal* are widely disseminated as a public service via the monthly *Statistical Bulletin* and on the Bank's internet website. More recently, the Bank unveiled a new statistical service for portable devices, called "BPstat Mobile", which allows users to access, from a portable device (e.g., smart phones and tablet computers), Portugal's main economic indicators as well as the statistical series (and the corresponding metadata) in the Bank's *Statistical Interactive Database*, BPstat | Statistics online.

As said, the European Central Bank is undoubtedly the main recipient of the Bank's statistics. Other important groups of users are: the general government, market participants, financial analysts, the media, the research community, the academia, and the public at large. Typically, the national central bank will provide each of these segments of users with the aggregate or (subject to specific rules and protocols) the granular data they need, on the basis of a previous assessment of their statistical requirements.

5 KEEP THE CUSTOMER SATISFIED

Statistics have to keep up with the rapid changes of modern times. Economies are constantly faced with new challenges and these need to be reflected in statistical data, and presented to users in an accurate, relevant and reliable way. Policy-makers, financial supervisors and regulators around the world require as much rich and timely information as possible so as to be able to take appropriate decisions.

The *Banco de Portugal* – or any other responsible central bank, for that matter – cannot afford having a complacent or unresponsive attitude towards the statistics for which it is accountable. To retain relevancy over time, these statistics must grasp the speed and the scope of the main stakeholders' ever-increasing demand for comprehensive, detailed and high-quality information.

However, continuously adapting the statistics to new phenomena has obvious limitations. Conventional data collecting systems cannot simply keep on expanding indefinitely just to cope with the need to fill the information gaps perceived by the users or in anticipation to their future data requirements. Amongst the many motives for not pursuing recurrently this approach I could point out, inter alia, the following:

- The resulting overburdening of respondents goes against established best practices.
- The related initial and maintenance costs are far from being negligible, both to the agency that collects the data and to the respondents.
- New statistical datasets (or significant enhancements to existing ones) require lengthy preparation time (years, rather than months) and, once launched, are supposed to remain in operation for a prolonged period of time (typically some years, in the case of euro area statistics). This time-lag could even be further extended, should the revision result from a major change in the principal methodological manuals, as it often happens.

- *Ad hoc* surveys are, in general, too time-consuming and expensive, not to mention reliant upon the willingness to participate on the part of the target population.

Data are critically important in making well-informed decisions. Lack of data can lead to an inefficient allocation of resources and imposes high costs on the society. In an increasingly complex economy, the traditional production of standard statistical tables addressing a set of pre-posed questions may no longer suffice.

Considering that the response given by conventional data collecting systems to new statistical demands is problematic, costly and could possibly turn out to be counterproductive helps to understand why the Bank has increasingly been reusing the available micro-data, thereby recognising its usefulness to address new statistical issues and challenges as they arise.

By further exploring of the largely unused statistical potential of already existing data sources, the Bank succeed in helping to keep its statistics relevant to the users, in a shifting and more demanding environment, while attending to the need to maintain the reporting burden on respondents at an acceptable level, thereby enhancing the overall efficiency of the statistical framework.

The micro-databases managed by the Bank's Statistics Department include:

- The *Securities Statistics Integrated System* database, which comprises detailed information on securities issues and portfolios, on a "security-by-security" and "investor-by-investor" basis. It provides, in a single repository, data on the securities issues and holdings required by the different statistical domains (e.g., monetary and financial statistics, external statistics, securities statistics and financial accounts), thus replacing the separate and distinctive data storing systems that were previously in place.
- The *Central Credit Register*, which is an administrative database that stores credit-related information supplied by all the resident credit-granting financial institutions.
- The *Central Balance-Sheet Database*, which stores granular information on virtually all the resident corporations, collected through the so-called *Informação Empresarial Simplificada*, a joint endeavour by four distinct Portuguese public entities – the Ministry of Finance, the Ministry of Justice, the *Instituto Nacional de Estatística* and the *Banco de Portugal* – consisting of a yearly submission of information by corporations, in a single, paper-free, electronic form, to fulfil reporting obligations of accounting, fiscal and statistical nature.

Besides complementing and/or cross-checking the information gathered through more conventional channels, these data have proved to be of great importance in monitoring and assessing developments in the Portuguese financial system, especially in the wake of the recent financial crisis. Notably, this approach has permitted so far, inter alia:

- Improving the responsiveness to users' requirements, particularly those arising from *ad hoc* information requests, with proven results in reducing or eliminating data gaps and in monitoring and assessing developments in the Portuguese financial system.
- Curtailing the follow-up procedures as regards data collecting schemes, whereby respondents are re-contacted after the initial submission of data, to obtain missing information and/or to verify and, if necessary, to correct questionable data.
- Enhancing the quality control procedures, thus increasing the efficiency of the production process and improving the quality of end-products.
- Avoiding data redundancy, while at the same time expanding significantly the range of statistics available.

In particular, the use of the available micro-databases for the compilation of the Portuguese flow-of-funds within the national financial accounts framework has proved to be extremely helpful, as it allows for a much better understanding of the interlinks within the resident economy and *vis-à-vis* the rest of the world.

Moreover, micro-data have the potential to support, if need be, the drilling down of the most summarized levels of data to the most detailed ones, which may help to confirm (or to disprove) trends and developments conveyed by macroeconomic statistics and, concomitantly, to explore and/or to elucidate their possible implications for, e.g., financial stability analysis and systemic risk assessment.

6 WORKING TOGETHER WORKS

There is ample motivation for actively fostering interagency cooperation, both at national and international levels. To begin with, such an approach allows for a higher level of transparency within the process of producing and disseminating statistics, by effectively clarifying the responsibilities committed to each of the statistical agencies involved. It also helps to improve data coherence with regard to terminology, classifications, definitions and other metadata, thus facilitating the integration of data produced from different sources. In addition, it promotes steady efficiency gains in the statistical system, by reducing possible duplication of effort in reporting, hence contributing to a better allocation of resources, minimizing the reporting burden of respondents and avoiding data redundancy. Therefore, ensuring an effective cooperation between national central banks as producers of statistics, and other statistical authorities – first and foremost the national statistical offices – is instrumental to the quality, relevancy and cost-effectiveness of macroeconomic statistics.

Clearly, interagency cooperation in the statistical field can be pursued through different channels and institutional settings. Let me give you a few examples: (i) partaking responsibilities for the national statistical programme; (ii) setting up cooperation agreements; (iii) arranging joint data collections; (iv) sharing data; and (v) providing technical assistance and common training initiatives. However, regardless of the particular form of interagency cooperation chosen, it is vital that such organizational arrangements remains focused upon optimising the efficiency of the statistical production processes.

The recognition of the importance for the efficiency of the statistical system of having robust working agreements among the main national statistical agencies, led the competent authorities in many countries, including Portugal, to evolve to more formal institutional arrangements as regards interagency statistical collaboration. In accordance with the new legal framework of the National Statistical System that entered into force in 2008, the Portuguese central bank is now recognised as a Statistical Authority and formally incorporated in the National Statistical System's structure as well as in the High Statistical Council, a state entity that is responsible for guiding and coordinating the National Statistical System. An important feature of the National Statistical System Law concerns the increased emphasis given to promoting coordination between statistical authorities, in particular between the Portuguese national statistical office and the Bank. In fact, the *Banco de Portugal* has been actively involved in interagency collaboration in the field of statistics for more than ten years, not only with the *Instituto Nacional de Estatística* but also with other entities with a vested interest in statistics, as was the case in the putting through of *Informação Empresarial Simplificada* – an institutional arrangement that I've mentioned earlier in my communication and an excellent illustration of the popular adage "*Working together works!*".

At international level, cooperation within the European Union assumes a major role. As I said earlier in my communication, the European System of Central Banks cooperates closely with the European Statistical System, both sharing responsibilities in the field of European Statistics. The *Banco de Portugal* is part of the European System of Central Banks and, as such, has been deeply involved in the building up of a harmonised European statistical framework, not only directly with the European Central Bank and the other national central banks but also with the Statistical Office of the European Communities (or Eurostat) and the national statistical offices of the European Union Member-States, under the umbrella of the *Memorandum of*

Understanding on economic and financial statistics agreed between the Directorate General for Statistics of the European Central Bank and Eurostat. This *Memorandum of Understanding* makes it possible for the European Central Bank and the Eurostat to apply the same statistical framework to the whole European Union while taking the national contributions into account.

7 GETTING THE MESSAGE ACROSS

Statistics are a public good – and, as such, a responsibility that central banks have to Society. To live up to this responsibility, central banks must develop adequate means to disseminate – or rather, to communicate – statistical information to precisely those who might need or want it, in a form that facilitates proper interpretation and meaningful comparisons. Indeed, one could say that having people understanding and making good use of statistics is, at least, as important as producing high quality data. This is particularly important at the present juncture, where we've been witnessing a steady rise of mistrust in the euro project by both financial markets and the wider public in the wake of the recent financial crisis and the ensuing sovereign debt crisis.

I have already stressed the importance of central banks statistics to core stakeholders – e.g., policy-makers, financial analysts, other market participants, and international organizations. However, central bank statisticians should continue to promote effective data communication beyond the most obvious requests, because experience shows that more demanding users – like specialist journalists, economists and researchers, to name a few – require such assistance.

Effective communication calls for clarity to ensure that central banks' goals are effectively met. Clarity, in turn, involves using simple and intelligible language. Central banks should avoid, as much as possible, focusing primarily on precise use of terminology, definitions and concepts, sacrificing the simplicity of the messages to their exactness. Such an approach, while safeguarding central banks against possible misuse or misinterpretation of the disseminated data, often results in lengthy explanations, written in arcane style, fully intelligible only to a small community of experts. In cases where large audiences are targeted, complexity in communicating statistics might be counterproductive. Reducing it (which does not have to imply a significant loss of precision) can increase the recipients' understanding of the message and thus serve the ultimate purpose of central banks' communications. Therefore, the central banks' communication function should be closely aligned with the information provided, the instruments used and the audiences targeted.

The communications' tools and channels that central banks have been using so far still play an important role in their respective strategies of communication. Therefore, it would be imprudent to advocate a major departure from this situation. Still, while respecting the past, we should prepare for the future. To remain effective and efficient in a changing communication's landscape, central banks have to increasingly explore the new possibilities brought about by the information society and the digital transformation.

To cope with this problem, using more agile communication solutions could be decisive. Among the already existing possibilities I should mention, inter alia, the following: (i) developing dedicated websites (a.k.a. "statistics portals"); (ii) getting into data visualization tools; (iii) being present (both actively and passively) in the social media (e.g., *Facebook*, *Twitter*, etc.); (iv) using video-sharing websites (e.g., *YouTube*); and (v) increasing collaboration with the providers of major search engines.

Adopting these kind of options, however, calls for a resolute change in mindset by central banks as regards their communication strategies, given that it implies shifting the way central banks currently communicate statistics, from an essentially centralised stance to a more decentralised and interactive approach (even though still subject to the communication policy of the institution).

Another major concern in this area regards the special attention that central banks should dedicate to the issue of dealing with the financial *media*. Specialized journalists are key intermediaries for the central banks' communications. Therefore, messages to this audience should be carefully tailored to increase their effectiveness, which also entails, at times, the need to enhance the statistical and financial literacy of journalists, so as to mitigate possible risks of misinterpretation or bias and, what's more, to avoid the subsequent dissemination of such misconceptions on a large scale, with potentially damaging consequences to the credibility and the reputation of central banks' policies. In the same vein, central banks should supply the specialized media with clear and concise information and spend enough time with journalists, briefing them on the relevant issues. While fostering the use of the *media* to reach out to larger audiences, central banks should increasingly be transmitters and translators themselves, particularly when the topics to communicate require a higher than average level of preparedness on the part of the addressees.

Finally, forging strong alliances with the academia and the research community as a whole strengthens the usability as well as the visibility of central banks' statistics and, concomitantly, has the potential to foster future use of such data by an increasing number of people.

8 CONCLUDING REMARKS

As I hope all of my remarks have illustrated, producing and disseminating high-quality statistics on the financial sector remains a core task of the central bank and an important input not only for decision-making processes but also for the communication of our decisions, and thus, for the credibility of our actions as the Portuguese central bank and a member of the Eurosystem.

Producing high-quality statistics requires that financial resources, facilities and the Information Technology infrastructure should be used as effectively as possible. The use of micro-databases and the strengthening of institutional cooperation are ways of increasing efficiency. But one cannot overlook the importance of the human factor. Indeed, to meet the Bank's statistical needs, not only financial and computing resources but also (and importantly) skilled staff should be adequate, both in magnitude and in quality.

Central bank statistics are compiled on the basis of sound statistical methodologies, in line with European Union legislation, European System of Central Banks regulations and guidelines, internationally agreed standards and commonly accepted best practices. The development and implementation of such methodologies require that (hopefully) the best graduates in the relevant academic disciplines are recruited. And if they are lacking in sufficient numbers and quality, this could mean that there is a need to better reflect in university courses the growing importance that official statistics have for the global economy.

Moreover, cooperation with the scientific community should be given serious consideration on the part of the Bank with a view to improving the methodology, enhancing the effectiveness of the implemented procedures and promoting better tools when feasible. Researchers may find it attractive contributing to the further advancement and application of international statistical standards to the development of quality indicators or to a more efficient compilation of euro area data. The Statistics Department of the *Banco de Portugal* would be more than happy to cooperate closely with interested researchers in the field of central bank statistics.

I conclude now.

I am convinced that your discussions at this meeting will offer valuable contributions on how to deal with challenges faced by central bank statistics and how to take advantage of the existing opportunities.

I wish you all the continuation of a fruitful conference and very much look forward to the results of your deliberations.

Thank you for your attention.

GOOD PRACTICES IN COMMUNICATING STATISTICS



Understanding central banking statistics to enhance statistical
and financial literacy in Europe

Statistical Information in mobile devices

II GOOD PRACTICES IN COMMUNICATING STATISTICS

UNDERSTANDING CENTRAL BANKING STATISTICS TO ENHANCE STATISTICAL AND FINANCIAL LITERACY IN EUROPE¹

Teles Dias, Luís²

Deputy Director

Banco de Portugal, Statistics Department

E-mail: ldias@bportugal.pt

Nymand-Andersen, Per

Adviser in Directorate General Statistics

European Central Bank

E-mail: per.nymand@ecb.int

1 INTRODUCTION

Give me statistical knowledge and I will construct a world out of it³

The perceived remoteness of national and European institutions may lead to a flawed interpretation of their objectives and responsibilities in society. Human nature is such that misunderstandings may bring about confusion, followed possibly by loss of confidence and trust in the established public institutions and governments. This also applies to the institutions and central banks responsible for national and European statistics. Citizens need to understand basic statistics and economic concepts, as part of their personal decision-making in life, and to interpret the rationale of today's complex and integrated policy decisions.

European citizens need to feel that statistics – as a public good – are trustworthy and useful in guiding the national and European decision-making process and that they are contributing to the political agenda, generating public discussions in society.

In a complex and dynamic Europe, with its diverse economies, financial structures and cultures⁴, the majority of citizens cannot be expected to differentiate between statistics released by public and private institutions, on the one hand, and between reliable and poor-quality statistics, on the other. The latter contribute to chatter and confusion, blurring the communication of reliable statistics and central bank

¹ Presented at the Conference on "Communication: a tool to enhance statistical culture" organised by the Hungarian EU Presidency, Visegrád (Hungary), June 2011

² The authors would like to thank Aurel Schubert (ECB) and Luís D'Aguiar (BdP) for the useful comments provided.

³ Inspired by the German philosopher Immanuel Kant's quote "*Give me matter and I will construct a world out of it*". "Universal Natural History and Theory of the Heavens" (1755). The Oxford Dictionary of Scientific Quotations. Ed. W. F. Bynum and Roy Porter. Oxford University Press, 2006.

⁴ According to European Commission Multilingualism, within the euro area there are 331 million citizens, speaking 15 official languages. In addition, there are over 60 regional and minority languages, spoken regularly by 40 million citizens. Available at: http://ec.europa.eu/education/languages/languages-of-europe/doc141_en.htm

policies⁵. This becomes even more apparent when factual statistics are used together with forecasts, which are then frequently revised.

It is also clear that the art of communicating statistics is often underestimated and that statisticians are frequently accused of speaking their own language tailored mainly towards the world of statistical experts, whose language in turn is not necessarily fully understood by politicians, financial market participants, the media or the public at large. Statistics need to be communicated by means of language and terminology that are commonly used and easily recognised by the various segments of users. Therefore, the statistical function needs to enhance its statistical communication strategy and its ability to better explain the methods and statistics, for example to policy-makers, the media and financial users.

Rapid advances in the availability of public and private statistical data, as well as information technologies, may also contribute to the trend whereby citizens are confronted with more information in a shorter time and need to adopt a position on frequently changing topics with a broader geographical scope. This is important in today's information age and in a communication context, as the available (and often competing and overlapping) data volume is already tremendous and expected to continue to increase in the future⁶, leading to possible information overload and challenging the way statistics are communicated⁷.

The provision of trustworthy and easily understood statistics contributes to enhancing and safeguarding welfare within society. This requires that the audiences for statistics can relate and use them as part of their own processes, either being part of their professional and private life, or knowing that the statistics are used for sound policy-making. The ability to communicate statistics easily to various user groups is a precondition to obtain the necessary support and trust from European market participants, firms and citizens. On the other hand, this also requires that some basic statistical and economical concepts are known to users as a necessary prerequisite for applying and using the statistics in practice. Policy-makers and statisticians should coordinate and prioritise the enhancement of the statistical and financial literacy of European citizens.

Our first discussion will address the concept of statistical and financial literacy and highlight the benefits of engaging in it, before elaborating on some suggestions and initiatives for promoting statistical and financial literacy in Europe.

2 STATISTICAL AND FINANCIAL LITERACY

Statistical literacy is an essential aspect of financial literacy, and both are also important to the functioning of the European System of Central Banks (ESCB)⁸: firstly, because the ESCB is responsible for one of the two European statistical systems⁹; secondly, as part of its communication and its accountability responsibilities vis-à-vis European citizens.

2.1 Statistical literacy

Wallman (1993) defines "statistical literacy" as the ability to understand and critically evaluate statistical results that permeate our daily lives – coupled with the ability to appreciate the contributions that statistical thinking can make in public, private, professional and personal decisions. The

5 Orphanides, Dale and Österholm (2008).

6 The Economist (2010), *Data, data everywhere (a special report on managing information)*. February 2011. Available at: <http://economist.com>

7 Per Nymand-Andersen (2011), *Communicating central banking statistics: Making useful sense of statistics in a dynamic world*. 58th World Statistics Congress of the International Statistical Institute (ISI). STS68: <http://www.isi2011.ie/content/scientific-programme/sts.html>

8 The ECB and the 27 EU National Central Banks (NCBs).

9 The other being the European Statistical System (ESS), which consists of Eurostat and the 27 EU National Statistical Institutes (NSIs). The two systems work in parallel and closely together, with no statistical overlap, as reflected within, and updated from time to time in the related Memorandum of Understanding.

Australian Bureau of Statistics (2009) provides a number of *criteria* – partly taken from Gal (2002) – that could be used to supplement the above (conceptual) definition:

- *Data awareness.* Statistical literacy requires a person to have an awareness of data sources, associated metadata, data availability and data accessibility, and to understand that statistics are contextual;
- *Ability to understand statistical concepts.* Statistical literacy requires the ability to read and use tools (e.g. percentages, ratios, measures of spread, central tendency and variability), as well as tables, graphs and maps;
- *Ability to analyse, interpret and evaluate statistical information.* The ability to organise data, construct and display graphs and tables, and work with different representations of data is also fundamental to achieving statistical literacy – how data are organised can contribute to how data are interpreted;
- *Ability to communicate statistical information and understanding.* Part of being statistically literate concerns people's ability to discuss or communicate reactions to statistical information (e.g. their understanding of the meaning of the information, their opinions about the implications of this information, or their concerns regarding the acceptability of given conclusions) in an effective manner that can impact upon decision-making.

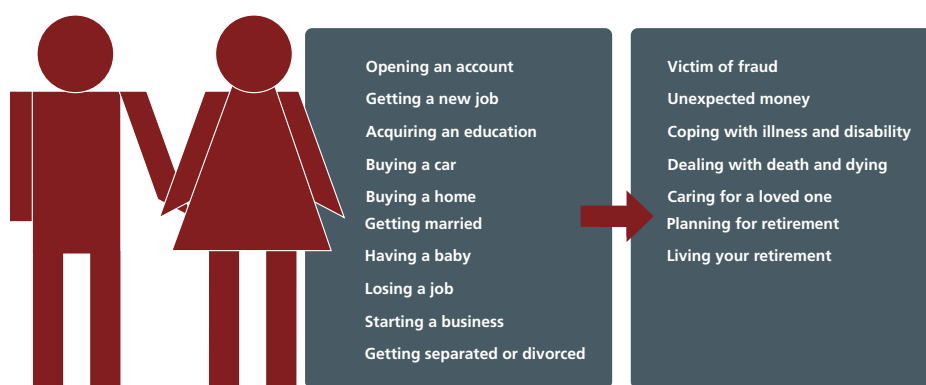
Combining these two formulations may offer a means to assess the actual levels of statistical literacy among the different segments of users, thereby giving the relevant authorities the possibility to take more informed decisions regarding which strata of users need to enhance their statistical skills and, ultimately, improve their decision-making processes.

2.2 Financial literacy

Financial literacy can be defined as “*having the knowledge, skills and confidence to make responsible financial decisions*”. (Task Force on Financial Literacy, 2010) Financial literacy is a lifelong journey, where individual financial decisions are required as part of different stages in life, which vary both in nature and context. Figure 1¹⁰ illustrates the financial choices citizens may face during their lives.

Figure 1

FINANCIAL DECISIONS THROUGH THE LIFELONG JOURNEY



¹⁰ Task Force on Financial Literacy, Leveraging Excellence. February 2010.

When approaching or entering a new stage in their life cycle, people tend to be more engaged and more willing to learn about new financial topics and responsibilities.

On the basis of the above definition, enhancing financial literacy in Europe means that:

- *Knowledge is provided*, enabling European citizens to understand financial and statistical topics and form part of their understanding of national and personal decision-making;
- *Skills are acquired*, offering citizens the ability to apply financial knowledge in professional and everyday life;
- *Confidence in society is provided*, giving citizens the self-assurance to take important financial decisions in the medium- to long- term, which is often a key factor in galvanising people into action;
- *Responsible financial decisions* are made so that citizens may use the knowledge and skills and develop the confidence to make choices that are appropriate to their financial circumstances on a financially sound basis.

3 BENEFITS OF A STATISTICALLY AND FINANCIALLY LITERATE POPULATION

A statistically and financially literate population in Europe offers multiple benefits, not least to the overall economy. Examples of such benefits are, inter alia:

- *Promoting self-sufficiency and financial independence* – thereby helping a population to be more responsible for its own financial decisions and actions;
- *Strengthening competitiveness*. As citizens become more knowledgeable and confident, they will shop around for financial offers and compare products prior to deciding. Citizens will adopt smart attitudes and habits, including asking questions before making decisions, and compare financial products that include credit cards, lines of credit, bank and mortgage loans, insurance, pensions and a variety of other investments, within a suitable professional and private portfolio;
- *Understanding personal finance*. Financially literate citizens are able to understand e.g. interest rates and fees associated with saving schemes, investments, loans and other types of debt and investment arrangements, and are aware of their own behaviour, as savers and investors, including the principles of risk and reward in making investment decisions.

On the macroeconomic level, a statistically and financially literate population:

- Promotes and enhances financial stability – a population that has the knowledge, skills and confidence in taking sound financial decisions makes the household sector more resilient to potential macroeconomic shocks and negative effects from the financial system;
- Facilitates the understanding and acceptance of needed national and European policies, as part of fostering financial soundness, fiscal prudence and economic policies;
- Contributes to improving the savings rates of households and to more efficiently allocating resources to productive activities in the real economy, thereby contributing to the growth of our economies.

In turn, a knowledge society:

- Enriches the political debate and provides citizens with the ability to understand the medium- to long-

term benefits of sound policy-making. A better understanding of economic issues leads to broader public support for measures ensuring the sustainability of public finances and to reduced deficiencies within our societies;

- Supports transparency in, and the accountability of, policies at national and European level and contributes to strengthening European values. Citizens will engage in (rather than reject) the broader national, European and global economic and financial debate and policies.

4 CENTRAL BANKING ENGAGEMENT IN PROMOTING STATISTICAL AND FINANCIAL LITERACY

Central banks themselves have an interest in making the general public understand and use their statistics for financial decision-making. It is widely agreed that fostering transparency on monetary policy decisions and their underlying motivations contributes to an efficient and effective passage for these decisions and facilitates the acceptance process. For instance, research suggests that, in many countries, more and better central bank communication has contributed to a notable improvement in the predictability of monetary policy decisions¹¹, while additional recent research indicates that central banking transparency contributes to a reduction in financial market volatility¹².

For central banking policy purposes, statistical and financial literacy helps to build public support for the pursuit of price stability in Europe and also to create a “*culture of stability*”¹³ in society, supporting the task of the central bank and other prudent economic policies.

People will accept that safeguarding price stability is the best contribution that monetary policy can make to economic efficiency and welfare if they know that price stability:

- protects the real purchasing power of money and income, so that they can concentrate on productive activities rather than on strategies to protect their wealth and income against inflation or deflation;
- enhances the ability of markets to allocate resources to their most efficient use, by stopping signals from changes in relative prices becoming blurred by a general trend in prices;
- reduces risk *premia* in longer-term interest rates, thereby permanently lowering financing costs for the corporate and household sector.

Central banks are well-placed to play a leading role in the enhancement of statistical and financial capability in Europe. The greater the general understanding of statistical, economic and financial issues is, the greater the possibilities are to communicate the policies of the ESCB and to generate support for stability-oriented policies. In promoting financial literacy, central banks are well-placed to contribute to:

- facilitating the functioning of financial markets;
- supporting sustainable and sound policies;
- building up positive reputation;

¹¹ Blinder, A.S., M. Ehrmann, M. Fratzscher, J. De Haan and D. Jansen (2008), *Central bank communication and monetary policy: a survey of theory and evidence*. Journal of Economic Literature 46(4), pp. 910-945. Van der Cruysen, C., Jansen, D. and de Haan, J. (2010), *How much does the public know about the ECB's monetary policy? Evidence from a survey of Dutch households*. Working Paper Series, No 1265, ECB, Frankfurt am Main, November.

¹² Jansen, David-Jan (2009), *Does the Clarity of Central Bank Communication Affect Volatility in Financial Markets? Evidence from Humphrey-Hawkins Testimonies*. 2 December 2009.

¹³ Jürgen Stark, Member of the Executive Board of the ECB, at the International Conference of Central Bankers and Economic Educators. Warsaw, 29 September 2006.

- assisting the acceptance process of policy decisions;
- enhancing the effectiveness of monetary policy¹⁴.

The two statistical systems at European level are unique in this respect, as they define harmonised statistical concepts and also collect and provide meaningful and comparable EU, euro area and national statistics to support, inter alia, the functions of the ECB, the Eurosystem, the ESCB and the European Systemic Risk Board (ESRB), and to sustain overall economic policies within the EU.

The specific statistical function of the Eurosystem and the reliability of its statistics – as one of the two European statistical systems – is guaranteed and safeguarded by the principle of “independence” as reflected within the Treaty provisions¹⁵. Independence of statistics is a necessary precondition in democracies. With independence comes responsibility: independent institutions and authorities have the responsibility to act prudently and to be accountable and transparent for actions and decision-making, e.g. by releasing reliable and meaningful national and euro area statistics¹⁶.

Statistical and financial literacy needs to be further coordinated and prioritised. The perceived lack of trust in governments and institutions by citizens is likely to continue¹⁷. European citizens demand that national and European institutions justify their existence and be transparent and accountable for their actions, inter alia, on the basis of impartial and reliable statistics. The recent financial market turmoil may have contributed to a decline in the credibility of public authorities and statistics. The latter remained accurate (though in some cases incomplete), but the perceived reality and people’s trust in statistics were tarnished.

A factual illustration of the perceived phenomenon relates to the perception among European citizens of the excessive increase in inflation during the changeover to the euro. While the statistical facts clearly showed the opposite, the perception of citizens pointed to an increase in inflation during that period. The causes of this phenomenon may be manifold and seem to be based on a misconception and lack of understanding (a) of the concept of inflation, (b) of how it is measured and (c) calculated and, at the same time, (d) in respect of the inability of responsible statisticians to communicate the technicalities of measuring inflation in non-technical terms that the non-technical experts and professionals can understand.

5 A CLEAR CALL FOR ENHANCING THE STATISTICAL AND FINANCIAL LITERACY OF EUROPEAN CITIZENS AND THE COMMUNICATION FUNCTION OF STATISTICS

The vast amount of statistics available to the Eurosystem is an enormous asset which could be used more proactively with marginal effort. Euro area and associated national statistics could be viewed as a “European public good” – free, reliable and trustworthy statistics for use by national and European policy-makers, market analysts, academics and citizens. The concept of an official public source of reliable statistics has the advantage that analysts and policy-makers can focus on making policy assessments and policy decisions rather than searching for data and information of variable quality among a broad and ever more widely available set of public and private data sources, with the associated impact on sound policy assessment and good decision-making. By virtue of its global economic importance, the ESCB statistical function has a responsibility to provide access to its statistics and the respective metadata for economic and financial research¹⁸.

¹⁴ Gnan et al. (2007), *Economic and financial education: concepts, goals and measurement*.

¹⁵ Article 130 of the Treaty (ex. Art. 108 of TEC) grants the ECB far-reaching independence. The Treaty explicitly stipulates that, when exercising their powers, neither the ECB nor any member of its decision-making bodies may seek or take instructions from Community institutions or bodies, from any government of a Member State or from any other body. The Treaty further states that the Community institutions and bodies and the governments of the Member States must respect this principle and must not seek to influence the members of the decision-making bodies of the ECB.

¹⁶ Aurel Schubert and Per Nymand-Andersen, *The role of statistics for generating trust within societies – necessary preconditions*. Hungarian EU Presidency, Visegrád Conference, 9-10 June 2011.

¹⁷ Special Eurobarometer No 323, *Europeans’ knowledge of economic indicators*. European Commission, January 2010.

¹⁸ Dr. Klaus Liebscher, Mag. Dr. Aurel Schubert, *Torn between New Data Needs and Respondents’ Fatigue. Are Efficiency Gains the Philosopher’s Stone?* Statistiken

The use of euro area statistics outside the central banking community is therefore geared more towards the professional users, researchers and monitors of central banking activities, including the media. This makes the role of journalists even more important as it is their task to communicate the central banking policy and to convey statistical evidence to the general public and the citizens of Europe – as in the case of explaining the indirect benefits of having inflation rates below, but close to, 2% over the medium term.

One of the most effective tools that central banks possess is their power to compile and explain statistics and policies based on the long-standing reputation of national central banks to provide independent, factual and credible statistics. The European citizens can learn to trust central banks¹⁹. An informed public – a public that recognises the role of central banks in the economy – will be far more likely to understand and accept the reasoning behind the difficult decisions that central banks sometimes have to make.

6 ONGOING AND FUTURE INITIATIVES

The rich set of data available to the Eurosystem could be shared with the research community, including – as far as possible – (anonymised) micro-level data. The future availability of micro-level data will open up and enrich academic research topics and provide a more detailed insight into the functioning and interlinking between the financial system and the real economy. Furthermore, tailoring a sub-set of Eurosystem statistics serves the specific needs of well-defined market segments (journalists, central bank watchers, politicians, research departments of banks, financial agents, etc.). In addition to the dissemination of (sometimes dense) statistical tables, the released data should be accompanied by descriptive statistics, and be easily accessible and flexible to use/reuse, as part of the user's working process. Summary statistics in terms of simple indicators and clear communication should be pursued.

Statistical presentation and visualisation tools could simplify and make statistics easy to understand and accessible for the different target groups. For instance, the ECB has released interactive graphs of national and euro area inflation rates and their components²⁰ along with interactive graphs showing euro area national government (debt and deficit) financing²¹ and euro area yield curves²².

The ECB has also recently released a statistical video, presenting and explaining euro area statistics and where to find them, available for viewing on the ECB website or on its new YouTube channel²³.

Further efforts have been initiated to cooperate with external partners – e.g. designing university projects for market surveys of users – with a view to better understanding user needs and their appeal for support tools that facilitate the use of statistics, and to exploring additional and supplementary dissemination channels to reach new user groups.

The ECB itself, as part of its educational programme, has also launched two new games – “Economia” and “Inflation Island” – which are available on the ECB website²⁴. The ECB will also initiate a new Europe wide schools competition in a bid to help improve young students' knowledge of economics and monetary policy.

Considerations are also under way involving electronic publications for iPad and tablet PCs and statistics for mobile devices.

Some of these initiatives have also been mirrored and developed further in a number of member countries, with very positive results. For instance, over the last few years, the Banco de Portugal has been promoting

Q3/08. Vienna, 6 August 2008.

¹⁹ If you cannot trust a central banker, who can you then trust? This is closely linked to the undisputable independence of the ECB and National Central Banks as stated within the Treaty.

²⁰ <http://www.ecb.europa.eu/stats/prices/hicp/html/inflation.en.html>

²¹ <http://www.ecb.europa.eu/stats/gov/html/index.en.html>

²² <http://www.ecb.europa.eu/stats/money/yc/html/index.en.html>

²³ See the video at <http://www.ecb.europa.eu/stats/html/index.en.html> or the ECB's YouTube page at <http://www.youtube.com/ecbeuro#p/c/9436A6D62BD97634/1/FyHiyPYyDp0> (also available in Portuguese).

²⁴ <http://www.ecb.europa.eu/ecb/educational/inflationisland/html/index.en.html>

“road shows” in universities, professional associations and businesses, whereby staff from its Statistics Department explain how the statistical function is organised at the Bank and the tools available to access the information on an interactive basis. The Bank is also very much committed to enhancing the media understanding of the statistics for which it is responsible, e.g. through dedicated workshops, particularly whenever new statistics are released.

In parallel with these initiatives, the ESCB has also initiated a dedicated Task Force²⁵ to build upon the ESCB experience in communicating statistics and to provide proposals for new ideas to make ESCB statistics more “accessible”, as part of building up the statistical and financial capabilities of European users and to promote awareness of official ESCB statistics and of how to use and interpret these statistics. This work is in its preliminary stages and aims to produce proposals for, inter alia:

- more focused market segmentation of users;
- further exploring of existing communication channels;
- ways to build up trust and to communicate statistics to specific audiences;
- customised statistics useful to the reporting agents.

Efforts to enhance the statistical and financial literacy of European citizens cannot be seen in institutional isolation and need a broader, coordinated approach between public and private stakeholders in order to make a focused, timely and measurable impact in today’s dynamic society and democracies.

7 CONCLUDING REMARKS

In today’s dynamic and complex world, European businesses, citizens and politicians are being flooded with ever-increasing volumes of information of variable quality from private and public sources, and are continuously confronted with the need to adopt positions, decisions and subsequent actions from a broad field of expertise and geographical scope within a shorter period of time. Policy-makers cannot expect businesses and citizens to be able to distinguish good-quality, reliable statistics from poor-quality public information, which subsequently impacts on sound decision-making in societies. Furthermore, European citizens demand that national and European institutions and policy-makers (i) justify their existence, (ii) benefit society and (iii) are transparent and accountable for their actions, inter alia, on the basis of impartial and reliable statistics. European citizens need to feel that official statistics are (i) a public service of high quality, (ii) useful in guiding the national and European decision-making processes, (iii) contribute to the political agenda, and (iv) generate public discussions in our societies.

In terms of macroeconomics, significant benefits can be reaped from investing in enhancements to statistical and financial literacy in Europe – ranging from fostering financial soundness in private and national economies, making the household sector more resilient to potential macroeconomic shocks and negative effects (e.g. due to the financial crisis) and facilitating the understanding and acceptance of necessary national and European policies as part of fostering financial soundness, fiscal prudence and economic policies. Furthermore, a knowledge-based population will foster transparency and accountability within democracies and contribute to (rather than reject) strengthening citizens’ engagement in the broader national, European and global economic and financial debate as well as policies.

Central banking communication itself has an interest in creating a “culture of stability” in society – as part of demonstrating and using its statistics in the decision-making process of safeguarding price stability. This is possibly the best contribution that monetary policy can make to economic efficiency and welfare.

²⁵ STC Task Force on “Accessibility of Statistics”.

The perceived lack of trust in governments, institutions and statistics by citizens is likely to continue. Even though the central banking community is initiating activities to strengthen statistical and financial literacy in Europe, further coordination and prioritisation among national and European institutions – including private partnerships – is needed to impact effectively on society.

Official European and associated national statistics could be viewed as a “European public good” – free, reliable and trustworthy statistics for use by national and European policy-makers, market analysts, academics and citizens. The concept of an official public source of reliable statistics has the advantage that analysts and policy-makers can focus on making policy assessments and policy decisions rather than on searching for data and information among a broad and increasingly more available range of public and private data sources, with an associated impact on sound policy assessment and good decision-making.

This also challenges the statisticians to enhance significantly their communication policies and tailor their statistics to the needs of the various user groups by using readily understandable language and tools fit for purpose, as part of the citizens’ daily working and decision-making process in private and professional life.

REFERENCES

Australian Bureau of Statistics (2009), What is statistical literacy and why is it important to be statistically literate? NSW State and Regional Indicators, September 2009.

Australian Bureau of Statistics Education Services. Statistical Literacy Paper.

Blinder, A.S., M. Ehrmann, M. Fratzscher, J. De Haan and D. Jansen (2008), Central bank communication and monetary policy: a survey of theory and evidence. *Journal of Economic Literature* 46(4), 910-945, 2008.

ECB website:

- <http://www.ecb.europa.eu/stats/prices/hicp/html/inflation.en.html>
- <http://www.ecb.europa.eu/stats/gov/html/index.en.html>
- www.ecb.europa.eu/ecb/educational/inflationisland/html/index.en.html
- <http://www.ecb.europa.eu/stats/money/yc/html/index.en.html>
- <http://www.ecb.europa.eu/stats/html/index.en.html>

European Commission Multilingualism: http://ec.europa.eu/education/languages/languages-of-europe/doc141_en.htm

Gal, Iddo (2002), Adults’ Statistical Literacy: Meanings, Components, Responsibilities. *International Statistical Review* (2002), Vol. 70.

Gal, Iddo (2004), Statistical Literacy – Meanings, Components, Responsibilities. Included in “The Challenge of Developing Statistical Literacy, Reasoning and Thinking”, edited by David Ben-Zvi and Joan Garfield. 2004 Kluwer Academic Publishers.

Gnan et al. (2007), Economic and financial education: concepts, goals and measurement.

Jansen, David-Jan (2009), Does the Clarity of Central Bank Communication Affect Volatility in Financial Markets? Evidence from Humphrey-Hawkins Testimonies. 2 December 2009.

Jürgen Stark, Member of the Executive Board of the ECB, at the International Conference of Central Bankers and Economic Educators, Warsaw, 29 September 2006.

Kant, Immanuel (1755), *Universal Natural History and Theory of the Heavens*. The Oxford Dictionary of Scientific Quotations. Ed. W. F. Bynum and Roy Porter. Oxford University Press, 2006.

Liebscher, Klaus and Aurel Schubert (2008), Torn between New Data Needs and Respondents’ Fatigue. Are Efficiency Gains the Philosopher’s Stone? *Statistiken* Q3/08, Vienna, 6 August 2008.

Murray, T. Scott (2011), Financial Literacy: A Conceptual Review. Research paper prepared for the Task

Force on Financial Literacy (Government of Canada), February 2011.

Nymand-Andersen, Per (2011), Communicating central banking statistics: Making useful sense of statistics in a dynamic world. 58th World Statistics Congress of the International Statistical Institute: <http://www.isi2011.ie/content/scientific-programme/sts.html>

Faustino, José

Head of Statistical Dissemination Unit

Banco de Portugal, Statistics Department

E-mail: jfaustino@bportugal.pt

1 INTRODUCTION

The past several months have been an eventful period for the Portuguese economy. All the economic sectors have been suffering severe consequences, particularly income reduction and strong credit restrictions. Most households and firms, taken by surprise and in a troubled situation, could not help asking themselves: “What happened? Why there was no information that would help us to understand what was coming? Can we still trust statistics?”

In the case of Portugal, the users’ interest for the statistics published by Banco de Portugal (hereinafter referred as “the Bank”) increased significantly as a result of the financial turmoil. All the internal quantitative indicators show that the demand for statistical data and metadata, as well as for statistical services made available by the Bank, have been growing at a fast pace. For instance: (i) the Bank’s structure in charge of statistical dissemination² recorded 4,107 direct contacts in 2011 (comparing with 2,944 in 2010); and (ii) the number of new registered users of BPstat | Statistics online³ almost doubled from 2009 to 2011 (7,500 and 14,000 users, respectively).

The increase in the number of users is also the result of publishing more detailed data and metadata, including new statistical domains, and the recent developments in data accessibility.

2 THE ACTION PLAN FOR COMMUNICATING STATISTICS

The Bank is both user and producer of statistics and it has a clear understanding of the enormous importance of statistics in the decision-making processes. Statistics are considered as a public good and therefore it is necessary to invest in statistical communication to encourage the regular use of statistics by users of all economic sectors (see Trichet (2008), Liebscher and Schubert (2008)).

One of the objectives defined in the Strategic Guidelines of the Bank for the period 2011 to 2013 concerns the improvement of services to the community, with special emphasis on the production of economic and statistical information relevant to promote financial and economic literacy.

¹ Presented at the *XIX Jornadas de Classificação e Análise de Dados (JOCLAD2012)*, Tomar (Portugal), March 2012.

² Banco de Portugal, Statistics Department, Statistical Dissemination Unit (SDU).

³ The internet online service to access the Statistical Interactive Database of the *Banco de Portugal*.

With this goal in mind, the Statistics Department developed an internal “Action Plan for Communicating Statistics” (PACIE) endeavouring to improve the quality of the statistical communication by the Bank. Three of the main goals in PACIE are: (i) The regular production of statistical publications, e.g., Central Balance-Sheet studies; (ii) new sets of information, e.g., the “Main indicators”; and (iii) new channels of communication, e.g., the *BPstat* mobile.

3 STATISTICAL PRESS RELEASES, SUPPLEMENTS AND STUDIES

In the institutional site of the Bank (www.bportugal.pt) the general public can find statistical information in the homepage and in a dedicated area for statistics.

In the homepage, there are specific data for euro exchange-rates, interest rates, economic indicators and economic forecast. In the statistical area it is published, inter alia, statistical publications that are useful to have a better and deeper understanding of the statistics published by the Bank - an example are the Central Balance-Sheet studies that are produced on the basis of the data collected from the annual accounts of corporations (reported under the Simplified Corporate Information) and the quarterly survey to non-financial corporations (jointly carried out with Statistics Portugal).

4 THE “MAIN INDICATORS”

The statistical information growth is useful, as it allows having more data on specific fields; but it can also be cumbersome, as it may be more difficult to quickly find the information, to get the most relevant figures and to have a clear picture on a specific economic domain (see Grossenbacher (2010), Maggino and Trapani (2009)).

To help the general public finding “a tree in the forest”, in 22 June 2011 the Bank initiated the publication of a new statistical domain in the *BPstat* and a new chapter in the Statistical bulletin - in both cases named “Main indicators”. The chief goal is to improve accessibility, understanding and usability of the statistics produced by the Bank. *BPstat* provides long time-series, updated as soon as the input data are available, and metadata that may contribute to improve statistical literacy.

The “Main indicators” are split in 20 sub-domains, each one covering a specific subject, including “Highlights” for the Portuguese economy, in most of the cases together with the same information for the euro area, U.S.A. and other countries of the European Union.

The “Main indicators” is presently the second most demanded statistical domain in *BPstat*, which proves the usefulness of this way of organising and publishing statistical data.

5 THE “BPstat MOBILE”

BPstat is a central component of the statistical dissemination system of the Bank. It was released in 19 January 2006. Six years later, in 13 February 2012, the Bank launched the *BPstat* mobile (www.bportugal.pt/mobile/BPstat).

The development of a version of *BPstat* for mobile devices (one of the objectives defined in the PACIE) was accelerated in view of the success of the “Main indicators”. In September 2011 a small project was started with the aim to improve the accessibility to statistics, making them available via mobile devices. Instead of developing a sophisticated and powerful technical solution, the decision was to reuse most of the components that would be available in the Statistics Department and to adapt them in a “low cost” and “quick win” strategy. While reusing the existing components in *BPstat* the project contemplates aspects considered relevant by the users of mobile media, particularly in the areas of graphics and data searching, maintaining the accuracy and quality of the statistical information.

From the BPstat mobile homepage it is possible to access the statistical data in two different ways: (i) navigating in a tree organized by statistical domains and sub-domains; or (ii) using the search engine.

The searching engine has some new features that are not available in other components of the statistical dissemination system of the Bank - examples are: (i) users may use common language instead of more technical definitions; and (ii) the system learns with the user's preferences, listing the series ordered by the number of accesses during the last months.

The focus is on the most recent data, but all the observations on the time-series can be accessed and ordered by different criteria.

The metadata is available in different levels and provides information on the statistical domains and on the time-series. The metadata is organised according to international standards, is updated regularly to cover all the methodological changes that may occur and includes links to all the related international organizations and documents.

The BPstat mobile can also be accessed via the institutional site of the Bank and, in a certain way, is complementary to the "classic" version of BPstat.

6 CONCLUSIONS

The Bank aims to provide a quality service to a large number of external users with multiple cultural and educational backgrounds, identifying several groups of users with homogeneous user needs of statistics and instead of a "one size fits all" statistical communication policy it distinguish the different segments of the statistical "market" to be reached via appropriate communication channels.

Only tailored-to-the-needs statistics (see Figure 1) ensure that statistics are understood and used by a large number of user segments - the choice of the most appropriate communication channel is a key issue to get more people benefiting from the information and knowledge that are embedded in statistics. BPstat mobile intends to be an important step in this direction.

Figure 1

TAILORED-TO-THE-NEEDS STATISTICS



REFERENCES

Grossenbacher, Armin (2010) Storytelling revisited. International Marketing and Output Database Conference (IMAODBC). Vilnius, 6-10 September 2010.

Lielscher, K. & Schubert, A. (2008) Torn between new data needs and respondents' fatigue – Are efficiency gains the philosopher's stone? 4th ECB Conference on Statistics. Frankfurt am Main, 24-25 April 2008.

Maggino, Filomena & Trapini, Marco (2009) Presenting and communicating statistics: Principles, components and their quality assessment: a proposal. UNECE Work Session on Communication and Dissemination of Statistics, Warsaw 13-15 May 2009.

Trichet, Jean-Claude (2008) A strategic vision on euro area statistics: the ECB's view. 4th ECB Conference on Statistics, Frankfurt am Main, 24-25 April 2008.

STATISTICAL SYSTEMS' DESIGN



Innovative solutions to compile balance of payments statistics
minimizing costs and ensuring quality

Business Intelligence in Statistical Systems: a stepwise approach

III STATISTICAL SYSTEMS' DESIGN

INNOVATIVE SOLUTIONS TO COMPILE BALANCE OF PAYMENTS STATISTICS MINIMISING COSTS AND ENSURING QUALITY¹

Cadete de Matos, João

Director

Banco de Portugal, Statistics Department

E-mail: jcmatos@bportugal.pt

Marques, Carla

Head of Balance of Payments

and International Investment Position Statistics Division

Banco de Portugal, Statistics Department

E-mail: csmarques@bportugal.pt

1 THE NEW B.O.P. / I.I.P. SYSTEM

The current collection and compilation system for b.o.p. statistics was set up in 1993 following the liberalization of the capital movements in Portugal. This system was mostly based upon settlements' data submitted by resident banks, which reported transactions with non-residents on their own and on behalf of their customers, with all the necessary statistical classifications. In addition, all entities were required to report transactions with non-residents settled without the intermediation of the resident banking sector. This would be the case of transactions settled through an account held abroad.

Since the late nineties the system evolved to incorporate new data sources and to meet new statistical requirements. Statistics Portugal information on external trade in goods, direct investment annual surveys, data from the securities statistics integrated system and money and banking statistics were some of the additional data sources incorporated during this period. On the demand side, new statistical requirements included the compilation of i.i.p. statistics (as of 1999 with back data as of 1996) and other requirements, namely those associated with the Portuguese participation in the European Community.

The thrust behind the revision of the current system relies mainly on three factors.

Firstly, to move from a multiple heterogeneous system that resulted from the various developments described previously, to an integrated and coordinated system that takes on board the current complexity in compiling b.o.p. and i.i.p. statistics, namely the existence of distinct and heterogeneous data sources, with different periodicities and granularity, and new and more demanding statistical requirements.

¹ Presented at the Seminar on Business Related Statistics, 28-29 February 2012, Luxembourg, February 2012.

Secondly, to comply with the current limitations in the use of banks' settlements data brought about by globalization, the development of the international markets and the new Regulation on cross-border payments in the European Community².

Thirdly, to benefit from the latest information technology (IT) tools and to adopt the business intelligence (BI) architecture framework to be used as a reference in all future IT developments in the statistical realm. This drive is integrated in the Statistics Department long-term goal of having an integrated and coordinated information system for all statistics produced within the Department, as each statistical system moves into the BI architecture.

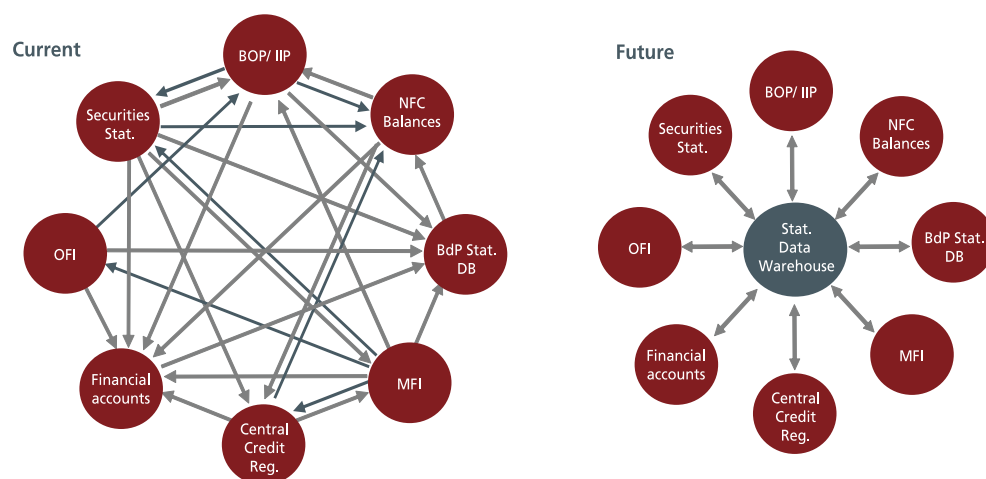
1.1 The business intelligence architecture

The BI architecture benchmark is built upon three pillars: (i) a data warehouse; (ii) centralized reference tables; and (iii) a common IT platform. Each pillar will contribute to ease and support the communication and articulation between the various statistical systems.

The statistical data warehouse (SDW) constitutes a central access point to where each system will feed their output data and from where it will acquire the necessary input data for compilation or quality control. This is a gradual process to reach a situation where virtually every data exchange between different statistical systems is established through the SDW, with clear productivity gains in the developing and maintaining of the various data flows. The following Figure 1 illustrates the current and future situations.

Figure 1

BI FRAMEWORK: MOVING FROM MULTIPLE FLUXES TO A DATA WAREHOUSE APPROACH



The second pillar of the BI architecture benchmark is the existence of centralized reference tables, which provide a common ground in terms of reference data and facilitate the interlinking between different statistical systems³. Some of the reference tables already considered within this scheme refer to countries,

² Regulation (EC) No. 924/2009 on cross-border payments in the Community establishes a EUR 50,000 threshold for settlements-based national reporting obligations on banks and other payments services providers for balance of payments statistics, for transactions on behalf of their clients. It is under review a new Regulation establishing a total exemption of such obligations for transactions in euro within the Community.

³ This scheme has been in place in the *Banco de Portugal* for several years. A technical team (i) identifies reference data of interest for several domains (statistical, supervision, accounting or other); (ii) defines the owner of the data and provides the tools for updating and managing it; (iii) ensures the storing and maintenance of the data; and (iv) supplies the data to all the users within the *Banco de Portugal*.

currencies, institutional sectors, maturity breakdowns and financial entities. Currently, efforts are being made to establish a common reference table for non-financial entities.

The consistent usage of a common technological infrastructure across the statistical systems constitutes the third pillar (a common IT platform), aiming at facilitating the integration and re-usage of components, promoting data access efficiency and the communication between statistical systems. The Organisation and Information Technology Department of the *Banco de Portugal* carried out a preliminary analysis and sanctioned a solution based on Microsoft SQL Server 2008 for the structural components and SAS for functionalities in the domains of statistical production and analysis and analytical workflow.

1.2 An overview of the future b.o.p./i.i.p. system

The new system is being developed along four phases: Acquisition; Processing; Exploration; and, Disclosure. Each phase has a set of different tasks associated, different data storages, and different users, but was developed following some common guiding principles: centralization, harmonisation, flexibility, consistency and efficiency.



1.2.1 Acquisition

The acquisition constitutes the first phase of collecting input data from external and internal sources. Other tasks performed in this phase are the validation of the file format and the respective source, data loading and a first automatic data quality check.

There are several external data sources, with different features and complexity, with different periodicities and different natures (statistical, accounting, settlements, etc.). Therefore, it is essential that the acquiring process is flexible enough to adapt to each specific source: there is no “one-format-fits-all” solution.

The internal sources comprise data from the Statistics Department, but also data provided by the Payment Systems Department and the Accounting Department. Data from the Statistics Department comprises not only statistical information (monetary, financial non-monetary and securities statistics), but also data from the administrative databases managed by the Department (the Central Balance-Sheet Database and the Central Credit Register). Regardless of its nature, the process is very straightforward when the data are stored in the Statistical data Warehouse of the European Central Bank (SDW), but somewhat challenging when that is not the case.

The main b.o.p. and i.i.p. external sources can be organized in the following categories:

- Direct report of external operations;
- Settlements data, immediately available from resident banks;
- External data from other statistical entities and organizations (including data from the National Statistical Institute on external trade of goods);
- Specific surveys targeted to fill in particular and limited gaps.

The main internal sources are organized in the following categories:

- Statistical data (including monetary statistics);
- Micro-databases (item-by-item), which include the Securities Statistics Integrated System (SSIS) database and the Central Balance-Sheet Database (CBSD);
- Payments systems' data (including credit and debit cards data);
- Accounting data (for the *Banco de Portugal* and for other financial institutions supervised by the *Banco de Portugal*).

1.2.2 Processing

The processing phase is where b.o.p., i.i.p. and other statistics are compiled, and is the core of the system. It comprises two sub-phases: (i) the pre-production phase, where data quality control, analysis, editing and managing are carried out with due consideration of the characteristics and specificities of each data source; and (ii) the production phase, where all the data are transformed to fit an unique common format, considered suitable for the compilation of statistics.

An important development that should be stressed is the fact that both b.o.p. and i.i.p. are compiled within the same database, guaranteeing a proper articulation between them. For the same reason, although i.i.p. is only disseminated quarterly, there will be a monthly estimation of these statistics.

The final stage of this phase will be the decision in terms of the data to release, internally to other statistical systems and externally, based on the quality and relevance of the data.

1.2.3 Exploration

The exploration phase is centred in using the data previously compiled and checked by the statistical compilers. It mainly comprises exploration management tasks, such as data delivery and reporting, multidimensional analysis and time series analysis. The exploration database of the b.o.p./i.i.p. statistics is included in the SDW according to the rules and conventions that have been previously determined.

Data may be accessed by different types of users within the *Banco de Portugal*, ranging from other statistical units in the Statistics Department to economists in the Economic Research Department. Each user will have a different level of access to the data but, as a minimum, the data exported to this database will have to have the detail necessary for the most demanding user.

1.2.4 Disclosure

The disclosure processes are focused on the statistical data dissemination obligations to external entities and also to the general public. It comprises tasks related to statistical publications, statistical reports distribution and output to external databases, namely the BDIE (the statistical time series database of the *Banco de Portugal*) and BPstat (a multidimensional statistical dissemination system). The disclosure database presents a lower level of detail and is analysed according to the confidentiality and disclosure practices of the *Banco de Portugal*.

2 THE KEY ROLE OF ARTICULATION BETWEEN DIFFERENT DATA SOURCES

A proper articulation between different data sources is a strong feature in the new system and, although it is a complex and demanding task, it is also essential to reach a good balance between the cost of the reporting entities and the quality of the statistics produced. It is also essential for an integrated system.

Figure 2

ARTICULATION OF DIFFERENT DATA SOURCES



The articulation of different data sources, statistical and non-statistical, requires the understanding and matching of different data domains, insuring their compatibility at different levels: at a conceptual level, including definitions and reference data, but also at an operational level, so as to consider different timeliness and frequency.

In this section some examples of such articulation will be presented.

2.1 Settlements' data

The regulation on cross-border payments allows for the use of readily available data which do not impair the straight through process. Within this context banks will be required to report settlements data for b.o.p. purposes, on transactions on behalf of their clients, with no statistical classification.

The settlements data will be reported monthly, on a transaction-by-transaction, client-by-client basis⁴, by the 5th working day following the end of the reference date⁵.

These data will play an important role in the new system at various levels. The first use will be to help identifying the universe of corporations operating with non-residents and to give an initial estimate of their overall relevance. This is especially important for new corporations or for corporations that are just starting to operate with non-residents.

The settlements data will also support the non-financial corporations in complying with their statistical obligations. A reporting corporation has three ways to submit the data: (i) to upload a ".xml" file generated internally by its IT system; (ii) to access the online application available in the *Banco de Portugal* website and manually introduce the required data; or (iii) to access its own payments data provided by the resident banks (through that same application) and to complement them with other required statistical information (e.g., the purpose of the transaction).

Settlements data will also be used, as much as possible, for quality control purposes, by cross-checking with the overall transactions. Such quality control procedures, which can be performed autonomously

⁴ The clients are identified by their fiscal number, whereas private individuals and non-resident clients who might not have a fiscal number can be reported with a generic code.

⁵ It should be mentioned that within the implementation of the new system there have been working meeting with every bank, where it was confirmed that these institutions are comfortable with the requirements on settlements data and with the 5 working days' timeliness.

with no human intervention, are essential in a system with more than 7,000 respondents and a very short timeliness.

Finally, the settlements' data will be used to estimate non-responses or/and late responses. It will also be the basis for estimating transactions carried out by households.

2.2 Payments' data

The new system also uses other payments' data besides the banks' settlements described in the previous point, the most relevant being the data on credit cards received by the Payment Systems Department of the *Banco de Portugal*.

These data cover virtually all transactions (in Portugal and abroad) made with credit and debit cards issued by Portuguese banks as well as transactions made in Portugal with credit cards issued by foreign banks, and are available monthly with a 20 days timeliness. Currently this is already a major data source for the compilation of the travel item. In the future, this integration will be strengthened with the inclusion of some details in the credit card data that will support the estimation of new requirements. Just to give some examples, the economic activity classification of the establishment where the expense is made will provide the basis for the estimation of the travel breakdown by product group, and information on the type of credit card might help the distinction between business and personal travel.

Credit card data might also be the basis for identifying the acquisition of goods by travellers that, according to the 6th edition of the IMF's Balance of Payments Manual (BPM6), should be excluded from the travel account and considered under the goods account.

2.3 Simplified Corporate Information

IES – *Informação Empresarial Simplificada* ("simplified corporate information", in English), is a joint effort of four distinct Portuguese public entities – the Ministry of Finance, the Ministry of Justice, *Instituto Nacional de Estatística* (the Portuguese NSI) and the *Banco de Portugal* – consisting of a yearly submission of information by corporations, in a single, paper-free, electronic form, to fulfil reporting obligations of accounting, fiscal and statistical nature.

IES is already broadly used for b.o.p. and i.i.p. purposes, although the annual frequency of the data and the almost manual processes that currently support these activities are a limitation. The new compilation system will support a more efficient and integrated use of this data source.

IES is used for compilation purposes, either as a primary or as an auxiliary source. Namely, it supports the compilation of trade credits receivable and payable (total stocks) and the estimation of imports and exports of special purpose entities (SPEs) that do not report directly for b.o.p. purposes. It is also the main source for accounting data (capital, own funds, net results and dividends distributed) for resident corporations involved in Foreign Direct Investment relationships.

It is also relevant for quality control purposes, namely for cross-checking with exports and imports reported to b.o.p. and with data on direct investment reported on the annual survey.

IES is also used to identify the universe of relevant corporations for b.o.p. and i.i.p. purposes and the corporations that are classified as SPEs.

2.4 Instituto Nacional de Estatística

The articulation with *Instituto Nacional de Estatística* (INE) is also an important feature of the system. Its major focus is probably in terms of the goods account, for which the primary source is the International Trade of Goods compiled by INE. But the cooperation between the two institutions within the compilation of b.o.p. also includes other areas such as the quality control, on an individual level if necessary, the setting of agreed methodologies and the combined analysis of issues of mutual interest.

3 THE ARTICULATION WITH THE REPORTERS

Direct report of external operations is one of the main data sources, and one of the most challenging. The shift from a settlements-based system to a direct reporting system implies an increased burden for both compilers and reporting entities, especially for non-financial corporations that are not used to or aware of the statistical requirements. The challenge is handling an extraordinary increase in the number of reporters and getting their cooperation in providing good quality data within the established deadlines and according to the required format.

This challenge is being tackled via an action plan developed along three vectors.

Firstly, a definition of reporting schemes closer to the perspective of the reporting entities. This requires an additional effort from the compilers within the acquisition phase, given the need for a conversion and standardization of data from a quasi-accounting perspective to a more statistical b.o.p. and i.i.p. perspective.

Secondly, the development of several auxiliary tools, such as online applications, to support the reporters. Some of these tools will rely on the articulation with settlements' data, as described previously.

Thirdly, the reinforcement of feedback to the reporters, by providing useful information prepared on the basis of data available within the *Banco de Portugal*.

The development of a restricted web page within the *Banco de Portugal* institutional website dedicated to the non-financial corporations plays a crucial role in these two last actions.

For financial institutions it will continue to be used BPnet, which can be broadly described as a secured extranet shared between the *Banco de Portugal* and most of the financial institutions supervised by the *Banco de Portugal*. BPnet is a secure channel of communication used not only for statistical purposes but for every domain where the *Banco de Portugal* intervenes, not only to receive data but also to send out information.

3.1 The thrust behind the Portal

A dedicated webpage, within the BdP institutional website, is being development, mainly focusing on the non-financial corporations and their relationships with the *Banco de Portugal*. For simplification this dedicated web page will be referred to as 'the Portal' for the purpose of this paper.

The Portal is intended to support an integrated approach of the BdP towards the non-financial corporations, recognizing the growing importance of these institutions. The overall organization of the Portal is focused on the non-financial corporations, rather than on the structure of the *Banco de Portugal*, as it is meant to be perceived as a service provided to these institutions. Statistics is just one of the domains that contribute and benefit from such framework.

One objective of the Portal is thus to ease and strengthen the relation between the *Banco de Portugal* and the non-financial corporations. It is recognized that a good cooperation and proximity to the reporters is essential to obtain good quality data.

Such objective is also pursued by providing useful services and reinforcing the feedback to these institutions, e.g. providing information of interest which compares each individual institution with the economic sector they are included in. It is important to clarify that each institution only has access to its own data, or to aggregated figures, as it is essential to uphold confidentiality issues.

The Portal, and more specifically the information provided, is essential to change the viewpoint of the non-financial corporations, which consider the statistical obligations as just a cost and neglect to consider the knowledge and information one can obtain through statistical data.

Figure 4

CORPORATIONS' PORTAL



3.2 Services provided by the Portal

The Portal will provide a number of different services.

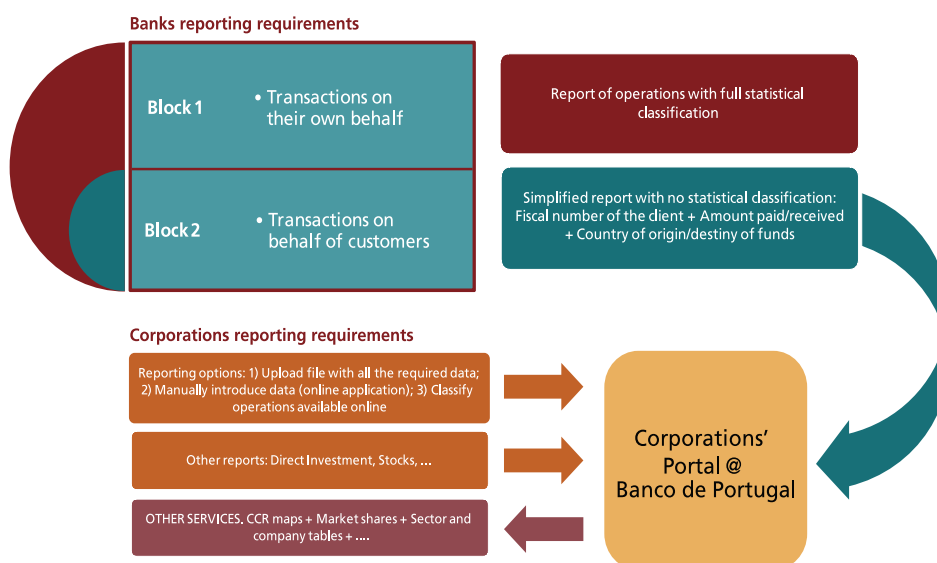
Firstly, it will give easy access to information relevant to non-financial corporations. In this first stage non-financial corporations will have online access to their central credit register map, which is currently available by written or on-site request only. Furthermore, they will have access to the sector and company tables (a map with financial and accounting data of the individual institution and of its branch of economic activity) and to the balance of payments maps (showing the relative weight of the individual institution when compared with the aggregated published figures).

Secondly, the Portal will comprise the applications that support and facilitate the fulfilling of statistical obligations. All relevant reporting forms, and the instructions and regulations that support them, will also be available in this site. In this first stage these will be mainly applications and reporting forms related to b.o.p. and i.i.p. statistics, but the scope will shortly broaden.

Thirdly, a number of different channels of communication will be provided through the Portal: file upload and download, e-mail and notifications. It should be stressed that this communication will flow both ways. Just to give an example, the reporters can upload a data file with the statistical data and will receive an (automatic) e-mail with the quality assessment of the data provided. The quality assessment reports will also be available within an area of the Portal specially dedicated to the communication with the reporting entities.

Figure 5

BANKS AND CORPORATIONS REPORTING REQUIREMENTS



4 CONCLUSION

The new Portuguese system for the collection and compilation of b.o.p. and i.i.p. statistics, based on the innovative solutions described in this paper, will be prepared to answer various challenges. First, to integrate distinct and heterogeneous data sources without overburdening the reporters or the compilers, while insuring a coherent final data set with good quality. Secondly, to comply with the limitations in the use of banks' settlements data while maintaining the same level of quality statistics. Thirdly, to build a flexible and resilient system that can adapt itself to a constantly changing environment, not only in terms of data requirements and outputs but also in terms of data sources.

The new system is also fostering a new framework for the articulation between non-financial corporations and the *Banco de Portugal*, which transcends the reporting of information for external statistics purposes. This framework, based on a dedicated web page, within the *Banco de Portugal* institutional website, will support the feedback to reporting entities promoting the value of statistics near those entities and will enhance the articulation with other relevant domains, such as the existing direct investment survey, the central balance-sheet information or the data originated from the central credit register.

Sanchas, Rita

Statistician

Banco de Portugal, Statistics Department

E-mail: risanchas@bportugal.pt

Aguiar, Maria do Carmo

Head of Securities Holdings Statistics Unit

Banco de Portugal, Statistics Department

E-mail: mcaguiar@bportugal.pt

1 INTRODUCTION

Producing accurate and reliable statistics is known to be a demanding task, because of all the uncertainty we must overcome. In fact, dealing with lack of information, wrong, misclassified or duplicated data is a challenge faced by the statistical compiler in order to achieve correct results and produce useful information. Moreover, timely, efficient, and, most of all, meaningful statistical information has never been so necessary as it is today, with multiple *ad hoc* requests constantly arising.

The recent generation of BI systems includes a wide range of powerful features that are fundamental to statistics, such as integration, analysis and reporting tools.

In 2008, the Information Technology (IT) Department and the Statistics Department of *Banco de Portugal* (hereinafter referred to as "*the Bank*") worked together and achieved to formalise a definition of the desirable common BI infrastructure to be developed as the basis for all statistical processes. This framework considers three main pillars, upon which future developments in statistical systems should rely: a data warehouse, centralised reference tables and a common IT platform.

Here we focus on the Securities Statistics Integrated System case to describe the challenges that emerge from the evolution process, as well as the opportunities arising, when stepping towards the new BI architecture.

1.1 Business Intelligence architecture

The importance of data warehouses is already widespread as huge amounts of potentially useful data become available almost every day. In what concerns statistical information, it is not possible to quickly

¹ Presented at the XIX *Jornadas de Classificação e Análise de Dados* (JOCLAD2012), Tomar (Portugal), May 2012

compile reliable and comparable results without having raw data gathered at a central point, despite its data source or input process.

The analysis of data flows occurring in the old model, each of which entailing specific data acquisition and conversion, revealed the enormous benefits that would emerge if we had a unique data repository, with certified micro data: not only would we reduce significantly data exchanges, but we would also enrich our data from the contributes of every system.

The second pillar of the BI architecture is the centralised reference database. It was designed to provide common reference data that enables cross linking information from different sources and systems, ensuring the real integration of systems. This master data management was already being developed and implemented for several years, as the need for such a core concept arose long time ago. But generic data need a generic handling, in order to avoid the proliferation of local incomplete and inconsistent databases. As such, in the Bank there is a specific team for this task, whose work includes monitoring the collection, consolidation, storage and release of reference data (e.g. countries, currencies, financial sectors, entities).

In what concerns the IT platform, a common technology was already established for use within the Bank. However, to provide business intelligence to a statistical system means much more than just having all users using the same IT systems - it is the overall approach that makes the difference, as it ensures that future software developments will be oriented for the ultimate goal: the complete integration.

1.2 Moving towards BI: a stepwise approach

In the Bank, and especially in the Statistics Department, several databases for micro-data have emerged over the last years with proven results on reducing or eliminating previous information gaps (see also Agostinho and Valério, 2010 and Lavrador, 2010). The use of such data for statistical purposes can deliver significant reductions in respondent burden, higher data quality and enhanced responsiveness to ad hoc information requests from the users. In fact, to capture the whole figure, final aggregates are not enough if we do not have the basic data to check details and analyse information from other potentially useful perspectives.

In this context, the Bank has been exploring the statistical potential of various sources of information, such as the Securities Statistics Integrated System (SSIS), the Central Credit Register (CCR) and the Central Balance-Sheet Database (CBSD).

The SSIS is an information system designed for collecting and storing data on securities issues and portfolios on a “security-by-security” and “investor-by-investor” basis, except for the households, whose data is collected by investor’s country (see also Aguiar, 2008 and Supplement 2/2008 to the Statistical Bulletin). Domestic securities issuances are captured from different sources, such as the Ministry of Justice, General Government, Banks, Euronext, etc. In what concerns foreign securities, the Centralised Securities Database (CSDB), managed by the European System of Central Banks (ESCB), is the primary and most reliable source. Regarding portfolios, stocks and transactions of equity and debt securities are collected on a monthly basis from the reports provided by several financial institutions and other resident entities.

The SSIS has been in place for more than ten years and was implemented through two relational databases. Also, an analytical database was added to SSIS at a later stage, aiming to enrich its exploration and analytical features.

However, in the context of recent BI improvements, this old architecture is currently under a modernization project. Therefore, all data processes in the statistical value chain will be revised according to the three main pillars mentioned above (see also Aguiar and Martins, 2011).

Shortly, the acquisition step, which consists of collecting and gathering information, will be split from the data processing step, in order to prevent new/updated data from interfering with the ongoing work. Thereafter, two independent databases will coexist and validated data will migrate to the production database under specific circumstances. At this stage, the centralised reference database is highly relevant to ensure consistent data classification and conciliation with already existent information.

The production step includes performing quality checks as well as data estimation. It will rely on an autonomous database that will keep information related to each statistic production cycle and be accessed only for this purpose.

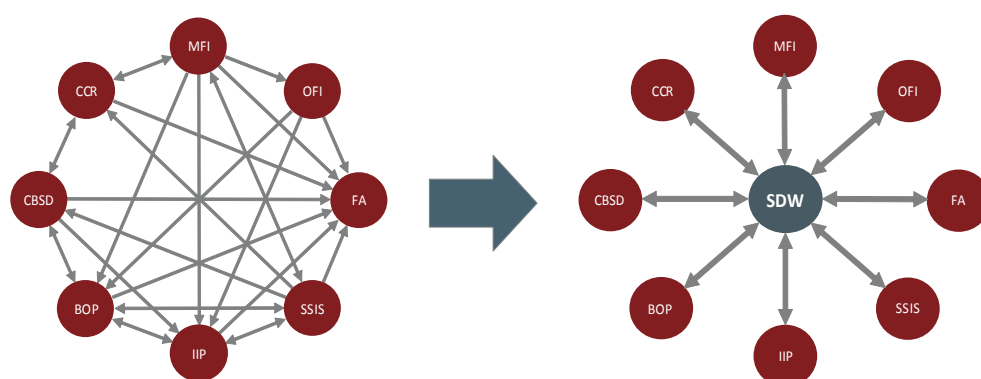
When data is deemed to be ready for exploration, it becomes part of the common data warehouse, so as to become available for different users, possibly grouped by profiles of permissions. Also, our statistical analysis will benefit from other information made available in the common source. To access it and extract the intended data, analytical IT tools provided by the defined common platform will play a major role.

The dissemination of predefined data is achieved by selecting a subset of the final information in statistical data warehouse, which depends on the final recipient, either official entities or the public in general.

Following a stepwise approach, the implementation of this architecture framework will contribute to the construction of a coherent and truly integrated statistical system as opposed to having multiple systems that coexist but are not connected in an efficient way (see Figure 1). At the moment, besides SSIS, other statistical information systems are being reformulated according to this model; such is the case of the BoP/IIP system (see also Marques, 2011).

Figure 1

BI FRAMEWORK: MOVING FROM MULTIPLE FLUXES TO A DATA WAREHOUSE APPROACH



Business intelligence is usually described as *"a broad category of applications and technologies for gathering, storing, analysing, and providing access to data to help enterprise users make better business decisions"*.

Information technology developments are essential to provide efficient tools that can help statisticians. In this sense, BI architectures seem to be the right framework for successfully accomplishing the task.

REFERENCES

Agostinho, António and Valério, M. J. (2010). Exploring micro-databases for statistical quality control: the experience of Banco de Portugal. European Conference on "Quality in Official Statistics". Helsinki, May 2010.

Aguiar, Maria do Carmo and Martins, Carlos A. (2011). Adding business intelligence to statistical systems – The experience of Banco de Portugal. Eurostat Conference on "New Techniques and Technologies for Statistics". Brussels, February 2011.

Aguiar, Maria do Carmo, Casimiro, P and Matos, J. (2008). The use of security-by-security databases for portfolio investment statistics. Irving Fisher Committee Workshop on "Challenges to Improve Global Comparison of Securities Statistics". Washington DC, March 2008.

Banco de Portugal (2008), Supplement 2/2008 to the Statistical Bulletin - Securities Statistics. Integrated System Features and Main Results.

Lavrador, Isabel (2010). Exploring the statistical potential of micro-databases. IFC Conference on "Initiatives to address data gaps revealed by the financial crisis". Bank for International Settlements. Basel, August 2010.

Marques, Carla (2011), Guidelines for a flexible and resilient statistical system: the architecture of the new Portuguese b.o.p/i.i.p 58th World Statistics Congress of the International Statistical Institute, Dublin, August 2011.

THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS

IV

Identifying holding companies and special purpose entities in the wake of the ESA 2010
implementation: a contribute from Banco de Portugal

IV THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS

IDENTIFYING HOLDING COMPANIES AND SPECIAL PURPOSE ENTITIES IN THE WAKE OF THE ESA 2010 IMPLEMENTATION: A CONTRIBUTE FROM *BANCO DE PORTUGAL*¹

IV

69

Identifying holding companies and special purpose entities in the wake of the ESA 2010 implementation: a contribute from Banco de Portugal

de Almeida, Ana M.

Deputy-Director of the Statistics Department

Banco de Portugal, Statistics Department

E-mail: ammalmeida@bportugal.pt

Crespo, M. Teresa

Head of Non-Monetary Financial Institutions Unit

Banco de Portugal, Statistics Department

E-mail: mtcrespo@bportugal.pt

Menezes, Paula

Head of Methodological Development Unit

Banco de Portugal, Statistics Department

E-mail: pamenezes@bportugal.pt

Nunes, Lúgia

Economist-Statistician

Banco de Portugal Statistics Department

E-mail: lmnunes@bportugal.pt

1 INTRODUCTION

The implementation of the new European System of National and Regional Accounts (ESA 2010) will imply some changes in the compilation process of financial accounts. In our view one of the issues that raise more concerns is the treatment and classification of head-offices, holding companies and special purposes entities (SPEs).

2 NEW INTERNATIONAL MANUALS METHODOLOGICAL GUIDANCE FOR SECTOR BREAKDOWNS

2.1 The institutional sectors

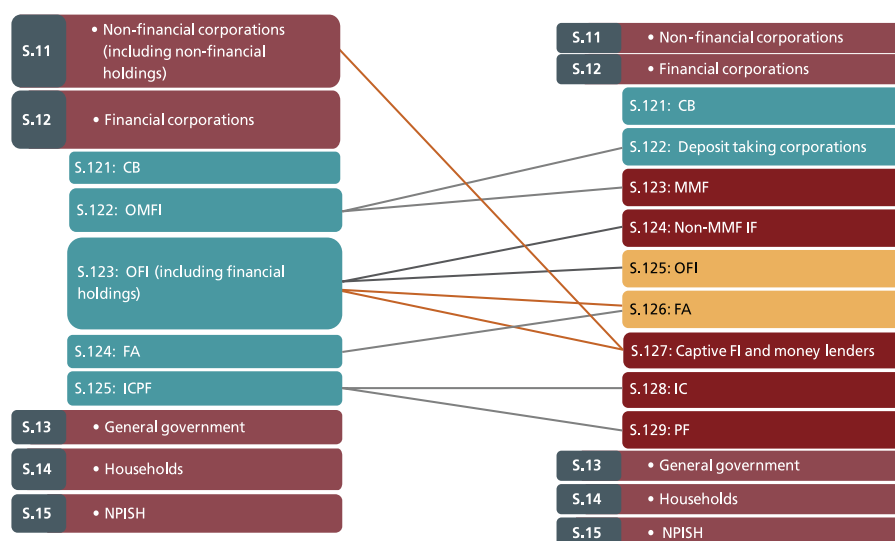
The main change will occur in the sector S.12 ("Financial corporations" (FCs)), which presents a more detailed breakdown in ESA 2010 than in ESA 95. The subsector Other monetary financial institutions (OMFI) in ESA 95 will be divided into two subsectors in ESA 2010: "Deposit taking corporations" and

¹ Presented at the OECD Working Party on Financial Statistics and Working Party on National Accounts, Paris (France), October 2012.

"Money market funds"(MMF). The subsector "Other financial institutions" (OFI) will be split into four new subsectors: "Non-money market investment funds" (Non-MMF), "Other financial intermediaries, except insurance corporations and pension funds" (ICPF), "Financial auxiliaries" (FA) and "Captive financial institutions and money lenders" (S.127). Moreover, an important issue results from the reclassification of the non-financial holdings from the "Non-financial corporations" (NFCs) sector (S.11) to the FCs' sector, more specifically to the above-referred subsector S.127. The subsector "Insurance corporations and pension funds" will be, in turn, broken down into two new subsectors: "Insurance corporations"(IC) and "Pension funds"(PF), respectively (see Figure 1).

Figure 1

THE INSTITUTIONAL SECTORS ACCORDING TO ESA 95 AND ESA 2010



2.2 Head-offices, holdings companies and special purpose entities

2.2.1 Head-offices and holdings companies

From a conceptual point of view, the definition of head-offices and holding companies is the same in the System of National Accounts 2008 (2008 SNA) and the ESA 2010. According to the latter, both head-offices and holding companies are institutional units (§2.14).

Head-offices are defined as units that exercise managerial control over their subsidiaries. They should be allocated to the dominant NFCs' sector of their subsidiaries, unless all or most of their subsidiaries are FCs, in which case they are treated as Financial auxiliaries (S.126) in the financial sector. On the other hand, holding companies that hold the assets of subsidiary corporations, but do not undertake any management activities, should be treated as captive financial institutions (S.127) (and included in S.127) and classified as FCs.

The practical rule suggested by ESA 2010 to identify these kinds of entities is the International Standard Industrial Classification of all Economic Activities (ISIC) code. According to this, head-offices are described under ISIC Rev.4, Section M, class 7010 - Statistical Classification of Economic Activities in the European Community (NACE) Rev.2, M 70.10: "This class includes the overseeing and managing of other units of the company or enterprise; undertaking strategic or organisational planning and decision-making role

of the company or enterprise; exercising operational control and managing the day-to-day operation of their related units"; and holding companies are described under ISIC Rev.4, Section K, class 6420 (NACE Rev.2, M 64.20): "This class includes the activities of holding companies, i.e. units that hold the assets (owning controlling-levels of equity) of a group of subsidiary corporations and whose principal activity is owning the group. The holding companies in this class do not provide any other service to the businesses in which the equity is held, i.e. they do not administer or manage other units".

2.2.2 Special purpose entities

In the previous versions of the international manuals², the guidelines on how to treat SPEs left room for countries to develop their own statistical treatment. More attention is now given to this type of entities in the new manuals, through the provision of some guidance on the characteristics of SPEs and their respective institutional sector classification.

However, there are several definitions of SPEs and these entities are known by different names, such as special purpose entities, special purpose vehicles, financial vehicle corporations or special financial institutions. Together with this broadly accepted description of SPEs, a clear definition is needed for statistical purposes. Despite the increased attention given by the new manuals, the definition of SPEs still leaves space for interpretation.

The ESA 2010 (§ 2.18) states that, although there is no common definition of a SPE, some of the following characteristics are typical:

- such units often have no employees and no non-financial assets;
- they have little physical presence beyond a "brass plate" confirming their place of registration;
- they are always related to another corporation, often as a subsidiary;
- they are often resident in a territory other than the territory of residence of the related corporations. In the absence of any physical presence an enterprise's residence is determined according to the economic territory under whose laws the enterprise is incorporated or registered;
- they are commonly managed by employees of another corporation which may or not be a related one. The unit pays fees for services rendered to it and in turn charges its parent or other related corporation a fee to cover these costs. This is the only production the unit is involved in, though it will often incur liabilities on behalf of its owner and will usually receive investment income and holding gains on the assets it holds.

Following the Balance of Payments and International Investment Position Manual (BPM6) (§ 4.51), SPEs can be used for various purposes, such as (i) holding and managing wealth for individuals or families; (ii) holding assets for securitisation; (iii) issuing debt securities on behalf of related companies (such a n entity may be called a conduit); (iv) holding companies that own shares in subsidiaries but without actively directing them; (v) securitisation vehicles; (vi) ancillary companies in different economies of their parent and (vii) carrying out other financial functions.

Whether a unit has all or none of these characteristics, and whether it is described as a SPE or some similar designation or not, it shall be treated in the same way as any other institutional unit by being allocated to sector and industry according to its principal activity, unless the SPE has no independent rights of action.

² Namely, 1993 SNA and ESA 95.

In summary, the accounts of SPEs with no independent rights of action are consolidated with the parent corporation, unless they are resident in a different economy from that of the parent. There is one exception to this general rule, and that is when a non-resident SPE is set up by the "General government" (GG) in whose case a rerouting of the operations is recommended.

It should be noted that the new institutional subsector S.127 encompasses all financial corporation and quasi-corporations which are neither engaged in financial intermediation nor in providing financial auxiliary services and where mostly of either their assets or liabilities are not transacted on open markets on the new European System of National and Regional Accounts (ESA 2010, § 2.98) (see Figure 2).

Figure 2

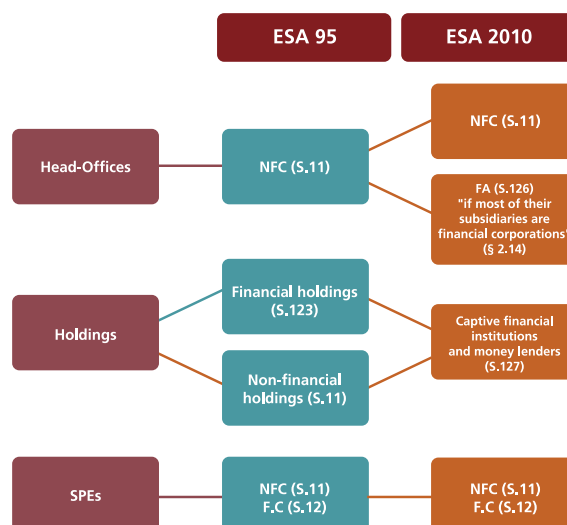
CAPTIVE FINANCIAL INSTITUTIONS AND MONEY LENDERS UNDER ESA 2010



Briefly and focusing on the non-financial and financial institutional sectors, we can say that the adoption of ESA 2010 will lead to the classification of head-offices, holding companies and SPEs, presented in Figure 3.

Figure 3

HEAD-OFFICES, HOLDINGS AND SPES SECTOR CLASSIFICATION UNDER ESA 95 AND ESA 2010



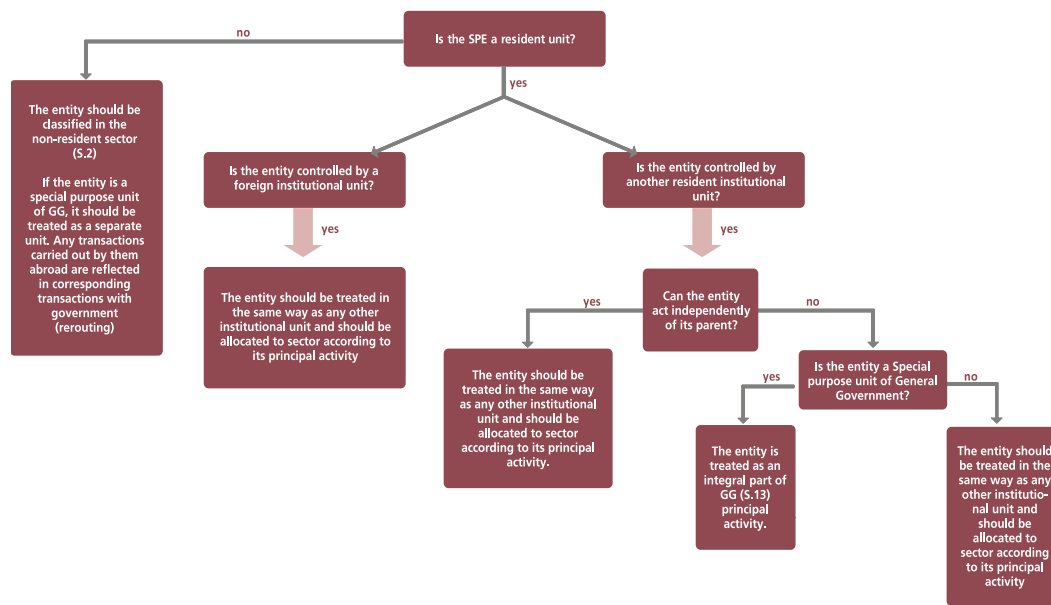
2.3 A decision tree for the sector classification of SPEs

Considering the guidance given by ESA 2010, a decision tree may be drawn helping compilers to identify the institutional sector where the SPE should be classified.

In what regards the sector classification of a SPE the compilers should, first of all, find out whether the SPE is a resident unit or not. Then the judgment is made on residence of the institutional unit which controls the SPE and the capacity of the latter to act independently from its parent enterprise. Thus, residency and autonomy of decision are key concepts for classifying SPEs (see Figure 4).

Figure 4

DECISION TREE FOR THE SECTOR CLASSIFICATION OF SPES



3 THE PORTUGUESE EXPERIENCE

As previously mentioned, since the international manuals still leave room for each country to identify holdings, head-offices and SPEs, our case looks for an answer on how to identify the entities that should be reclassified from the NFCs' sector to the FCs' sector.

3.1 The institutional responsibilities for sector classifications

In Portugal, the Instituto Nacional de Estatística (Statistics Portugal) is responsible for the institutional sectors' definition, boundaries and NACE validation, with *Banco de Portugal* (the central bank) being also in charge of the financial sector definition and its boundaries.

Banco de Portugal is responsible for the supervision of the financial holding companies (excluding financial holdings related to insurance corporations), collecting quarterly / bi-annually information for this purpose.

3.2 Analysing holding companies

In order to define the financial sector according to ESA 2010, *Banco de Portugal* started to work on the identification of non-financial holding corporations that should be reclassified from the non-financial

to the financial sector, and assessing also the quantitative macro-impact of that sector change. With this purpose, the following hypotheses were tested:

- **Hypothesis 1** – maintaining the NACE attributed at the origin in the Corporate Business Register (CBR) and reclassifying the entities with NACE 6420 “Activities of holding companies” to S.127 “Captive financial institutions and money lenders”;
- **Hypothesis 2** – analysing which quantitative criteria would be more appropriate following the methodological guidance of the new international manuals.

The **Hypothesis 1** is based on the existence of a strong correlation between the economic activity (NACE code) and the institutional sector classifications. This assumption would result in the reclassification of all non-financial holding companies with NACE code 6,420 from the NFCs’ sector to the S.127 subsector, implying thus the reclassification of approximately 4,200 entities that were registered in the CBR in 2011, and also a shift of approximately 3 per cent of the NFCs’ capital shares to the financial sector.

However, we came to the evidence that some companies with code 6420 were not holding companies and some companies with another NACE code were, in fact, holding companies. This NACE self-classification resulted in misleading classifications for a number of entities and further analysis had to be carried out.

Another data source was then used, the IES³ and the outcome of the reclassification showed a significant difference with respect to the one obtained using only NACE codes. In conformity with **Table 1** below, only 3,200 corporations registered with NACE code 6,420 reported 2011 information to IES (of which 60 were non-resident SPEs), and their total assets corresponded to 111% of the Gross Domestic Product (GDP); also the number of companies where a head-office NACE codification was attributed was very small, around 130, and their total assets corresponded only to 2 per cent of the GDP; perhaps this last situation resulted also from an incorrect assignment of the NACE codes.

Table 1

RECLASSIFICATION OF HOLDINGS IN S.127 APPLYING HYPOTHESIS 1							
NACE code	Corporate Business Register (CBR)		Informação Empresarial Simplificada (IES 2011)		Coverage of CBR by IES		
	Nr. of companies		Nr. of companies		Total Assets (%GDP)	Nr. of companies	Capital shares
	Total	SPE (RoW)	Total	SPE (RoW)			
6,420 Holdings	≈ 4,200	≈ 100	≈ 3,200	≈ 60	111%	77%	99%
7,010 Head-Offices	≈ 160	0	≈ 130	0	2%	84%	87%

The application of **Hypothesis 2** implied the use of quantitative criteria, in order to access which holding corporations should be reclassified from the NFs to the FCs’ sectors; it was thus necessary to choose which ones seemed better according to the guidance provided by ESA 2010. Thus, for testing if:

- a holding company simply owned the assets of subsidiaries, the criteria of nil services provided and commodities sold were used;
- an entity of this type was managed by employees of another corporation, which could or not be a related one, the criterion of a number of workers less or equal to 5 was used;

³ IES (*Informação Empresarial Simplificada*) is the Portuguese acronym for the simplified reporting system for corporate information, through the electronic submission of accounting, fiscal and statistical information that companies have to remit yearly, on a mandatory basis, to the Ministry of Justice, the Ministry of Finance, Statistics Portugal and the *Banco de Portugal*.

- a holding company had a strong financial component, the criterion of financial assets equal to/or greater than 80 per cent of the total assets was used.

How many non-financial holding companies were then to be included in S.127? Different answers could be found according to the quantitative criteria selected (see Table 2).

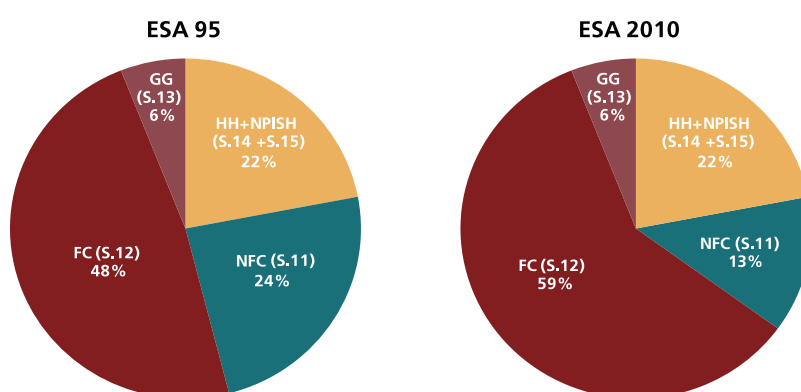
Table 2

RECLASSIFICATION OF HOLDINGS IN S.127 APPLYING THE QUANTITATIVE CRITERIA OF HYPOTHESIS 2			
	Nr. of companies	Total Assets (%GDP)	Nr. of companies needed to cover 95% of Total Assets
Total non-financial holdings	≈ 3,200	≈ 111%	≈ 780
1. Services = 0	≈ 2,300	≈ 62%	≈ 570
2. Commodities sold = 0	≈ 3,180	≈ 110%	≈ 770
3.a Workers ≤ 5	≈ 2,960	≈ 60%	≈ 900
3.b Workers ≤ 10	≈ 3,080	≈ 71%	≈ 910
<i>Of which workers = 0</i>	≈ 2,020	≈ 32%	≈ 630
4. Financial Assets/Total Assets ≤ 8	≈ 1,250	≈ 38%	≈ 450
3.a + 4	≈ 1,160	≈ 21%	≈ 500
1+2+3.b	≈ 2,260	≈ 53%	≈ 600

As shown in Figures 5 and 6, different criteria leading to different results would influence the macro analysis of S.11 and S.127.

Figure 5

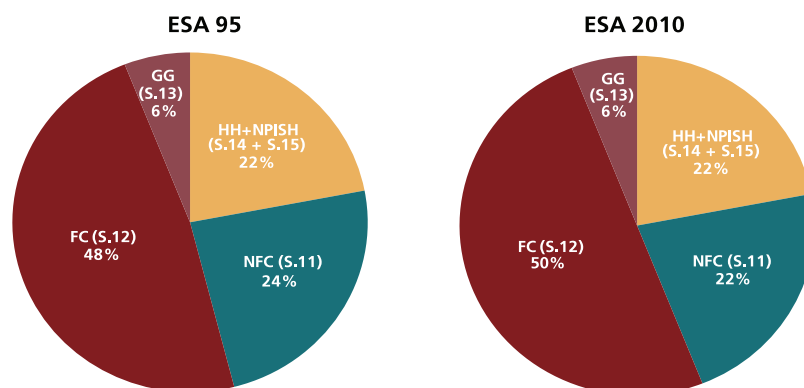
RECLASSIFICATION OF HOLDINGS IN S.127 APPLYING HYPOTHESIS 1 (NACE) – IMPACT IN FINANCIAL ASSETS



The appliense of **Hypothesis 1** led to a decrease of the NFCs' financial assets in 11 percentage points (p.p) and to a corresponding increase in the FCs' ones.

Figure 6

RECLASSIFICATION OF HOLDINGS IN S.127 APPLYING HYPOTHESIS 2 (USING QUANTITATIVE MEASURES 3.A + 4)



The use of **Hypothesis 2** gave rise to an increase of the financial assets of the FCs' by 2 p.p. and to a corresponding decrease of the NFCs'.

In terms of the ratios "debt-to-equity" and "debt-to-GDP", choosing **Hypothesis 2**, in detriment of Hypothesis 1, implied a decrease of, respectively, 30 per cent and 41 per cent in these ratios.

3.3 Analysing SPEs

In accordance with the OECD Benchmark Definition of Foreign Direct Investment (2008, 4th edition), the general criteria to assist compilers in identifying SPEs provide the following guidance: "...the enterprise is ultimately controlled by a non-resident parent company, directly or indirectly..."

In practice, however, we could not use quantitative criteria for typifying SPEs different from the ones used for characterising holdings (besides assessing the variable "control").

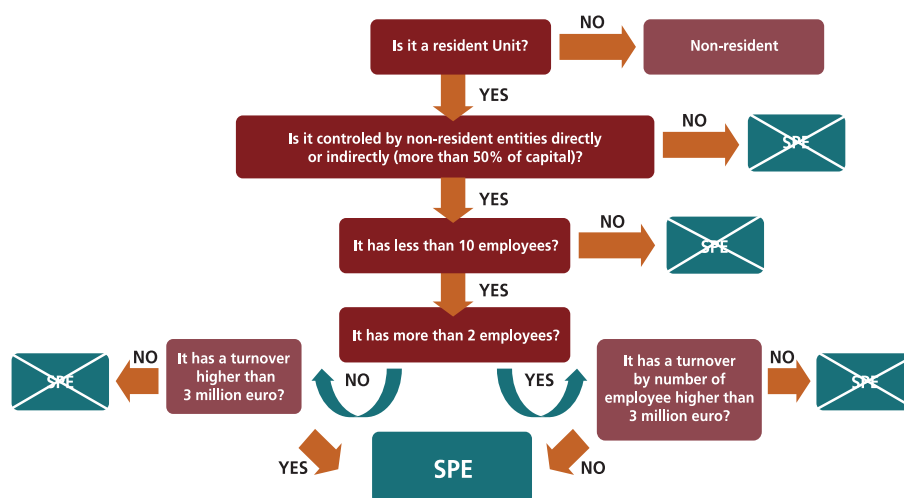
Thus, for testing if SPEs:

- had established links with other entities (usually their subsidiaries), the existence of control criterion was used;
- were resident in territories different from those of the related entities, the control by non-residents criterion was applied.

The balance of payments and international investment position (bop/iip) statistics in *Banco de Portugal* have been following the decision tree presented in [Figure 7](#).

Figure 7

DECISION TREE FOR ANALYSING SPES IN BOP/IIP STATISTICS



4 CONCLUSIONS AND WAY FORWARD

The identification of the holdings to be reclassified from the NFCs to the FCs' sector, depends on the hypotheses followed and, in conformity, different results are obtained – as previously shown for the Portuguese case. It is then our belief that there are still some issues that should be solved, both at national and international levels, aiming to harmonise statistical data on holdings, head-offices and SPES in the near future.

In Portugal, we recommend:

- to define procedures for the correct initial NACE code classification of the FCs, which may include, for instance, informing automatically the relevant supervisory authority. For entities already in activity, it will be necessary to streamline procedures for reviewing the NACE code by Statistics Portugal;
- to evaluate the need of a quarterly direct report from SPES, holding companies and head-offices. In order not to stress the reporting burden on these entities, an estimate of quarterly data using information already available with a higher frequency in several databases at *Banco de Portugal* might however be considered: the Central Credit Register (that covers almost 95 per cent of the credit granted to holding companies by resident credit institutions), the Securities Issues database (which covers all the debt securities and 90 per cent of the shares and other equity issued by holding companies) and the Securities Holdings Database (that covers around 40 per cent of the financial assets held by the holding companies);
- to reevaluate periodically, by Statistics Portugal and *Banco de Portugal*, the population of holding companies and head-offices, based on the IES data, and disclosing the correspondent list of entities.

At an international level, higher harmonisation among countries is advisable. This work should be developed involving countries and the relevant international organisations (ECB, Eurostat and OECD); with this purpose, a joint Task-Force in the July 2012 meeting of the Committee on Monetary, Financial and Balance of Payments Statistics (CMFB) was proposed, whose mandate could cover, namely:

- the characterisation of the qualitative and quantitative criteria (including concrete thresholds) to distinguish between holding companies and head-offices, and also discussing borderline cases;
- the definition of the adequate periodicity for reviewing the population of holding companies and head-offices – annually or at larger time intervals;
- the dissemination of the list of holding companies considered in the sector S.127, at least in each European country, possibly including also information on the International Securities Identification Number (ISIN code) of the respective securities issued.

REFERENCES

Andreasch, Michael, "New Financial Sector delineation in ESA 2010: first assessment for the Financial Accounts in Austria", OECD Working Party on Financial Statistics, October 2011.

ESA 2010 - European System of Accounts 2010 - Proposal for a Regulation of the European Parliament and of the Council on the European system of national and regional accounts in the European Union.

ESA 95 – Council Regulation (EC) Nr. 2223/96 of June 1996 on the European system of national and regional accounts in the Community.

International Monetary Fund, Balance of Payments and International Investment Position Manual, 6th edition, 2009.

ISIC Rev. 4 – International Standard Industrial Classification of All Economic Activities – United Nations Menezes, Paula; Lima, Filipa; Fonte Santa, Sílvia Issues in implementing SNA2008: looking for the data – ISI 2011.

NACE Rev. 2 Statistical classification of economic activities in the European Community – Eurostat.

Simon, Béla, Enlargement of the Financial Corporations Sector: Sector classification of Holdings Companies and other Captive Institutions – Methodological questions and practice in Hungary, OECD Working Party on Financial Statistics, October 2011.

Tsekhman, Noemi Frisch, The classification of Holding Companies and Head- Offices: Problems encountered by the Israel Central Bureau of Statistics, OECD Working Party on Financial Statistics, October 2011.

SNA 93 - System of National Accounts 1993 - United Nations, European Community, Organisation for European Cooperation and Development, International Monetary Fund and World Bank.

SNA 2008 - System of National Accounts 2008 - United Nations, European Community, Organisation for European Cooperation and Development, International Monetary Fund and World Bank.

MICRO-DATABASES: POTENTIAL FOR STATISTICAL USE

V

Data validation methods and tools in the framework
of a security-by-security / investor-by-investor system

Reaping the benefits of integrating the micro-databases
available at the Banco de Portugal

V MICRO-DATABASES: POTENTIAL FOR STATISTICAL DATA

DATA VALIDATION METHODS AND TOOLS IN THE FRAMEWORK OF A SECURITY-BY-SECURITY / INVESTOR-BY-INVESTOR SYSTEM¹

V

81

Aguiar, Maria do Carmo²

Head of Securities Holdings Statistics Unit

Banco de Portugal, Statistics Department

E-mail: mcaguiaar@bportugal.pt

Data validation methods and tools in the framework of a security-by-security / investor-by-investor system

1 THE SECURITIES STATISTICS INTEGRATED SYSTEM: AN OVERVIEW

The Securities Statistics Integrated System (SSIS) is an information system created in 1999 and managed by the Statistics Department of *Banco de Portugal* (BdP) that stores data on securities issues and portfolios (holdings) on a “security-by-security” (s-b-s) and “investor-by-investor” (i-b-i) basis (in the case of investors belonging to the households’ institutional sector, data is aggregated by the investor’s country). It gathers in a single database detailed data on stocks and transactions of debt securities and shares and other equity (financial derivatives are not included). Both stocks and transactions are collected on a monthly basis. Information is acquired by ISIN (International Securities Identification Number) and afterwards is classified according to the European System of national and regional Accounts (ESA 95) classification of financial instrument.

The classification of securities relies on the existence of a reference database which, in the case of domestic securities, is maintained by BdP; data is collected from several sources such as the Euronext, the Securities Market Commission (SMC), the General Government, the National Numbering Agency (Interbolsa), commercial databases, etc. Foreign securities are classified according to the Centralised Securities Database (CSDB) managed by the European System of Central Banks (ESCB).

As regards securities holdings, detailed information is collected on investments by residents in domestic and foreign securities, as well as on the holdings of non-resident investors in domestic securities. This information is reported by financial institutions, the SMC, and other resident entities.

The existence of a reference database with individual information on securities and issuers allows for the collection of statistical information from reporting entities on a s-b-s basis. This approach implies lower reporting costs, given that there is no need for reporters to aggregate background information according to multiple criteria. Furthermore it enables a better information monitoring and a greater flexibility when exploring data and building statistical analysis.

¹ Presented at the Workshop on optimising the data checking process of banking statistics, **Copenhagen (Denmark), September 2011**.

² The author would like to thank Alexandre Botelho, André Guerreiro and Isabel Lavrador for their valuable contribution.

The current SSIS architecture relies on two relational databases and one analytical database. Collected data is stored and validated (first level of quality control) in the “transactional database”. Data estimation of missing information is also done in this database. Validated and “enriched” data is copied daily to the so called “exploration database”. A second level of quality control is made on aggregate data, by carrying out consistency tests and comparisons with other information sources. Statistical outputs are produced from the “exploration database” as well as from the “multidimensional database”. The multidimensional database is a quite powerful tool since it enables user friendly analysis of the information.

SSIS stores information on the type of instrument, the institutional sector and the residency of the issuer/investor, prices (market value), transactions and positions associated with securities issues (issues, redemptions and outstanding amounts) and transactions and positions associated with securities portfolios (purchases, sales, stocks).

SSIS promotes consistency across statistics produced by BdP. In fact, SSIS information is used as an input for the compilation of a wide set of statistics produced at BdP: from monetary and financial statistics to balance of payments and international investment position and financial accounts. On the other hand, information from other statistical sources is used as an input for estimation of missing data and for data quality management purposes. Many of these procedures have been developed over time and are accomplished via Excel and Access tools. Integration is not always straightforward. Multidimensional analysis of securities data has been in place for the last five years and it has been a powerful tool for rapid analysis and reporting, but we can foresee many advantages in adding dimensions of analysis from other statistical systems.

Currently the SSIS is being reformulated according to the Business Intelligence (BI) strategy followed by BdP which relies on the definition of an architecture framework to be used as a reference in all IT developments in the statistical area. This architecture is built upon three pillars: a statistical data warehouse, centralised reference tables and a common IT platform. Reformulation of SSIS according to the BI architecture will imply redefining the statistical processes, along with adopting the common IT infrastructure. The data model that supports SSIS needs to be redesigned in order to separate data acquisition and data processing repositories, which currently are the same. Internal reference data will be replaced with master data references, ensuring harmonisation with other statistical systems. When available, input from other systems will be provided via the statistical data warehouse; this will be an incremental process. Multidimensional analysis, already in place, will benefit from other systems data available via the statistical data warehouse. Efficiency gains are expected, along with improved data analysis.

2 THE STATISTICAL VALUE CHAIN

The statistical value chain comprises four phases: Acquisition, Processing, Exploration and Disclosure. Each phase in the value chain has a comprehensive set of core tasks. The statistical value chain guiding principles are: centralisation; harmonisation; flexibility; consistency and efficiency.

The Acquisition processes deal with collecting data from external or internal sources, validating file formats or schemas, checking and substituting business keys. The Production phase is where statistics are made, and is heavily dependent on human intervention. Quality control is done using adequate statistical techniques, followed by estimates of missing or incorrect data. Classification and aggregates calculation are also examples of processes running at this stage. The Exploration processes are all about using data that has previously been checked or calculated by specialists in the statistical domain. Multidimensional analysis, statistical analysis, data mining, reporting and data extraction are examples of such processes. The Disclosure processes are focused on the statistical data dissemination obligations to external entities and also for the general public.

Data quality management is one of the most resource consuming tasks in the statistical value chain. Good statistics depend on good data and this implies efficient data control mechanisms in order to timely detect and correct data errors or inconsistencies. The next section describes the current data validation methods and procedures used in the production of securities holdings statistics at BdP.

3 DATA VALIDATION METHODS AND PROCEDURES IN SECURITIES HOLDINGS STATISTICS: HANDS ON

Data quality management in the SSIS is done both on elementary and on aggregated data, through coherence tests and the comparison with other sources, enabling also coverage assessment.

In the securities issues segment, several comparisons are performed (e.g. issues from monetary financial institutions (MFIs) are compared with their liabilities on securities reported in their balance sheet). In the securities holdings segment, in addition to the confrontation between positions and transactions, comparisons are also made between the total amounts reported in portfolios and end-of-period positions of domestic securities issued, as well as with other information sources, both internal and external, at an aggregate level. In the context of internal sources, comparisons are made with data from MFIs' balance sheet reported to monetary and financial statistics, data from non-financial corporations' balance sheet received by the central balance-sheet database, and with information from external transactions reported to balance of payments and international investment position statistics. Within the scope of external sources, comparisons are made with data from several sources, namely the Securities Market Commission, the Portuguese Treasury and Government Debt Agency, the Portuguese Civil Servants Retirement and Survivor Pensions Funds and the Portuguese Insurance and Pension Funds Supervisory Authority;

It is also important to mention the strong interaction with the reporting entities, through the generation of feedback files with information on the results of the processing and also through bilateral contacts between BdP and the reporters, with the purpose of clarifying and correcting anomalous situations.

3.1 Reception of reports: first level of quality checks

The first level of quality checks is done automatically by the application that processes the files with reported data. These checks include validation of reporter identification and reporting date; validations of ISIN, country, currency and institutional sector codes; plausibility of combinations of type of instrument, country and issuer sector, when applicable. Consistency between flows and stocks in terms of units (shares and other equity) or nominal value (debt securities) is also done automatically on a s-b-s and i-b-i basis. The outcome of these tests is sent back to reporters also on an automatic way.

Compliance with deadlines is an important issue, since a pre-requisite for starting aggregate data quality checking is that all main reporting institutions data is available. Small banks (reporters) may not be available to start this process, but the most relevant must be, in order to guarantee a sufficient coverage. There are automatic excel files with macros and queries that provide information regarding the date of reception of data, the amount in euro reported, the number of errors, number of records, etc. When there is evidence that almost all of the reported data of the month being analysed has been processed, one can proceed to the next step.

3.2 Detection of inconsistencies by comparison of aggregated stocks/flows

The next step is to generate tables for each reporter, by type of security (short and long term debt, shares, investment fund shares and other equity), sector of issuer and sector of holder. The inconsistencies are highlighted on these tables by comparing changes of stocks with flows. Each inconsistency also provides information regarding the stock of previous month, purchases, sales and stocks of the month

of analysis, according to that particular segment of information. The list of inconsistencies becomes the starting point for further investigation.

3.3 Assessment of anomalies/inconsistencies

Having in mind the list of inconsistencies, the next step is to investigate which security/issuer/investor is responsible for the inconsistency. The main tool used to accomplish this task is a combination of queries via an MSAccess database with links to Sybase and a set of MSExcel pivot tables. These table are used to analyse data by sector of issuer and investor and to drill down (i.e., to disaggregate) to s-b-s / i-b-i data. “Perdigueiro”³ application is used to make an historic analysis either by ISIN or investor. It also gives evidence on the nature of the anomaly (e.g. an incorrect value, a wrong type of transaction, duplicate registers, and changes in stocks with no flows). Each problem is then recorded in a file which centralises the inspected problems (on a s-b-s basis) and the corrective solution.

3.4 Follow up

From the inspection of the inconsistencies two conclusions may be reached: either there is a problem or the inconsistency is acceptable. There are a number of reasons that may explain inconsistencies between flows and stocks: changes in prices, transfers of portfolios between institutions of the same economic group or somehow connected, or changes of sector of some issuers/investors (reclassifications).

If the flows/stocks inconsistencies are confirmed, no action is taken apart from adding a brief description to the file with the list of monthly anomalies for future reference. If, on the other hand, it corresponds to an error made by the reporter, two situations can occur:

- Problems that are easy to be corrected by the compilers, what is done as fast as possible (which doesn’t mean the reporter isn’t notified). Examples: irregular values easily recognisable (usually stock values (e.g.: a value with 3 zeros more than it should); share stocks in big portfolios valued at nominal prices (which in fact is not an error since the reporters have that possibility); data sent regarding securities that are not outstanding anymore or that are duplicates.
- Problems not easy to be corrected mainly because additional information is needed, for which reporters must be contacted and asked to clarify and/or correct. Examples: inconsistencies where it is difficult to assess which part of the information is incorrect (flows or stocks); flows not valued; records not reported; wrong codes of securities.

All problems/inconsistencies are sent to the reporters by e-mail (with attached files and a brief description of the problem). Each reporter should correct or clarify the identified issues.

After refreshing the initial tables, if all the inconsistencies between stocks and flows are explained and no significant errors are left, data is considered to have enough quality to proceed with the production cycle.

Once the reporting data is validated and estimations of missing data is included, another round of checking procedures is performed. These include comparing outstanding amounts with total holdings, for domestic securities; comparing aggregated data with other sources available for specific investors or sectors (e.g. monetary financial institutions, investment funds, social security funds, insurance companies and pension funds); building complete “from-whom-to-whom” tables (stocks, transactions and other changes) based exclusively on data from SSIS.

3 “Perdigueiro” is the Portuguese name for pointer: a breed of hunting dog

The final check will be the comparison between SSIS “from-whom-to-whom” tables and Financial Accounts “from-whom-to-whom” tables⁴, in which there is a hierarchy of sources (e.g. MFI data comes from monetary and financial statistics, RoW data comes from balance of payments statistics, etc).

4 WRAP UP: LOOKING AHEAD

The use of micro-databases and item-by-item reporting, covering different areas of the economy and the financial markets, has been helping National Central Banks worldwide to overcome a number of shortcomings related to the conventional data collecting systems. The use of such data for statistical purposes can deliver significant reductions in respondent burden, higher data quality and enhanced responsiveness to ad hoc information requests from the users. Unfortunately, there is a shift of the burden from the respondent to the compiler and therefore the need for efficient tools and procedures in order to minimise this burden.

In a perfect world, all reported data would be perfect, and reference databases would be perfect and producing statistics would almost be a perfectly boring task. Meanwhile, while struggling for the perfect word, data quality management is a crucial task within the statistical value chain and one that can be quite time consuming.

Experienced data quality managers however develop special skills and with the help of some more or less sophisticated analysis tools, can easily find the biggest mistakes and be quite efficient in fulfilling their mission.

Usually investigations start with aggregate figures and carry on by checking the underlying micro-data, in order to find the causes for suspect deviations.

Having some redundancy can be very helpful; for instance, asking reporters to send information regarding nominal values or quantities as well as market values will allow checking changes in positions; moreover, having reported transactions and positions can support incoherencies detection. Tracking changes throughout different time frames can also be of fundamental help. Finally, crossing data with other sources of information and with other statistics will be of the utmost importance in order to have harmonised and comparable statistics.

Information technology developments are essential in providing efficient tools that can help statisticians. In this sense, BI architectures provide the right environment for accomplishing their task. Business intelligence is usually described as *“a broad category of applications and technologies for gathering, storing, analysing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support systems, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining”*.

Who would ask for more?

REFERENCES

Aguiar M. (2007) “Integrated statistical systems: evolution or revolution?” Irving Fisher Committee, IFC Bulletin N. ° 28: The IFC’s contribution to the 56th ISI Session, Lisbon, August 2007

Aguiar M., Casimiro, P. and Matos J. (2008), “The use of security-by-security databases for portfolio investment statistics.” Irving Fisher Committee, IFC Bulletin N. ° 29: Proceedings of the IFC Workshop on Challenges to improve global comparison of securities statistics, Washington DC, March 2008

⁴ These are double-entry tables that allow evaluating which institutional sectors are financing the economy, in terms of securities. These tables show the holdings of various financial instruments by the different institutional sectors, both on the asset and the liability side.

Aguiar M., Martins C. (2011) "Adding business intelligence to statistical systems. The experience of Banco de Portugal", NTTS 2011 – New Techniques and Technologies for Statistics, Brussels, February 2011

Banco de Portugal (2008), Supplements to the Statistical Bulletin: 2/2008 "Securities Statistics – Integrated System Features and Main Results"

D'Aguiar L., Lima F. (2009), "Credit risk transfer – dealing with the information gap." International Statistical Institute, Special Topics Contributed Paper Meeting N. ° 62: Data Issues Related to the Financial Crisis, Durban, August 2009

ECB (2010) "The Centralised Securities Database in brief"

Lavrador I. (2010), Exploring the statistical potential of micro-databases, IFC Conference on Initiatives to address data gaps revealed by the financial crisis, Bank for International Settlements, Basel, August 2010

REAPING THE BENEFITS OF INTEGRATING THE MICRO-DATABASES AVAILABLE AT THE *BANCO DE PORTUGAL*¹

Menezes, Paula

Head of the Methodological Development Unit

Banco de Portugal, Statistics Department

E-mail: pamenezes@bportugal.pt

D'Aguiar, Luís

Economist-Statistician

Banco de Portugal, Statistics Department

E-mail: laguiar@bportugal.pt

1 INTRODUCTION

Statistics have to keep up with the rapid changes of modern times. Economies are constantly faced with new challenges and these need to be reflected in statistical data, and presented to users in an accurate, relevant and reliable way. Policy-makers, financial supervisors and regulators around the world require as much rich and timely information as possible so as to be able to take appropriate decisions.

The *Banco de Portugal* (hereinafter referred as “the Bank”) is no exception, for that matter, and cannot afford having a complacent attitude towards the statistics for which it is accountable. To retain relevancy over time, these statistics must cope with the speed and the scope of the main stakeholders’ ever-increasing demand for comprehensive, detailed and high-quality information.

However, continuously adapting the statistics to new phenomena has obvious limitations. Conventional data collecting systems cannot simply keep on expanding indefinitely just to cope with the need to fill the information gaps perceived by the users or in anticipation to their future data requirements.

Amongst the many motives for not pursuing recurrently this approach one could point out, *inter alia*, the following:

- The resulting overburdening of respondents goes against established best practices and is “politically” ill-advised.
- The related initial and maintenance costs are far from being negligible, both to the agency that collects the data and to the respondents.

¹ Presented at the *XIX Jornadas de Classificação e Análise de Dados (JOCLAD2012)*, Tomar (Portugal), March 2012.

- New statistical datasets (or significant enhancements to existing ones) require lengthy preparation time (years, rather than months) and, once launched, are supposed to remain in operation for a prolonged period of time (typically some years, in the case of Eurosystem statistics). This time-lag could even be further extended, should the revision result from a major change in the principal methodological manuals, as it often happens.
- *Ad hoc* surveys are, in general, too time-consuming and expensive, not to mention reliant upon the willingness to participate on the part of the target population.

Data are critically important in making well-informed decisions. Lack of data can lead to an inefficient allocation of resources and imposes high costs on the society. In an increasingly complex economy, the traditional production of standard statistical tables addressing a set of pre-posed questions, no longer suffices.

The response given by conventional data collecting systems to new statistical demands – stemming from, e.g., the need to conduct macro-prudential analyses or to accommodate new data requirements related to the Bank's participation in the European System of Central Banks (ESCB) – is problematic, costly and could possibly turn out to be counterproductive, which helps to understand why the Bank has increasingly been reusing the available micro-data, thus recognising that this information is unquestionably necessary to respond to a complex world, and to address new issues and challenges as they arise².

2 A PARADIGM SHIFT

The Bank's strategy to deal with the challenge of maintaining its statistics relevant to the users in a shifting and more demanding environment, while attending to the need to keep the reporting burden on respondents at an acceptable level, was to enhance the overall efficiency of the statistical framework by further exploring the largely unused statistical potential of already existing data sources. In fact, statistically edited micro-data, which include data from administrative sources not originally intended for statistical purposes or even data related to the prudential supervision function, offer an unusual array of interesting features, *inter alia*:

- *Very good coverage* of the population in most of the cases.
- *Relatively low reporting costs*, thus helping to mitigate the constraints imposed by the statistical response burden of the reporting agents.
- *Increased flexibility* as regards the compilation of new statistics, e.g. related to financial and other structural innovations.
- *More rapid response* to *ad hoc data requirements* from the users – in many cases, almost in real time.

Moreover, the evolution in network and communication protocols, database systems and multidimensional analytical systems has somewhat removed the potential disadvantages of having to deal with the huge amounts of data normally associated with the handling of micro-databases. (de Almeida *et al.*, 2011)

Best practices in compiling official statistics advocate that all data should be collected only once: any form of double reporting or redundant collection should be avoided and if existing be terminated. Accordingly, data already available – due to whatever reasons – should be reused if found useful for (other) statistical purposes. Obvious candidates are data from existing Central Credit Registers, as well as balance sheet data from Central Balance-Sheet Offices and/or supervisory information. The experience of the Bank in this area has shown that the use of such information for statistical purposes can lead to a very significant reduction of the response burden, higher data quality and lower costs.

² Throughout this paper the term "micro-data" will be used to refer data about individual persons, households, businesses or other entities; it may be data directly collected by the Bank or obtained from other sources, such as administrative sources.

At national level, a formal exchange of administrative data with institutions outside the central bank, like the national statistical institute (NSI) or the tax authorities, would also help to reduce the reporting costs. An important precondition would be the maintenance of common company registers with the NSI. Extending this idea across national borders, one could think of common international databases – exchanging of micro-data e.g. on significant cross-border mergers and acquisitions that need to be recorded symmetrically in the respective statistics of both affected countries. This could ideally be insured with an exchange of (confidential) micro-data. (Liebscher *et al.*, 2008)

For the last 10 years, the Bank has been developing and maintaining several micro-databases based on item-by-item reporting and has been exploring the statistical potential of these complementary sources of information with very significant positive impacts on the overall quality of its statistical output.

The databases managed by the Bank's Statistics Department include:

- The *Securities Statistics Integrated System* (SSIS) database, which is a "security-by-security" and an "investor-by-investor" database that provides, in a single repository, data on the securities issues and holdings required by the different statistical domains (e.g., monetary and financial statistics, external statistics, securities statistics and financial accounts), thus replacing the separate and distinctive data storing systems that were previously in place.
- The *Central Credit Register* (CCR), which is an administrative database that stores credit-related information supplied by all the resident credit-granting financial institutions.
- The *Central Balance-Sheet Database* (CBSD), which stores granular information on virtually all the resident corporations, collected through the so-called Informação Empresarial Simplificada (IES), a joint effort of four distinct Portuguese public entities – the Ministry of Finance, the Ministry of Justice, Instituto Nacional de Estatística (the Portuguese NSI) and the Banco de Portugal – consisting of a yearly submission of information by corporations, in a single, paper-free, electronic form, to fulfil reporting obligations of accounting, fiscal and statistical nature.

Besides complementing and/or cross-checking the information gathered through more conventional channels, these data have proved to be of great importance in monitoring and assessing developments in the Portuguese financial system, especially in the wake of the recent financial crisis. Notably, this approach has permitted so far, *inter alia*:

- *Improving the responsiveness to users' requirements*, particularly those arising from ad hoc information requests, with proven results in reducing or eliminating data gaps and in monitoring and assessing developments in the Portuguese financial system, e.g. in connection with the recent global financial crisis.
- *Curtailing the (very demanding, in terms of use of resources and time) follow-up procedures as regards data collecting schemes*, whereby respondents are re-contacted after the initial submission of data, to obtain missing information and/or to verify and, if necessary, to correct questionable data.
- *Enhancing the quality control procedures* (e.g. by cross-checking elementary/raw data from different statistical domains), thus increasing the efficiency of the production process and improving the quality of end products.
- *Avoiding data redundancy*, while at the same time expanding significantly the range of statistics available.

In particular, the use of the available micro-databases for the compilation of the Portuguese flow-of-funds within the national financial accounts has proved to be extremely helpful, as it allows for a much better understanding of the interlinks within the resident economy and *vis-à-vis* the rest of the world.

Moreover, micro-data have the potential to support, if need be, the drilling down of the most summarized levels of data to the most detailed ones, which may help to confirm (or to disprove) trends and developments conveyed by macroeconomic statistics and, concomitantly, to explore and/or to elucidate their possible implications for e.g. financial stability analysis and systemic risk assessment. (de Almeida *et al.*, 2011)

3 GOING ONE STEP FARTHER

In keeping with such line of action, the Bank has been developing an approach that, once fully completed, will allow for the integration of existing administrative and survey data, thus enhancing the basic data infrastructure while protecting confidentiality. Also, a reduction in respondent burden and an increase in the breadth and depth of information available to policy makers and researchers are expected.

Such approach has only been possible because of the possibilities brought in by the information technology (IT) revolution. But even though IT has enabled the statistical community to carry out the current procedures for collecting, compiling and disseminating statistics more efficiently, it is much more important to reflect on how such revolution can be used to introduce new and more effective procedures.

An architecture based on so-called business intelligence (BI), capable of enabling efficient analysis of quantitative information by a wide variety of users, could significantly contribute to meeting the Bank's concerns in this area. With this in mind, the Bank set off a study in 2008 aiming at defining a business intelligence framework to be used as a reference in all future information technology developments in the statistical realm. This framework will be built upon three pillars (Aguar *et al.*, 2011):

- A *data warehouse*, to guarantee a central access point to all statistical data, independently of the input source or the production process.
- A *centralised reference database*, to provide common reference data and to enable the linkage of information across different sources and systems.
- A *common technological infrastructure*, across the various information systems, to facilitate the integration and re-usage of components and to promote data access efficiency and transparency to final users.

The implementation of this architecture framework will contribute to the construction of a coherent and truly integrated statistical system as opposed to having multiple systems that coexist but are not connected in an efficient way.

At the moment, three statistical information subsystems are being reformulated according to this model: the balance of payment and international investment position (BoP/IIP) statistics, the CBSD and the SSIS.

Integration of micro-data is a powerful approach to enrich the already available information allowing cross-data comparisons and quality checks among the different statistical domains. As an example, the IES provides annual accounting data for a given corporation, which might be answering to the Bank's ISII (*Inquérito sobre Investimento Internacional*) survey and, at the same time, having its securities issues recorded in the SSIS database. In an integrated system, it would be possible to ensure compatible data at a micro-level. This is a powerful tool for the compilation of financial accounts, which require that total uses equal total resources in the domestic economy.

There are many different practical and methodological problems that must be addressed when two or more sources are to be integrated, *inter alia*:

- Harmonising populations, e.g. determining the group of entities that belong to a given institutional sector (financial and non-financial corporations, general government, households and non-profit institutions serving households).
- Harmonising reference periods (annually, quarterly ...).
- Harmonising of variables.
- Harmonising of classifications.
- Adjusting for measurement errors (accuracy).
- Adjusting for missing data.
- Deriving variables.

Data integration is concerned with integrating unit record data from different administrative and/or survey sources to compile new official statistics which can then be released in their own right. Possible *benefits of integrated data sets* include (UNECE 2009):

- Compiling new or enhanced statistics.
- Producing more disaggregated information for measures where some information currently exists.
- Carrying out research using composite micro-data that cover a wider range of variables for a larger number of units than available from any single data source.
- Potentially improving or validating existing data sources.
- Potentially reducing respondent burden.

Benefits are evident but there are also *problems, challenges and cautions with the use of integrated micro-data*, particularly those related to confidentiality issues. As said before, data already available should be reused if found useful for (other) statistical purposes; that being the case, it is necessary to strictly safeguard their confidentiality and to ensure that the sharing is legally allowed or explicitly agreed by the reporting agents. However, because of legal constraints, confidentiality makes the access to some useful data sources problematic and disclosure is a constant problem when we need to release data.

4 CONCLUDING REMARKS

In Portugal, as in most countries, official statistics are collected not just for decision-makers but also for the use of the community. The research community plays a significant role in stimulating policy analysis and debate. This is important particularly for democracies where official statistics can be used to assess the effectiveness of government's policies and programmes. Furthermore, providing researcher access to micro-data can be a way of extracting additional value from the high cost of collecting official statistics, extending the range of statistical outputs, and getting valuable insights into the quality of the data and how statistical surveys might be improved. Conversely, if researchers do not have access to relevant official statistical data, there is the risk that they will collect their own data, which will often be with smaller samples and of inferior quality relative to official surveys. These collections are at additional costs to both the data collector and the respondent, increasing the reporting burden imposed on the community (UNECE 2009).

REFERENCES

Aguiar, M. & Martins, C. (2011). Adding business intelligence to statistical systems – The experience of Banco de Portugal. Eurostat Conference on “New Techniques and Technologies for Statistics”. Brussels, February 2011.

D’Aguiar, L. & Lima, F. (2009) Credit risk transfer – dealing with the information gap. The IFC's contribution to the 57th ISI Session, Durban, August 2009. IFC Bulletin No 33, August 2010.

de Almeida, A., D’Aguiar, L. & Casimiro, P. (2011) Promoting enhanced responsiveness to users’ data needs: the experience of the Banco de Portugal in exploring the statistical potential of micro-databases. Proceedings of the 58th ISI Session. Dublin, August 2011.

Di Zio, M. (1998) Integration of microdata: benefits and challenges. ESCAP Workshop on Census and Survey Microdata Dissemination: Benefits and Challenges. Bangkok, 18-20 June 2008.

Liebscher, K. & Schubert, A. (2008) Torn between new data needs and respondents’ fatigue – Are efficiency gains the philosopher’s stone? 4th ECB Conference on Statistics. Frankfurt am Main, 24-25 April 2008.

UNECE (1992) Fundamental principles of official statistics in the UNECE region.

UNECE (2009) Principles and guidelines on confidentiality aspects of data integration undertaken for statistical or related research purposes.

COMPILING STATISTICS: SPECIFIC CASE STUDIES

VI

Statistics on securitisation in Portugal – Compilation issues and data assessment

Compilation and measurement issues for the financial sector: the cases for FISIM
and securitisation in Portugal

VI COMPILING STATISTICS: SPECIFIC CASE STUDIES

STATISTICS ON SECURITISATION IN PORTUGAL – COMPILATION ISSUES AND DATA ASSESSMENT¹

de Almeida, Ana M.²

Deputy-Director of the Statistics Department

Banco de Portugal, Statistics Department

E-mail: ammalmeida@bportugal.pt

Crespo, M. Teresa

Head of Non-Monetary Financial Institutions Unit

Banco de Portugal, Statistics Department

E-mail: mtcrespo@bportugal.pt

1 INTRODUCTION

Securitisation means a process whereby a pool of assets is transferred by its original holder (originator) to a special-purpose vehicle. This vehicle issues debt securities (the so-called securitised bonds) or securitisation units, that it places with investors to finance the purchase of securitised assets.

With such transaction originators obtain liquidity, diversify their range of funding sources, transfer credit risk, improve their capital ratios, obtain better time adjustment between assets and liabilities and, by purchasing the securities issued by securitisation special-purpose vehicles, may use them as collateral to obtain liquidity with the European Central Bank (ECB).

2 LEGAL FRAMEWORK

The first securitisation transaction conducted by a Portuguese monetary financial institution (MFI) took place in 1997, although there was no specific national legislation at the time. Hence, to conduct this transaction an offshore structure and a limited range of asset classes were used, which included consumer credit, car purchases, leasing and long-term rentals.

Decree-Law No 453/99 of 5 November (the so-called 'Securitisation Law') establishes the legal framework governing securitisation transactions conducted in Portugal, setting forth the legal requirements applicable to securitisation and regulating the setting-up and functioning of securitisation special-purpose vehicles.

¹ Presented at the XIX Congress of Sociedade Portuguesa de Estatística, in a session of Econometrics, **Nazaré (Portugal), October 2011.**

² The authors would like to thank Luís D'Aguiar and Pedro Tomás for their comments.

This Law envisages two types of entity: Securitisation Funds (FTCs) and Securitisation Companies (STCs). These two types of special-purpose vehicle are subject to the supervision of the CMVM, which is responsible for regulating this activity as well as for registering and authorising the activity of FTCs and STCs. However, no securitisation transaction has been conducted based on this legal framework, due to the lack of a clear and attractive tax scheme.

Decree-Law No 219/2001 of 4 August was approved in an attempt to resolve this issue. It set forth the tax scheme applicable to securitisation transactions carried out in Portugal, notably by exempting from personal and corporate tax income securitisation units and securitised bonds held by non-resident investors, and exempting from withholding tax income obtained by resident investors. These legislative changes led to the beginning of securitisation transactions with recourse to Portuguese financial vehicles.

At the end of 2003, through Decree-Law No 303/2003 of 5 December, authorisation was given for the securitisation of corporate and household tax debts to the Portuguese State and Social Security.

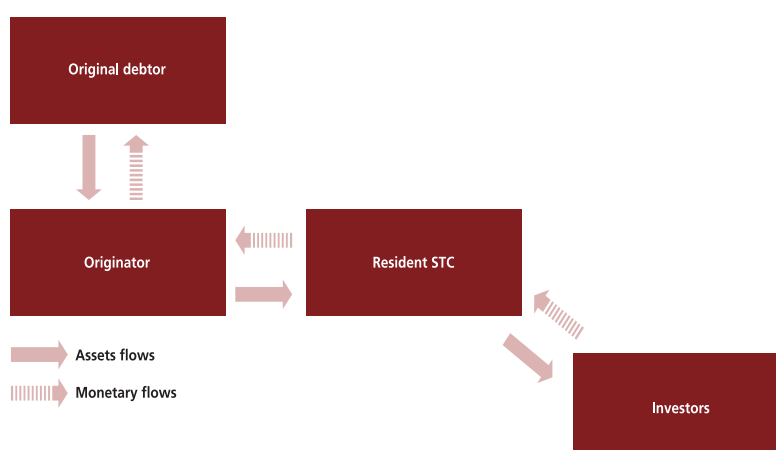
3 THE SECURITISATION SECTOR IN PORTUGAL

The Portuguese legal system allows two types of Financial Vehicle Corporation (FVC): the FTCs and the STCs. At first these two types of vehicle had different capital requirements, which explain the fact that the first securitisation transactions were conducted via FTCs, which had lower capital requirements. However, the equivalence of minimum capital requirements between FTC management companies and STCs through Ministerial Order 676/2002 of 19 June changed this situation, leading to securitisation transactions being conducted also by STCs.

STCs are limited liability companies financing their activities through the issuance of securitised bonds. Such issuance of bonds has loans as underlying assets and is conducted through public or private subscription in the domestic and/or international capital markets (Figure 1).

Figure 1

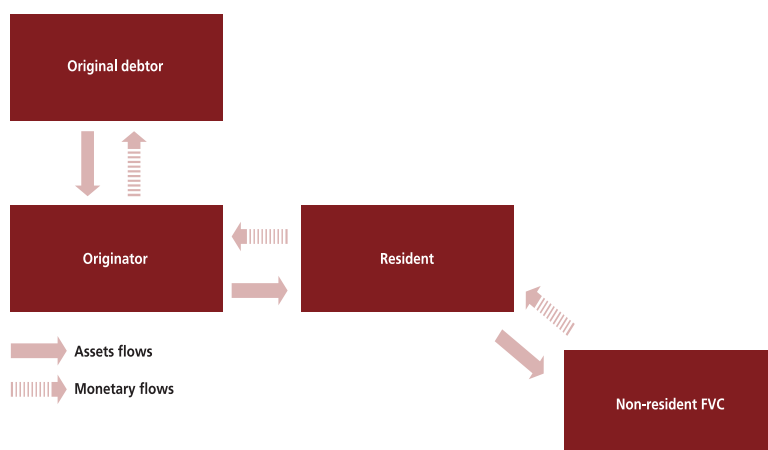
SECURITISATION INVOLVING AN STC



FTCs have quite a similar structure to that of investment funds, which issue securitisation units to finance the acquisition of loans. In Portugal units issued by resident FTCs are considered equivalent to capital and usually acquired by non-resident financial vehicles. In turn, these vehicles, usually established in Ireland, issue securitised bonds placing them in the international capital market (Figure 2).

Figure 2

SECURITISATION INVOLVING AN FTC



Another distinct feature of FTCs is the fact that they are closed entities that carry out only one securitisation transaction, while STCs carry out several securitisation transactions over time.

In the early years securitised credit was derecognised from the originator's balance sheet (the so-called 'true sales'). However, this changed in 2005, following the adoption of the revised versions of the International Accounting Standards (IAS) 32 and 39. In particular, IAS 39 provides for two different accounting treatments, depending on whether the originator retains control of credit following securitisation. Where control is retained, which is the case for most securitisation transactions conducted in Portugal, credit should remain on the asset side of the respective balance sheet.

Depending on whether securitised loans are derecognised from the originator's balance sheet, and to avoid double counting, securitisation transactions are registered differently:

- If securitised loans are derecognised from the originator's balance sheet, the outstanding amount of loans granted by the originator, which is recorded under assets, is reduced by the securitised amount and there is a matching increase in the 'cash' item (Figure 3). On the financial vehicle's balance sheet, loans are registered vis-à-vis their original debtor.

Figure 3

OFF-BALANCE-SHEET SECURITISATION (LOANS DERECOGNISED IN THE ORIGINATOR'S BALANCE SHEET)

Assets		Liabilities	
Cash	→		
Loans	←		

- If securitised loans are not derecognised from the originator's balance sheet, the outstanding amount of loans granted remains unchanged, and to compensate the increase in the 'cash' item on the asset side, a liability of the originator to the financial vehicle is recorded (Figure 4), and there is an ensuing increase in the balance sheet. In order not to affect monetary aggregates, the registration on the liability side is, by convention, under 'deposits and deposit-like instruments over two years' and is written against the financial vehicle. On the financial vehicle's balance sheet, securitised loans are registered as assets vis-à-vis the originator, to avoid double counting of loans granted to the original debtor.

Figure 4

ON-BALANCE-SHEET SECURITISATION (LOANS NOT DERECOGNISED IN THE ORIGINATOR'S BALANCE SHEET)

Originator			
Assets		Liabilities	
Cash	→	Deposits and deposit - like instruments	→
Loans	=	vis-à-vis OFIs	

4 DATA FLOW: FROM RAW DATA TO STATISTICS

FTCs and STCs are supervised by the CMVM, to which they report information for prudential supervision purposes. To avoid the weight of double reporting by these entities for supervision and statistical purposes, data reported to the CMVM were used to compile statistics. With this objective in mind, a formal agreement was signed between *Banco de Portugal* and CMVM according to which the latter forwards to the Banco accounting data received for supervisory purposes. However, such data are not in sufficient detail to compile statistics and meet the ECB reporting requirements, notably under Regulation ECB/2008/30 concerning statistics on the assets and liabilities of financial vehicle corporations engaged in securitisation transactions.

Hence, additional information sources are used to complement the accounting data received from the CMVM:

- Where originators are financial institutions under the prudential supervision of *Banco de Portugal*, there are reporting requirements for supervisory purposes that require that such institutions inform on the nature of the securitisation transactions carried out. In addition, resident MFIs that are originators of securitisation transactions are also subject to mandatory reporting of balance sheet data for the compilation of monetary and financial statistics.
- Where originators are non-financial entities, *Banco de Portugal* has to make use of additional information publicly available, such as issuance prospectuses of securitized bonds, pre-sales information of rating agencies and FTCs regulations.

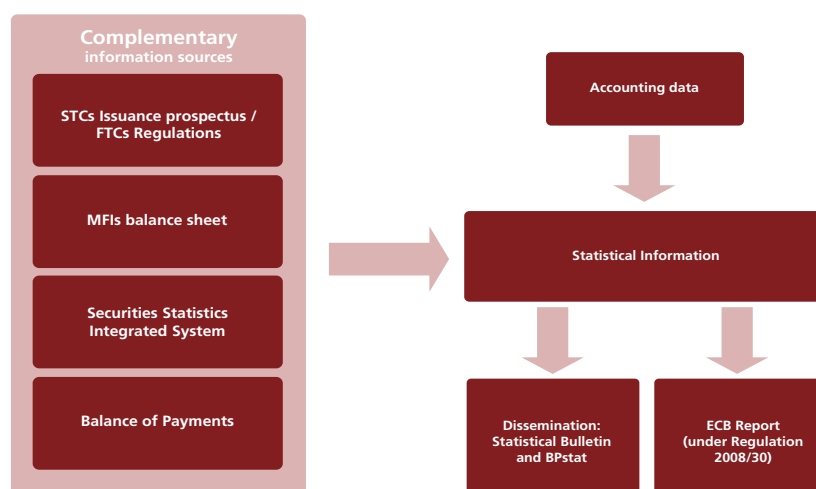
In addition, several statistical data sources are used to break down accounting data by counterparty sectors and transactions' original maturities. They also allow for quality control of raw accounting data. Hence, balance of payments data make it possible to verify financial flows between Portugal and other countries and identify possible early redemptions of securities issued by STCs and placed abroad.

Another data source available at *Banco de Portugal* is the Securities Statistics Integrated System (SIET, under the Portuguese acronym), which is a security-by-security and investor-by-investor database. SIET has the advantage of gathering in one single database information on securities issued within the country and abroad by Portuguese residents and securities held by resident and non-resident investors in custody with resident financial institutions. Thus, SIET makes it possible, to a large extent, to identify the holders of securitised bonds and securitisation units issued by STCs and FTCs.

All these data sources combined make it possible to compile and release securitisation statistics, thereby complying with all the ECB requirements for Monetary Union countries, pursuant to Regulation ECB/2008/30 (Figure 5).

Figure 5

DATA FLOW



5 PORTUGUESE SECURITISATION IN NUMBERS

Table 1 shows an aggregate balance sheet of FTCs and STCs, broken down by financial instrument. Total assets amounted to around €62 billion as at the end of 2010, compared with around €25 billion as at the end of 2005. On the assets side, 'loans' are the most representative financial instrument, corresponding to approximately 93% of total assets at the end of the year under analysis. Liabilities are basically broken down into 'debt securities' and 'shares and other equity', representing bonds issued by STCs (46% of the total aggregate statistical balance sheet) and securitisation units issued by FTCs (53%).

The first securitisation transaction conducted under national legislation took place in December 2001 and was carried out by an FTC. It consisted of the securitisation of a pool of mortgage loans amounting to €1 billion. At the end of 2010, 45 FTCs were operating, and the total amount of loans securitised by this type of institutions was close to €31 billion. Around 76% of this value corresponded to mortgage loans granted by MFIs to households and only 16% accounted for loans originally granted to non-financial corporations.

The first STC commenced activity in December 2003 and securitised debt to general government. In December 2010 four STCs were operating, with securitised loans totalling approximately €28 billion. Of this, around 84% corresponded to mortgage loans originated by MFIs and 7% to various types of loan (mainly commercial loans) originated by non-financial corporations.

Table 1

AGGREGATE BALANCE SHEET OF PORTUGUESE FTCS AND STCS							
	2005	2006	2007	2008	2009	2010	Jun 2011
ASSETS	25,234	28,772	33,427	42,974	50,380	61,915	64,811
Loans	890	910	1,487	2,156	1,775	2,981	2,626
Financial derivatives	0	0	4	505	492	918	1727
Other assets	24,272	27,678	31,565	39,900	47,791	57,742	60,164
LIABILITIES	0	7	15	8	7	35	35
Debt securities	3,700	5,677	7,485	8,883	14,060	28,703	36,869
Loans	0	0	0	0	0	0	1
Shares and other equity	20,765	22,331	25,099	33,224	35,547	32,534	27,302
Financial derivatives	0	3	0	12	37	43	43
Other liabilities	769	761	843	855	736	635	597

Outstanding amounts at the end of the period € millions

Chart 1 shows the increasingly relevant role played by securitisation in the financial sector as a whole, reaching 8% of its total assets at the end of 2010.

Chart 1

FTCS AND STCS BALANCE SHEET STRUCTURE AND WEIGHT IN THE FINANCIAL SECTOR

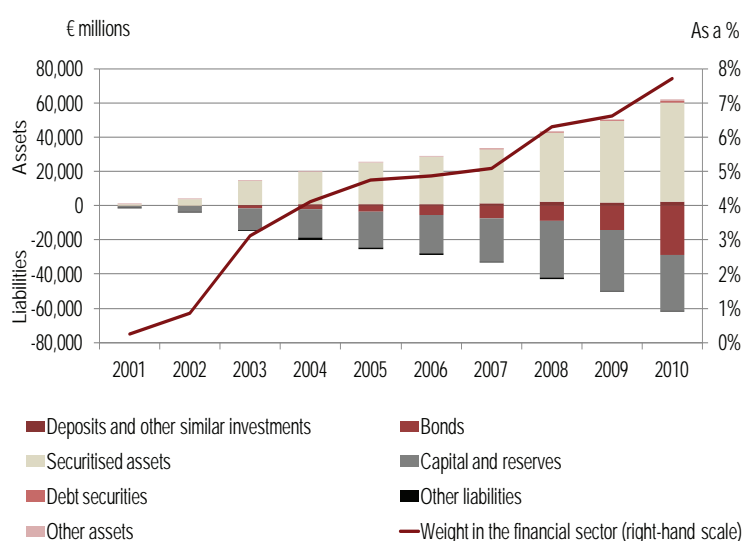


Table 2 shows that the substantial increases seen in the past five years in the amounts of loans taken by MFIs reflect the growing importance of on-balance sheet securitisations in the originator's balance sheet, which has been the case since 2005.

Table 2

LOAN COUNTERPARTY, BY INSTITUTIONAL SECTOR							
	2005	2006	2007	2008	2009	2010	Jun2011
LOANS	24,272	27,678	31,565	39,900	47,791	57,742	60,161
MFIs	4,423	11,012	14,758	23,719	30,377	42,169	47,037
OFIs	0	569	728	923	2,135	1,809	746
Non-financial corporations	1,932	2,085	2,310	1,864	3,364	2,867	2,712
General government	150	150	150	150	150	150	150
Households	17,592	13,560	13,290	12,883	11,435	10,441	9,226
<i>of which: house purchase</i>	16,252	13,107	13,027	12,781	11,395	10,432	9,221
Rest of the world	175	302	329	361	330	306	290
Outstanding amounts at the end of the period							€ millions

Table 3 shows that since 2009 the Portuguese MFI sector replaced the rest of the world as the main investor in securitised bonds issued by STCs.

Table 3

INSTITUTIONAL SECTORS OF THE HOLDERS OF SECURITISED BONDS ISSUED BY STC							
	2005	2006	2007	2008	2009	2010	Jun2011
SECURITIES OTHER THAN SHARES	3,700	5,677	7,485	8,883	14,060	28,703	36,869
MFIs	51	100	259	2,735	9,414	24,536	32,041
OFIs	184	132	205	233	411	386	388
Non-financial corporations	0	0	68	165	141	86	55
General government	0	0	0	0	0	35	24
Households	0	0	2	5	6	5	4
Rest of the world	3,465	5,445	6,951	5,745	4,088	3,655	4,357
Outstanding amounts at the end of the period							€ millions

Hence, four stages may be identified in the 10-year period in which securitisation transactions were conducted through Portuguese FTCs and STCs. These stages, as can be seen in Table 4, have different features as regards the financial vehicles used, the accounting treatment made by the originator of the securitisation and the investors. This reflects a number of events observed in international financial markets:

- From 2001 to 2003 securitisation was carried out solely through FTCs, securitised loans were derecognised from the originator's balance sheet and securities issued by FTCs were purchased almost entirely by non-residents;
- From late 2003 to 2005 securitisation was carried out mostly through FTCs, securitised loans continued to be derecognised from the originator's balance sheet and securities issued by both FTCs and STCs were mostly purchased by non-residents;
- From 2005 to 2010 securitisation continued to be carried out mainly through FTCs to the detriment of STCs. However, securitised loans began to remain on the originator's balance sheet following changes in accounting legislation; securities issued by FTC and STC were mostly purchased by non-resident investors and there was a change in the type of investor since mid-2007, as almost all securities issued by financial vehicles under new securitisation transactions were purchased by originators.
- As of 2010 new securitisation transactions were conducted exclusively through STCs, and several FTCs ceased activity in advance; securitised loans remained almost entirely on the originator's balance sheet, and securities issued by STC went on to be purchased almost entirely by the originator, with the purpose of serving as collateral to obtain liquidity from the ECB.

Table 4

STAGES OF SECURITISATION IN PORTUGAL				
Stages	Periods	Vehicles involved	Accounting treatment	Investors (in securities issued by FTCs and STCs)
1 st	2001-2003	FTCs	Derecognised from the originator's balance sheet	Non-residents
2 nd	2003-2005	FTCs and STCs		
3 rd	2005-2010		Not derecognised from the originator's balance sheet	Non-residents and originators
4 th	2010 ...	STCs and FTCs		

6 DATA RELEASE AND INSTITUTIONAL REPORTING

Banco de Portugal releases quarterly data on securitisation in its Statistical Bulletin, covering data since 2001 (date of the first securitisation in Portugal). The information published refers to the aggregate statistical balance sheet of FTCs and STCs, broken down by financial instrument.

BPstat | Statistics online also releases time series and multidimensional information (crossing several variables) that may be parameterized according to users' needs.

Since February 2010 *Banco de Portugal* has been reporting harmonised statistics on these institutions' balance sheets to the ECB, in accordance with the requirements of Regulation ECB/2008/30. These data

are compiled for three types of financial vehicle: (i) entities engaged in traditional securitisation³; (ii) entities engaged in synthetic securitisation, and (iii) other entities. Data reported are quarterly and refer to outstanding amounts at the end of the period and financial transactions conducted over the period.

The ECB recently started to release data received under the above-mentioned Regulation on its website, aggregated for European Monetary Union countries and broken down by individual country. In June 2011 the total balance sheet of Portuguese FTCs and STCs corresponded to approximately 3% of the total balance sheet of euro area financial vehicles.

Table 5

AGGREGATE BALANCE SHEET OF EURO AREA FTCs AND STCS			
JUNE 2011	Euro area	Portugal	Weight
ASSETS			
Currency and deposits	337,435	2,626	0.8%
Debt securities	231,995	1,727	0.7%
Loans	1,548,067	60,163	3.9%
Shares and other equity	36,444	0	0.0%
Other assets (incl. derivatives)	52,090	295	0.6%
LIABILITIES			
Debt securities	1,845,018	36,869	2.0%
Loans	132,656	1	0.0%
Shares and other equity	35,534	27,302	76.8%
Other liabilities (incl. derivatives)	192,824	639	0.3%
TOTAL ASSETS/ LIABILITIES	2,206,032	64,811	2.9%
Outstanding amounts at the end of the period	€ millions		Weight in percentage

In the near future, *Banco de Portugal* expects to release further details on these entities' activity, notably the institutional sector of the original debtor and of the originator of the securitisation.

REFERENCES

Campos, A. (2005). Titularização de Créditos, algumas notas sobre titularização sintética. Revista da Banca, No 60, 77-92.

Decree-Law No 453/1999 of 5 November – Securitisation Law.

Decree-Law No 219/2001 of 4 August – Securitisation tax scheme.

Decree-Law No 303/2003 of 5 December –Broadening of the scope of securitisable assets.

Moreira, T., Moura, R. M. (2004). Titularização de Créditos – Algumas reflexões e Propostas. Revista de Fiscalidade, October 2004, 1-11.

Guideline of the European Central Bank of 19 December 2008 (BCE/2008/31).

Pinto, J., Marques, M. (2007). O movimento de Titularização de Activos em Portugal. Cadernos do Mercado de Valores Mobiliários, No 26, 8-45.

Regulation (EC) No 24/2009 of the European Central Bank of 19 December 2008 concerning statistics on the assets and liabilities of financial vehicle corporations engaged in securitisation transactions (ECB/2008/30).

European Central Bank, Securitisation in the Euro Area, ECB Monthly Bulletin, February 2008, 81-91.

³ Currently all Portuguese FTCs and STCs are included under (i).

COMPILATION AND MEASUREMENT ISSUES FOR THE FINANCIAL SECTOR: THE CASES FOR FISIM AND SECURITISATION IN PORTUGAL¹

de Almeida, Ana M.

Deputy-Director of the Statistics Department

Banco de Portugal, Statistics Department

E-mail: ammalmeida@bportugal.pt

Crespo, M. Teresa

Head of Non-Monetary Financial Institutions Unit

Banco de Portugal, Statistics Department

E-mail: mtcrespo@bportugal.pt

Santa, Sílvia F.

Economist-Statistician

Banco de Portugal, Banking Prudential Supervision Department

E-mail: ssantos@bportugal.pt

1 INTRODUCTION

In the wake of the financial crisis, the approach that has been adopted for measuring the service charges implicit in the financial intermediation activity (Financial intermediation services indirectly measured – FISIM) brought about some theoretically surprising outcomes, like the occurrence of negative FISIM and the high volatility of FISIM allocation with consequences on the GDP measures.

Considering these developments, in the context of the revised European System of Accounts (ESA 2010), steps are put forward in the FISIM computation in order to have a more reliable measure of financial activity. The most important being the need to have different reference rates according to the currency in which loans and deposits are denominated.

The method presently in use in the European Union (EU)² follows the findings of the final report on the reliability of the results obtained during the trial period of 1995 to 1998. Nonetheless, some of the actual concerns were already latent at that time, specifically the instability of the FISIM output caused by the reference rates volatility and the need to improve statistical data sources. The dissimilarity being, in those days negative figures were punctual and mostly concentrated in non-resident FISIM between financial entities (exports and imports).

This investigation advocates the use of different interbank reference rates conferring the maturity and currency of the operations under evaluation. Alternatively, in the absence of income data by sector and maturity, this methodology could also be taken onwards via a weighted average of the interbank

¹ Presented at the 11th biennial session of the Group of Experts on National Accounts of the United Nations Economic Commission for Europe, Geneva (Switzerland), May 2012.

² Defined by Council Regulation 448/98, of 16 February 1998, later précised by the Commission Regulation 1889/2002, of 23 October 2002

rates. This new approach is a step forward regarding the measuring of the financial services indirectly measured as it incorporates the issue of maturity and currency, which are elements influencing banks decisions. Even in periods of financial markets turbulence the proposed method led to economically explainable results for the Portuguese economy.

Securitisation operations by Portuguese monetary financial institutions (MFIs) made their first appearance in 1997, despite of the non-existing specific regulation applicable. At first, the securitisations deals made use of offshore structures and the range of asset classes to be sold by the originators was restricted to, e.g. consumers' credit areas, cars acquisitions, leasing agreements and long-term rentals.

Between 2001 and 2005 the securitisations in Portugal were mostly done exclusively using securitisation funds as a vehicle, the securitised assets were derecognised from the originator's balance sheet (off-balance) and the securities issued were mostly bought by non-residents.

As from 2005 onwards the securitisations were still mostly done using securitisation funds as a vehicle, but securitisation companies began to gain more and more importance, the securitised assets started to remain in the originator's balance sheet (on-balance), as a consequence of regulatory changes. The securities issued either by securitisation funds or companies were still mostly bought by non-residents, but in 2007 the originators began to buy themselves the issued securities.

From 2010 to the present, the securitisations were done exclusively using securitisation companies as a vehicle and several operations previously done by securitisation funds were redeemed before the stipulated date. The securitised assets remained mostly in the originator's balance sheet and the issued securities were also mainly bought by the originators. Most of these originators were MFIs which used these securities as collateral to obtain liquidity next to the European Central Bank (ECB).

2 FISIM

2.1 Methodological framework

FISIM may be defined as the difference between the income actually received/paid³ by the financial entities and the income that would have been received/paid³ if a reference rate were applied.

Regarding the FISIM methodology, the revised ESA already encompasses the following changes: discontinuation of the FISIM computation for the Central Bank and the restructuring of the Central Bank non-financial account, setting the internal and the external reference rates by considering namely the maturity and the currency breakdowns in the computation and excluding FISIM between financial institutions.

As for the theory supporting the choice of the reference rate, our conviction is that the opportunity cost of the funds rather than the cost of financing should be considered, since a similar treatment irrespectively of the type of funding should exist. We should consider the opportunity cost of funds, i.e. an interest rate that reflects the same maturity, currency, and risk of the operations.

It is clear that the selection of the reference rate is crucial for the computation of FISIM. Therefore, considering that the reference rate should measure the opportunity cost of funds, which, in the framework of FISIM, should be the cost of reinvesting it in the same instrument (loans and deposits), we propose to concentrate on the interbank market rates as opposed to bonds rates. In particular, one should consider that government bonds market price can be driven by their relative illiquidity due to several regulations applicable to investors.

³ Interest rate times outstanding amount of loans/deposits at end of period.

Thus, to consider the maturity and the currency mismatch of banks' operations, our suggestion is to use the inter-bank borrowing and lending rates, specifically the Euribor interest rate for short term operations and the ISDAFIX rates for long term operations.

The proposal to use ISDAFIX rates as the reference rate for long term operations is based on the fact that those rates are considered a benchmark in interbank operations (incorporating credit premium inherent to the interbank market) and also because swap markets are rather liquid. ISDAFIX is a leading benchmark for fixed rates on interest rate swaps worldwide, providing average mid-market swap rates for the euro (EUR), the Hong Kong dollar (HKD), the Japanese yen (JPY), the British pound (GBP), the Swiss franc (CHF) and the U.S. dollar (USD), at selected maturities on a daily basis. ISDAFIX rates are available on Thomson Reuters and Bloomberg.

The following sections evaluate the outcome of using different reference rates by maturity and currency comparing it with the approach that takes a single reference rate approached by the three months Euribor.

2.2 Effective rate – Data sources

The data source for stocks on loans and deposits was the Regulation (EC) No 25/2009 of the ECB, of 19 December 2008 (ECB/2008/32), concerning the consolidated balance sheet of the monetary financial institutions sector. With regard to data on interest rates, the Regulation (EC) No 290/2009 of the ECB, of 31 March 2009 (ECB/2009/7), concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations, was used.

Although realising that accounting flows diverge from statistical flows, the interest rate implicit in accounting data (flows/ stocks) is compatible with monetary interest rate (MIR) statistics. Therefore, for the compilation of interest income receivable/payable by MFI, the exercise encompasses the MIR statistics on stocks outstanding. The MIR statistics only embrace the households and the non-financial corporations as counterpart sectors which however represent almost all of the FISIM consumption.

2.3 Reference rate - Multiple reference rates

In Portugal, the operations covered by the internal FISIM are mostly on a euro basis, which simplifies the computation of FISIM, since we only need to have the Euribor 3M months (short-term operations) and the EURFIX 3 and EURFIX 5 for operations, respectively, between one and five years and above five years.

2.4 Reference rate - Single weighted average of multiple rates

Alternatively, in the absence of interest income (or effective interest rate) data by sector, currency and maturity, we analysed the possibility of using a weighted average of the reference rates (RR). For the computation of a weighted average the information needed are the stocks' breakdowns by sector, maturity and currency. The reference rate could be computed according to the following formula:

$$RR = \frac{\sum_m \sum_c r_{mc} \times S_{mc}}{\sum_m \sum_c S_{mc}}$$

where S_{mc} stands for the outstanding amount of each operation within maturity band m , denominated in currency c . To each S_{mc} an individual market rate - r_{mc} - is assigned. Therefore, RR is a weighted average of the individual r_{mc} , where the weights are given by the respective S_{mc} .

2.5 Lagged reference rates

Considering that an attribute of this kind of operations is the time lag involved in the adjustment of loans and deposits interest, we explored the possibility of considering the reference rate of the previous quarter.

For the weighted average rate, this consideration could be foreseen by simply taking the reference rate of the previous period.

2.6 Main results

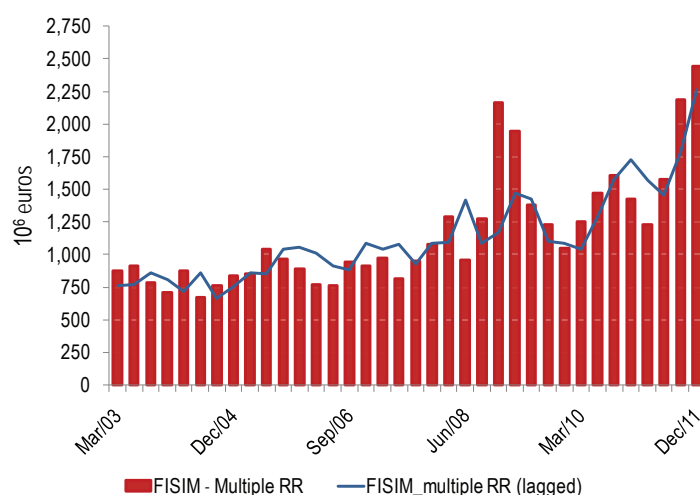
2.6.1 Multiple reference rates

With the application of the multiple reference rates approach, we concluded that the total amount of FISIM produced on loans granted was overestimated, due to the fact that we were considering Euribor 3M irrespectively of the maturity of the operations concerned. Moreover, the FISIM outcome with this alternative approach of multiple reference rates is more stable.

Considering the time lag of these operations, visible in the peak of December 2008, we have replaced the reference rate for the one of the previous quarter. Therefore, in periods of interest rate inflexion, there is some stability in FISIM output. Moreover, the volatility of FISIM produced on loans, in the period covered by this analysis, decreases if we consider the lagged rate. This finding is visible in [chart 1](#).

Chart 1

TOTAL FISIM – LOANS (LAGGED RR)

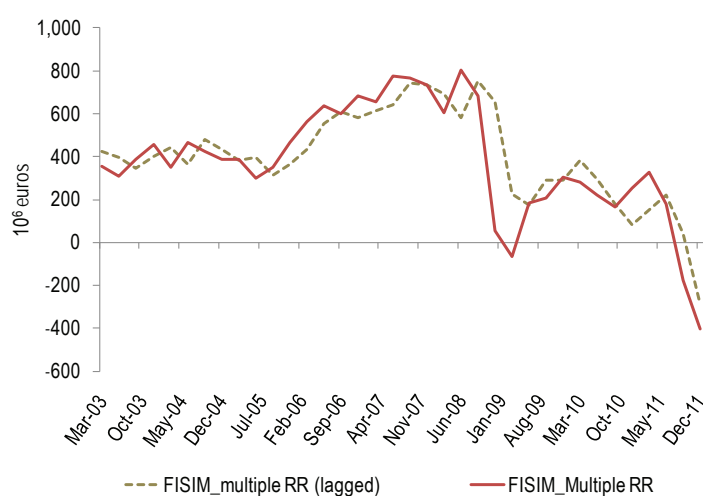


Regarding FISIM on deposits, on the basis of the same reasoning, we have the reverse conclusion given that in this case the amount of FISIM was underestimated, even reaching negative figures from the end of 2008 onwards. Therefore, this new approach could contribute to the elimination of the persistent negative FISIM in the aftermath of the financial crisis. Theoretically, it is conceivable that financial intermediaries face negative FISIM during a short period of time as a consequence of some price rigidity. Nevertheless, apart from turning points it is difficult to understand that negative FISIM sustain over a

long period of time. Again by considering the reference rate of the previous quarter, we observe that the negative FISIM of March 2009 is eliminated and the volatility is reduced. At the end of 2011, FISIM on deposits became negative again reflecting the lack of access to funding by Portuguese banks, which led to increased competition in retail funding (Chart 2). In this context, the *Banco de Portugal* decided to set up maximum interest rates at the end of 2011. With this measure the return to positive FISIM is expected in 2012.

Chart 2

TOTAL FISIM – DEPOSITS (LAGGED RR)



2.6.2 Single weighted average of reference rates

The total FISIM is exactly the same whether we apply the method with three reference rates or with one weighted average of reference rates. Nevertheless, the impact on GDP would not be the same since the FISIM by both consumption sector and purposes of consumption would diverge. This analysis will be detailed in the next section.

2.7 Allocation to main user sectors

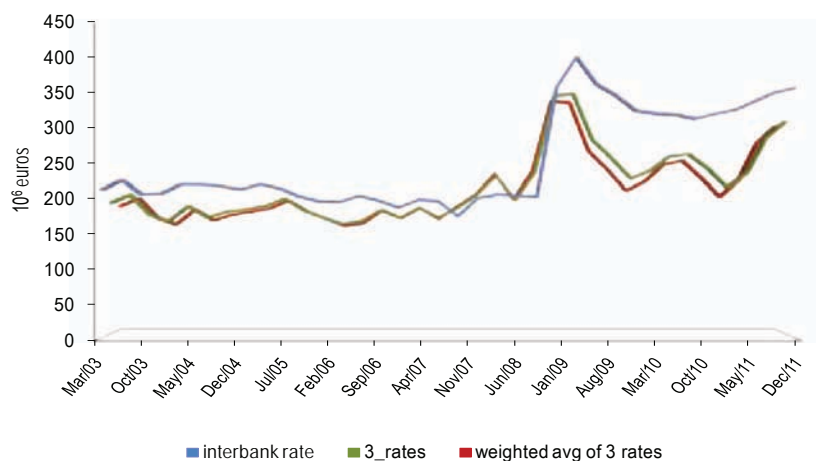
A complete analysis of the impact of the proposed methods requires splitting the FISIM components by both consumption sector and purposes of consumption (intermediate and final consumption). It should be noted that, regardless of the consumption sector under analysis, the most significant deviations among methods occur in the aftermath of the financial crisis, specifically from 2009 onwards.

– Loans

In line with our general conclusion, in the current approach (Euribor approach) we have FISIM overestimated on loans allocated to households and non-financial corporations. Focusing on the effect of using a single reference rate (weighted average of interbank rates) instead of multiple interbank rates, our assessment was that both methods lead to similar outcomes in the case of loans for consumption purposes ([Chart 3](#)), which is the component with higher contribution to the GDP.

Chart 3

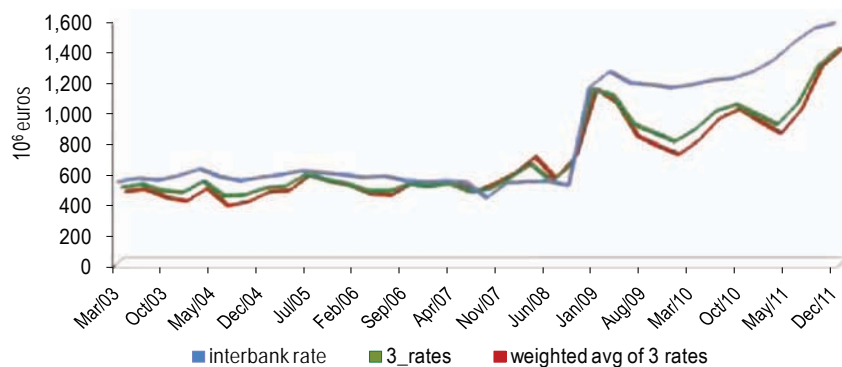
FISIM ON LOANS ALLOCATED TO HOUSEHOLDS FOR FINAL CONSUMPTION



The use of multiple reference rates, instead of a single interbank rate, leads to lower FISIM on loans allocated to non-financial corporations ([Chart 4](#)).

Chart 4

FISIM ON LOANS ALLOCATED TO NON-FINANCIAL CORPORATIONS



– Deposits

Regarding deposits both the multiple reference rate and the weighted average method lead to the same outcome in terms of final consumption, nevertheless some differences occur on FISIM produced on deposits granted by non-financial corporations. On the basis of the Euribor approach, the amount of FISIM produced on deposits was undervalued (Chart 5).

Chart 5

FISIM ON DEPOSITS ALLOCATED TO HOUSEHOLDS FOR FINAL CONSUMPTION



2.8 Volatility of loans and deposits

With this new approach of using different rates instead of a single one, the long-run volatility of FISIM on loans, measured through its standard deviation, decreases. However, the short-run volatility, proxied by the average of the four quarters moving volatility, increases. This occurs since the rate on loans is very elastic, as banks provide a variety of different loans to adapt to clients' needs. Since loans are the main goal of banks' profits, loans rate would more closely follow the dynamics of the interbank short-term reference rate. Therefore, the replacement of the reference rate by a new rate that incorporates longer maturity increases the volatility of the margin measured at short intervals.

Contrarily, regarding the FISIM on deposits, with this new approach both the long and the short run volatility decreases. The deposit rate is not very elastic and from this assessment it is clear that the rate on deposits does not follow the dynamics of the interbank short-term reference rate.

2.9 Impact on GDP

The contributions of the different components of FISIM output to GDP are visible in [charts 6 and 7](#). In order to illustrate the external component, the intermediate and final consumption presented on [charts 6 and 7](#) reflect only the FISIM produced by the resident financial intermediaries.

From [chart 6](#) we observe, using the Euribor, a decrease of the final consumption contribution which became less significant from 2009 onwards.

Chart 6

FISIM OUTPUT COMPONENTS (USING EURIBOR)

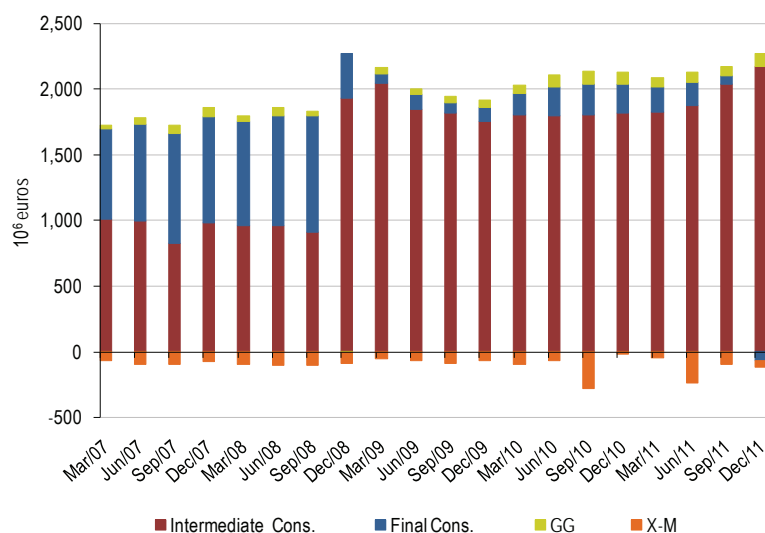
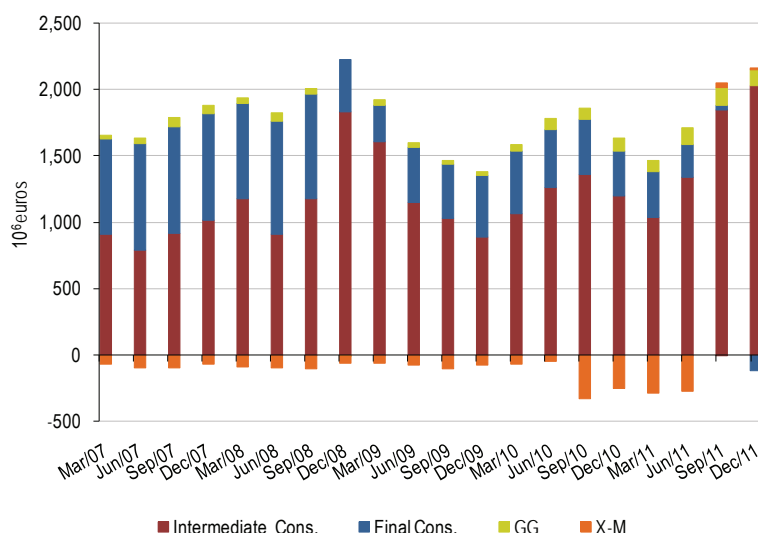


Chart 7 shows, using the multiples rates, a higher contribution of the final consumption to GDP from 2009 onwards, when compared to the previous approach. To be noted that final consumption in December 2011 became negative because of FISIM on deposits which, as explained above, were also negative.

Chart 7

ALLOCATION OF FISIM OUTPUT (USING WEIGHTED RR)



Finally, the adoption of this methodology, as an alternative to the one based solely on Euribor, led to the decrease of the FISIM produced internally, except for the 2008 period. This decrease is mainly driven by the production on loans since there is an increase of FISIM output on deposits. Nonetheless, it should be stressed that although total FISIM output is reduced, the new approach would have a positive impact on the GDP justified by the FISIM allocated to the final consumption of households. Therefore, the implementation of this new approach leads to an increase in the level of GDP by FISIM from 1.1% to 1.4% when compared to the one that uses a single reference rate (Euribor).

3 SECURITISATION

3.1 Legal framework

The legal framework for securitisation transactions carried out in Portugal (referred as the “Securitisation Law”), setting up the legal requirements applicable to loan securitisation and regulating the constitution and functioning of securitisation vehicles, was put in place by Decree-Law No. 453/99, of 5 November.

The Securitisation Law offers issuers two kinds of such entities: FTCs (*Fundos de Titularização de Créditos* or securitisation funds) and STCs (*Sociedades de Titularização de Créditos* or securitisation companies). These two types of financial vehicles corporations (FVCs)⁴ are subject to the same supervisory body: the

⁴ Following the terminology adopted in Regulation (EC) No 24/2009 of the European Central Bank, of 19 December 2008, concerning statistics on the assets and liabilities of financial vehicle corporations engaged in securitisation transactions (ECB/2008/30).

Comissão de Mercado de Valores Mobiliários (CMVM) — the Portuguese securities market commission - which is responsible for granting activity permission, as well as for regulating the securitisation activities.

The Portuguese government enacted Decree-Law No. 219/2001, of 4 August (the “Securitisation Tax Law”), setting up the tax regime applicable to the Portuguese securitisation transactions, and introducing several amendments to the Securitisation Law. As a result of these revisions, there was a significant increase in securitisations carried out through Portuguese financial vehicles.

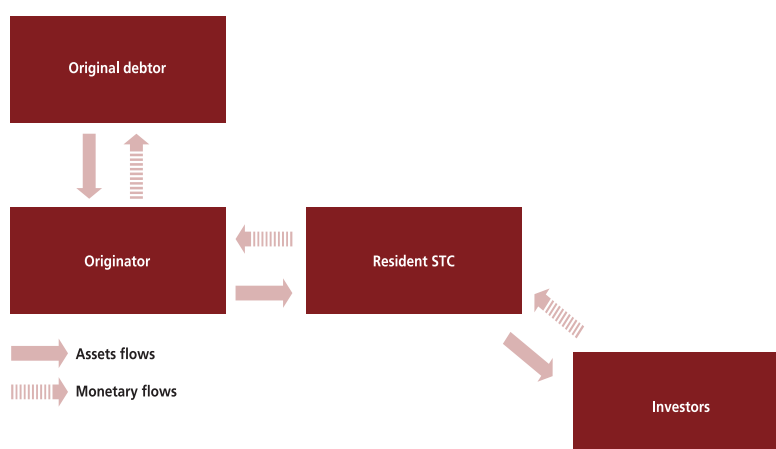
3.2 The securitisation sector in Portugal

The two types of Portuguese FVCs are distinct not only in the legal sense but also in view of the different ways in which the related securitisation processes are structured. At the outset, the FTCs structures had capital prerequisites that were lower than the ones of STCs, which might help to explain the greater attractiveness of the former. However the difference in capital requirements has been losing importance along the way leading to an increased use of the latter.

STCs are single purpose companies that take the legal form of a limited liability company. In order to finance their activities, STCs issue equity and securitisation bonds. The issue of securitisation bonds, collateralized by securitised loans, is made by private or public placement in domestic and/or in foreign markets (Figure 1).

Figure 1

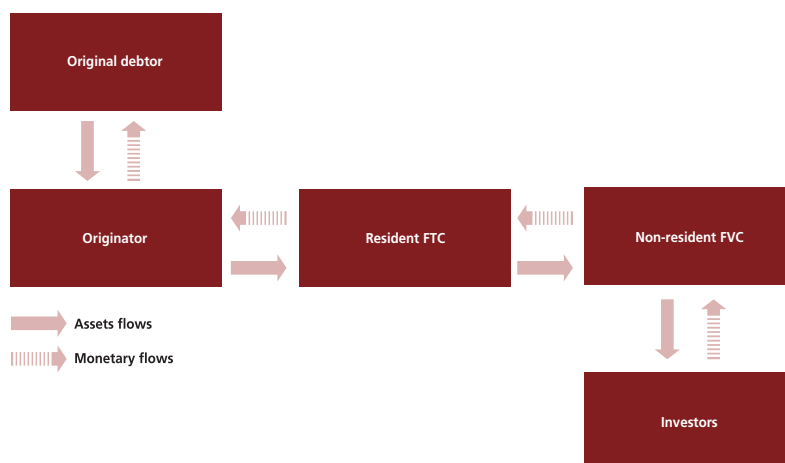
SIMPLIFIED SCHEME FOR A TYPICAL SECURITISATION INVOLVING A RESIDENT STC



FTCs have a structure very similar to that of an investment fund — they issue securitisation units to finance the acquisition of loans. In Portugal, the units issued by resident FTCs are typically acquired by non-resident financial vehicles. In turn, the non-resident financial vehicles issue bonds in foreign securities markets (Figure 2).

Figure 2

SIMPLIFIED SCHEME FOR A TYPICAL SECURITISATION INVOLVING A RESIDENT FTC AND A NON-RESIDENT FVC



Another distinct feature of FTCs is the fact that they act as closed entities, while STCs carry out several securitisation transactions over time.

In the early days, off-balance sheet securitisations were the most widespread type of securitisation deals. However, following the adoption of the revised versions of International Accounting Standards (IAS) 32 and 39, back in 2005, this situation started to change in favour of on-balance sheet securitisation. In fact, under IAS 39, originators in a securitisation transaction are not always able to derecognise asset transfers in their accounts, given that, in a typically structured securitisation transaction, they would normally retain some of the risks/rewards of the ownership of the asset. In such cases, IAS 39 provides for two different treatments depending upon whether the originator has retained control of the financial asset following transfer. Where control is retained (as will be the case in most securitisation transactions), the financial asset must be recognised to the extent of the reporting entity's "continuing involvement".

Conditional on the loans being derecognised or non-derecognised in the originator's balance sheet, and to avoid double-counting, securitisation transactions are recorded as follows:

If the securitised loans are derecognised, the amount of "loans" outstanding in the assets side of the originator balance sheet is decreased, together with a matching increase in e.g. "cash". In the FVC's balance sheet loans are recorded vis-à-vis the original debtor sector.

If the securitised loans are not derecognised, the amount of "loans" outstanding is kept unchanged; to balance out the increase in "cash" on the assets side of the balance sheet, an additional liability to the FVC is recorded. In order to avoid affecting the monetary aggregates, the entry on the liabilities side is allocated, by convention, to the category "deposit-like instruments, vis-à-vis OFIs, over two years". In the FVC's balance sheet, the loans are recorded vis-à-vis the originator's sector (MFIs) to circumvent double-counting.

3.3 Data flow: from raw data to statistical information

While the Portuguese FVCs are supervised by the CMVM, the *Banco de Portugal* has a formal agreement with CMVM for the regular remittance of (accounting) data reported by FVCs for prudential supervision purposes. These data have different periodicities, depending on the type of FVC: STCs submit quarterly balance sheet data and their audited balance sheets on an annual or semi-annual basis (if they issue securities through public subscription or have quoted securities); FTCs report monthly data.

Another important source of information on securitisations concerns data collected from the originators. Credit institutions and other financial institutions (excluding investment funds, insurance companies and pension funds) have to report data to the *Banco de Portugal* for prudential supervision purposes. Therefore, whenever these institutions act as originators in a securitisation deal, the *Banco de Portugal* has the means to identify the nature of the securitisations being carried out. In the particular case of resident MFIs, institutions that are also subject to direct reporting obligations for statistical purposes, their balance sheets provide additional statistical information on the securitisation deals.

Where the originators are non-financial entities, the *Banco de Portugal* has to make use of alternative sources of information, such as issuance prospectus, rating agencies' pre-sales information and FTCs management rules and regulations.

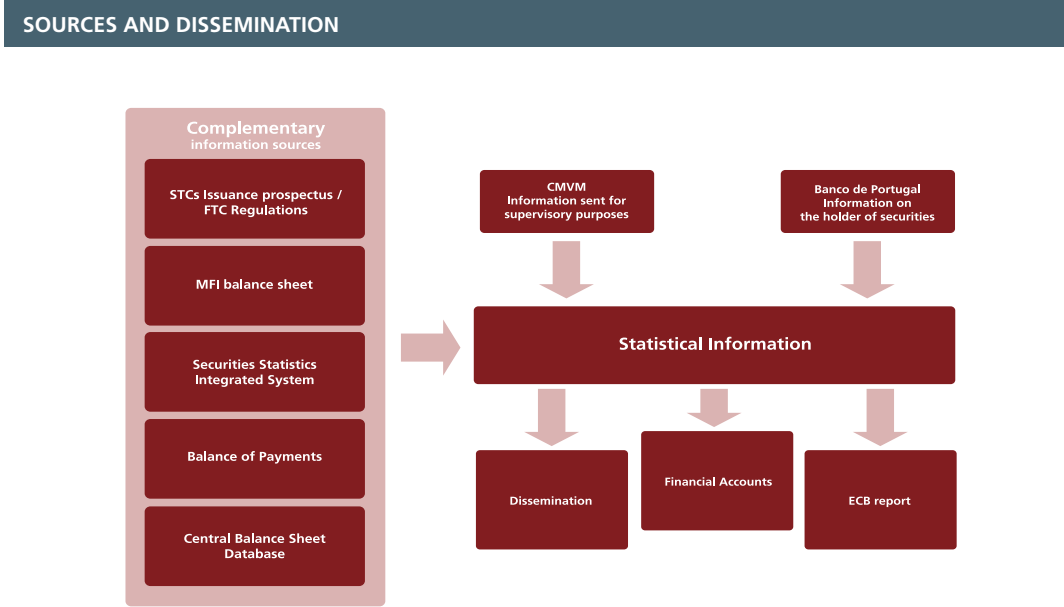
Also the gathering official accounting data on non-financial corporations, like the one found in the Central Balance-Sheet Database, plays an important role as a data source for securitisations. At any rate, the available statistical information on securitisations is, to a great extent, derived from accounting data which fall short of the required standard for high quality statistics (inter alia, for lack of detail). To cope with this issue, complementary statistical data sources are used that allow for breaking down the accounting data into the envisaged categories and for checking the quality of primary data.

Another key source of information is the Securities Statistics Integrated System (SSIS), a security-by-security and investor-by-investor database. SSIS has the advantage of gathering, in a single database, all the information concerning securities issued in Portugal and securities held by Portuguese and foreign investors that are kept in custody with resident financial institutions. Therefore, the SSIS makes it feasible, to a large extent, the identification of the holders of the debt securities and other equity issued by the Portuguese FVCs.

Balance of payments data, for instance, offer helpful information for the STC structures, allowing for the identification of possible anticipated amortizations of the securities issued and placed abroad.

All these data sources combined allow for the compilation and dissemination of high quality securitisation statistics, including those reported to the ECB (Figure 3).

Figure 3



3.4 Portuguese securitisation in numbers

Table 1 shows the FVCs' aggregate balance sheet, broken down by financial instrument. Total assets amounted to about 62 billion euros, by end-2011, as compared to 20 billion euros in 2004. In the assets side, "Securitised assets" are, by far, the most significant entry, averaging about 95% of total assets in the period concerned. Liabilities are basically split between "Securities other than shares" and "Shares and other equity", accounting for the paper issued by STCs (59%) and FTCs (39%), respectively.

Table 1

AGGREGATE BALANCE SHEET OF PORTUGUESE FVCS								
	2004	2005	2006	2007	2008	2009	2010	2011
ASSETS	19,977	25,236	28,772	33,426	42,974	50,381	61,915	61,934
Currency and deposits	770	890	910	1,487	2,156	1,775	2,981	2,891
Securities other than shares	0	0	0	4	4	4	4	5
Securitised assets	19,119	24,273	27,678	31,564	40,400	48,280	58,656	58,743
Shares and other equity	0	0	0	0	0	0	0	0
Financial derivatives	0	0	7	15	8	7	35	79
Other assets	88	72	177	356	405	314	238	217
LIABILITIES	19,977	25,236	28,772	33,426	42,974	50,381	61,915	61,934
Deposits	0	0	0	0	0	0	0	0
Securities other than shares	1,943	3,700	5,677	7,485	8,883	14,060	28,703	36,783
Loans	0	0	0	0	0	0	1	171
Shares and other equity	16,791	20,765	22,331	25,099	33,224	35,547	32,534	24,162
Financial derivatives	0	0	3	0	12	37	43	116
Other liabilities	1,242	770	762	842	856	737	635	701

End-of-year figures. 10⁶ Euros

The first Portuguese FTC started its activity in December 2001, by securitising a pool of mortgage loans amounting to 1 billion euros. By the end of 2011, thirty nine FTCs were in activity. The total outstanding amount of loans securitised by this type of FVCs was of 24 billion euros. About 74% of the loans securitised by FTCs corresponded to mortgages originated by MFIs, and 16% to non-financial corporations' loans.

As regards STCs, the first one started its activity in December 2003, by securitising fiscal credits of the Central Government. As of December 2011, there were four STCs in activity, with securitised assets amounting to 35 billion euros, 54% of which were mortgages originated by MFIs and 28% corresponded to commercial loans originated by non-financial corporations.

In [Tables 2](#) and [3](#), Portuguese FVCs show sharp increases in loans vis-à-vis MFIs in the last four years, reflecting the growing importance of non-derecognised securitisations since 2005, and the importance of mortgage loans in the whole of securitised assets granted by MFIs.

Table 2

SECURITISED ASSETS' COUNTERPARTS, BY INSTITUTIONAL SECTOR								
	2004	2005	2006	2007	2008	2009	2010	2011
SECURITISED ASSETS	19,119	24,273	27,678	31,564	40,400	48,280	58,656	58,743
MFIs	15,487	21,312	25,399	29,316	38,577	43,761	54,701	56,429
OFIs	734	894	893	937	1,002	2,151	1,818	316
Non-Financial Corporations	1,521	1,014	844	1,156	822	2,367	2,137	1,892
General Government	1,377	1,053	542	155	0	0	0	0
Non-resident entity	0	0	0	0	0	0	0	107

End-of-year figures. 10⁶ Euros

Table 3

MFI SECURITISED ASSETS' ORIGINAL DEBTOR, BY INSTITUTIONAL SECTOR AND RESIDENCY									
	2004	2005	2006	2007	2008	2009	2010	2011	
MFI SECURITISED ASSETS	15,487	21,312	25,399	29,316	38,577	43,761	54,701	56,429	
MFIs	MFIs	0	0	0	0	55	55	22	30
	OFIs	0	0	23	23	65	65	33	147
	Non-Financial Corporations	99	588	1,990	2,492	4,699	4,488	9,941	14,873
	General Government	0	0	0	0	137	137	154	215
	Households	15,271	20,582	23,043	26,393	33,105	38,439	43,958	40,572
	o/w: Mortgage loans	14,050	19,439	21,950	24,904	31,763	36,787	41,550	36,311
Non-resident counterpart	117	142	343	409	516	578	593	592	
End-of-year figures. 10 ⁶ Euros									

By the end of 2011, the total of securitised mortgage loans was of about 36 billion euros, corresponding to nearly 30% of the total outstanding amount of mortgage loans granted by all the Portuguese financial institutions (see [Table 3](#)).

Since 2009 the MFI sector substituted the rest of the world sector as the main holder of securities issued by Portuguese FVCs (as seen in Table 4).

Table 4

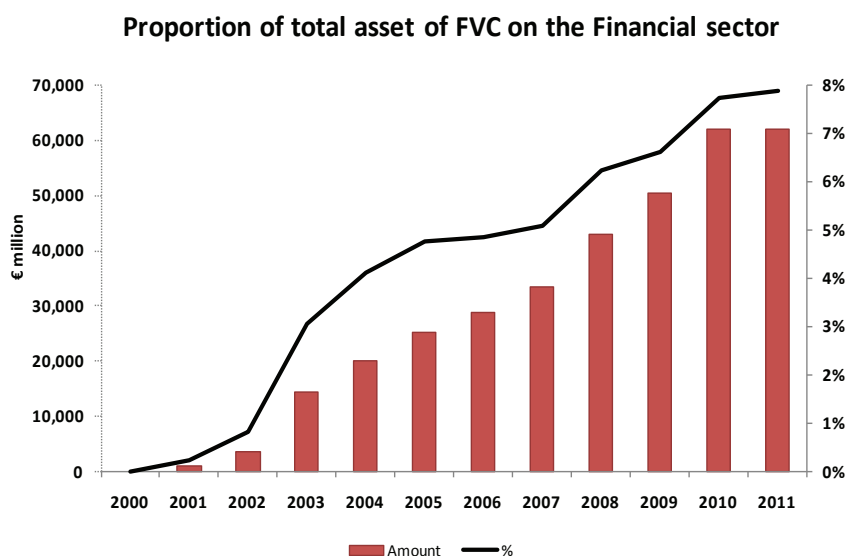
HOLDERS OF SECURITIES ISSUED BY FVCS, BY INSTITUTIONAL SECTOR								
	2004	2005	2006	2007	2008	2009	2010	2011
SECURITIES OTHER THAN SHARES	1,943	3,700	5,677	7,485	8,883	14,060	28,703	36,783
MFIs	8	51	100	259	2,735	9,414	24,461	31,030
OFIs	120	184	132	205	233	411	386	561
Non-Financial Corporations	0	0	0	68	165	141	86	43
General Government	0	0	0	0	0	0	35	22
Households	0	0	0	2	5	6	5	4
Non-residents	1,815	3,465	5,445	6,951	5,744	4,087	3,731	5,123

End-of-year figures. 10⁶ Euros

Chart 8 illustrates the growing visibility of FVCs in the financial sector as a whole, representing about 8% of the sector's total assets by the end of 2011.

Chart 8

PROPORTION OF TOTAL ASSETS OF FVCS ON THE FINANCIAL SECTOR



3.5 Outputs: dissemination and institutional reporting

The *Banco de Portugal* publishes quarterly data on securitisation in its monthly Statistical Bulletin, covering data since 2001. The presented information refers to the aggregate balance sheets of Portuguese FVCs (both STCs and FTCs), broken down by instrument, in line with the breakdown reported to the ECB.

Data are also available on “BPstat | Estatísticas online”, an Internet online access to the Statistical Interactive Database of the *Banco de Portugal*.

As regards the fulfilment of the reporting requirements set forth in Regulation ECB/2008/30, the *Banco de Portugal* has been submitting to the European Central Bank, since February 2010, harmonised data on the FVCs’ balance sheets. Data refer to end-of-quarter outstanding amounts and financial transactions are provided on a quarterly basis.

The ECB has recently began to disseminate in its website information collected through the Regulation above mentioned, referring to the euro area as a whole and to each single country.

REFERENCES

de Almeida, Ana M., Crespo M. Teresa, (2011), Assessing Securitisation Activity in Portugal- Compilation and measurement issues, Banco de Portugal, Supplement 1/2011 to the Statistical Bulletin, October 2011

Campos, A. (2005), Titularização de Créditos, algumas notas sobre titularização sintética, Revista da Banca, nº 60, 77-92

Colangelo, A. and R. Inklaar (2009) Measuring the output of the banking sector: shortcomings of the current European methodology and new perspectives, in Eds. Balling, M., Gnan, E., Lierman, F., and Schoder J-P, "Productivity in the Financial Services Sector", SUERF Studies 2009/4, Larcier, Brussels

Decree – Law nº 453/1999, of 5 November – The Securitisation Law

Decree – Law nº 219/2001, of 4 August – The Securitisation Tax Law

Decree – Law nº 303/2003, of 5 December – Enlargement of the type of assets that can be securitized

European Central Bank (2003), “Manual on MFI Interest Rate Statistics”

European Central Bank working paper nº 1204 / June 2010, Banking sector output measurement in the euro area – a modified approach, Antonio Colangelo and Robert Inklaar

European Central Bank, Securitisation in the Euro Area, Monthly Bulletin, February 2008, 81-91

Fonte Santa, S. (2007), Financial Intermediation Services Indirectly Measured (FISIM) – the problematic of imports and exports, Banco de Portugal, Supplement 1/2007 to the Statistical Bulletin, August 2007

Guideline ECB/2007/9, of 1 August 2007, on monetary, financial institutions and market statistics, as amended

Moreira, T., Moura, R. M. (2004), Titularização de Créditos – Algumas reflexões e propostas, Revista de Fiscalidade, Outubro de 2004, 1-11

Martín-Oliver, Alfredo, Salas-Fumás, Vicente and Saurina, Jesús, A test of the law of one price in retail banking 2005”, Documentos de Trabajo Nº 0530, Banco de España

Martín-Oliver, Alfredo, Salas-Fumás, Vicente and Saurina, Jesús, Search Cost and Price dispersion in vertically related markets: the case of bank loans and deposits, Documentos de Trabajo Nº 0825, Banco de España

Pinto, J., Marques, M. (2007), O movimento de Titularização de Activos em Portugal, Cadernos do Mercado de Valores Mobiliários, nº 26, 8-45

Regulation (EC) Nº 24/2009 of the European Central Bank, of 19 December 2008 (ECB/2008/30), concerning statistics on the assets and liabilities of financial vehicle corporation engaged in securitisation transactions

Regulation (EC) No 25/2009 of the ECB, of 19 December 2008, concerning the consolidated balance sheet of the monetary financial institutions sector (ECB/2008/32)

Regulation (EC) No 290/2009 of the ECB, of 31 March 2009, concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations (ECB/2009/7)

Wang, J. C. and Basu, S. (2007). Risk Bearing, Implicit Financial Services, and Specialization in the Financial Industry, Working paper, Federal Reserve bank of Boston.

SUPPLEMENTS TO THE STATISTICAL BULLETIN

- 1/98 *Statistical information on non-monetary financial institutions, December 1998*
- 2/98 *Foreign direct investment in Portugal: flows and stocks statistics for 1996 and stocks estimates for 1997, December 1998*
- 1/99 *New presentation of the balance of payments statistics, February/March 1999*
- 2/99 *Statistical information on Mutual Funds, December 1999*
- 1/00 *Portuguese direct investment abroad, December 2000 (only in Portuguese)*
- 1/01 *"Statistical balance sheet" and "Accounting balance sheet" of other monetary financial institutions, August 2001*
- 1/05 *A New Source for Monetary and Financial Statistics: the Central Credit Register, April 2005*
- 2/05 *National Financial Accounts for the Portuguese Economy. Methodological Notes and Statistical Results for 2000-2004, June 2005*
- 3/05 *National Financial Accounts for the Portuguese Economy. Statistics on Financial Assets and Liabilities for 1999-2004, November 2005*
- 4/05 *Seasonal Adjustment of Balance of Payments Statistics, November 2005*
- 5/05 *Statistics on Non-Financial Corporations from the Central Balance-Sheet Database, December 2005*
- 1/07 *Papers presented by Banco de Portugal representatives at the 56th session of the International Statistical Institute, held in Lisbon 22-29 August 2007, August 2007*
- 1/08 *Simplified reporting: Inclusion of the Simplified Corporate Information in the Statistics on Non-Financial Corporations from the Central Balance-Sheet Database, May 2008*
- 2/08 *Securities Statistics: Integrated System Features and Main Results, July 2008*
- 1/09 *Papers presented by Banco de Portugal representatives at the 57th Session of the International Statistical Institute, held in Durban, South Africa, 16-22 August 2009*
- 1/11 *Papers presented by the Statistics Department in national and international fora, October 2011*
- 2/11 *Papers presented by Banco de Portugal representatives at the 58th World Statistics Congress of the International Statistical Institute, held in Dublin, Ireland, 21-26 August 2011, October 2011*
- 1/12 *Quality management in the statistics of Banco de Portugal, January 2012 (only in Portuguese)*
- 2/12 *General Government Statistics, October 2012*
- 3/12 *Papers presented by the Statistics Department in national and international fora, December 2012*

