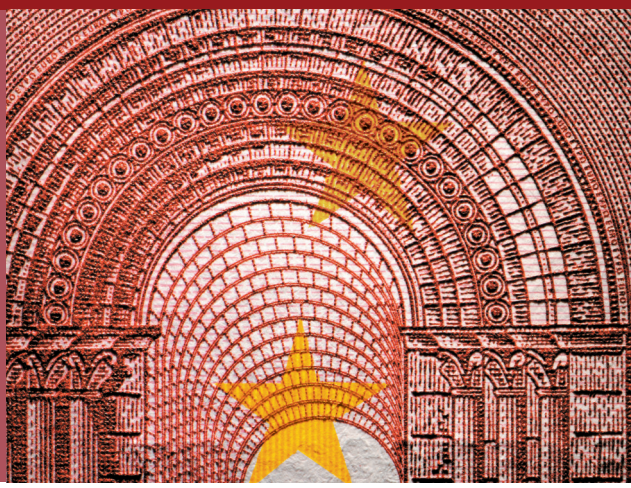
SUPPLEMENT TO THE STATISTICAL BULLETIN

4|2013



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

December 2013

Banco de Portugal
EUROSYSTEM

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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

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

FOREWORD

The current issue of the *Supplement to the Statistical Bulletin* compiles a number of articles and technical papers prepared by the staff of the Statistics Department of the Banco de Portugal, which were recently presented at various national and international *fora* and reflect the diversity of the statistics under the Statistics Department's responsibility.

This issue of the *Supplement* comprises six sections: (I) Good practices in communicating statistics; (II) Micro-databases – Potential for statistics; (III) The implementation of the new international manuals; (IV) Indicators of macroeconomic imbalances; (V) National financial accounts statistics; and (VI) Compiling statistics – Specific case studies in.

To guide the reader throughout the collection of papers, a brief summary is provided for each one.

I. GOOD PRACTICES IN COMMUNICATING STATISTICS

José Faustino, Joaquim António and Paulo Jesus, "Building a Customer Relationship Management model for the statistical function in Banco de Portugal", Guimarães, Portugal, April 2013[1].

The dissemination of statistics is at the last stages of the statistical production cycle. Nevertheless, central banks should assign the highest priority to this essential task.

Central banks are both users and producers of statistics. They started producing statistics because they needed high quality data, particularly with reference to their longer-run goals and the conduct of monetary policy. Today, they keep developing this function not only to meet their own data requirements but also because they understand the value and the importance of statistical information for social and economic development and for financial stability.

The paper describes the increasing importance of statistics dissemination and the on-going work to implement a Customer Relationship Management model for the statistical function in the Banco de Portugal.

II. MICRO-DATABASES – POTENTIAL FOR STATISTICS

Paula Menezes and Luís D'Aguiar, "Impact and benefits of micro-databases' integration on the statistics of the Banco de Portugal", Hong Kong, China, August 2013[2]

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.

The paper will address the benefits and problems to be dealt with when two or more data-sources are to be integrated.

1 *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

2 59th World Statistics Congress organised by the ISI - International Statistical Institute

III. THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS

Ana Margarida de Almeida, Sérgio Branco and João Falcão, "Pension statistics for the new ESA: compilation, modelling and some results for Portugal in 2011" Canberra, Australia, April 2013[3]

In the context of the revision of the European System of National and Regional Accounts (ESA), the compilation of pension liabilities becomes more important as European countries face serious challenges due to social security deficits. The importance of this issue becomes visible in the revised ESA with the inclusion of a new chapter - chapter XVII - dedicated to the recording of pension schemes. The creation of a new Supplementary Table, to be compiled on a mandatory basis, is one of the most relevant changes in the new ESA. This table, which aims to record households pension entitlements opening and closing positions, as well as transactions and other economic flows, will cover data on all of pension schemes included as social insurance (including social security). This change is in line with the new System of National Accounts 2008 (SNA 2008).

The compilation of this information has been addressed in the European context of the Contact Group on Pensions under the aegis of the Committee on Monetary, Financial and Balance of Payments Statistics (CMFB) and in Portugal it has involved the Banco de Portugal, the National Statistics Institute, the Ministry of Finance and Ministry of Labour and Social Solidarity. Annual voluntary reports have been sent to Eurostat and the European Central Bank since 2007 (reference year).

IV. INDICATORS OF MACROECONOMIC IMBALANCES

João Cadete de Matos, Ana Margarida de Almeida, Lígia Maria Nunes and Daniela Black Miranda, "Measuring external debt in a context of macroeconomic imbalances", Hong Kong, China, August 2013[4]

The exploitation of new methodologies and indicators is considered valuable in measuring a key macroeconomic indicator like the external debt. The recent Portuguese economic developments illustrate the need and usefulness of having a multidimensional approach to this indicator, with several balance of payment items – such as, the current and the capital account balances, the foreign direct investment or the reserves assets – being carefully analysed when reading the external conditions faced by the economy. Only such an approach can provide a comprehensive measure of external debt consistent across the range of debt instruments, institutional sectors and valuation methods used.

The paper develops an assessment of external debt measures and concludes about their potential advantages and disadvantages. Comparisons are made by focusing on alternatives like external gross debt against external net debt, external debt *vis-à-vis* international investment position, and external debt at nominal value against external debt at market value.

V. NATIONAL FINANCIAL ACCOUNTS STATISTICS

Filipa Lima, Olga Monteiro, Paula Menezes and Lígia Nunes, "The dynamics of debt in the context of financial accounts – Evidence from Portugal", Guimarães, Portugal, April 2013[5]

Over the past decade, Portugal has deepened its divergence in terms of economic growth with respect to the euro area, mainly driven by the accumulation of external deficits and macroeconomic imbalances. In the beginning of 2011, in the context of a new outbreak of the sovereign debt crisis in the euro area, there was a significant build-up of international investors' concerns over the sustainability of the public finances and the intertemporal dynamics of the Portuguese external debt. Deteriorating access conditions

3 OECD - Australian Bureau of Statistics, Workshop on Pensions

4 59th World Statistics Congress organised by the ISI - International Statistical Institute

5 *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

to international funding markets made the recourse to external financial assistance unavoidable, forcing Portugal to request financial assistance from the EU, the euro area Member States and the International Monetary Fund (IMF). The paper shows that financial accounts and from-whom-to-whom analysis is a powerful tool to analyse risks and vulnerabilities in financial systems in a holistic way like the trends observed since the onset of the international financial crisis in 2007.

Ana Margarida de Almeida and Daniel Carvalho, "The Portuguese economy through the lenses of flow of funds: how inter-sectoral relationships evolved in 2000-2012", Paris, France, October 2013[6]

Flow of funds data allow for a very comprehensive analysis of inter-sectoral relationships among the resident sectors of the economy and between these and the rest of the world. The Portuguese economy has undergone important shifts in its net funding patterns, against the backdrop of the sovereign debt crisis since 2011.

The paper carries out who-to-whom analysis of the main developments in recent times to illustrate the usefulness of these data for analytical purposes and policy guidance.

VI. COMPILING STATISTICS – SPECIFIC CASE STUDIES

Homero Gonçalves and Tiago Pereira, "Profitability in the manufacturing sector in Portugal: evidence from micro-data", Guimarães, Portugal, April 2013[7]

Using data from the Central Balance-Sheet Database of the Banco de Portugal this paper evaluates the evolution of the profitability of the manufacturing sector over the period 2008-2011. This time-frame allowed us to assess the impact of the economic crisis in this sector's performance. The study was performed at the NACE Rev.2 Division level, enabling the analysis of the various manufacturing activities.

The paper found relevant profit persistence in manufacturing, as well as a high level of profitability in the pharmaceutical industry. A recovery in the profitability of traditional industries such as textiles, apparel and leather products was also found.

Ana Margarida de Almeida, Sérgio Branco and João Falcão, "Pension liabilities in a context of an ageing population: the Portuguese case", Canberra, Australia, April 2013[8]

Over the centuries the world population has changed! The 20th century was characterised by an enormous population growth which increased from 1.6 to 6.1 billion. According to the United Nation´s population estimates, the 21st century will be characterised by a global population ageing, with the proportion of people above 60 years old increasing from currently 10% to 25%-45% by 2100. Acceleration in the speed of population ageing is expected over the coming decades. This trend is not, however, homogeneous in all countries. In fact, today we live in a demographically divided world with some regions, namely African and Arab countries, growing very fast, while other regions like Europe, East Asia and North America age rapidly. To cope with ageing problems, some European Union (EU) countries are promoting reforms to provide a sustainable social security for the next decades. Portugal also faces this challenge, as its population is ageing fast.

The paper examines the economic effects of population ageing, namely in the estimation of pension liabilities for employers, namely the general government, households pension entitlements.

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6 OECD Working Party on Financial Statistics

7 *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

8 OECD - Australian Bureau of Statistics, Workshop on Pensions

I GOOD PRACTICES IN COMMUNICATING STATISTICS

BUILDING A CUSTOMER RELATIONSHIP MANAGEMENT MODEL FOR THE STATISTICAL FUNCTION IN BANCO DE PORTUGAL[1*]

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ABSTRACT

The dissemination of statistics is at the last stage of the statistical production cycle. Nevertheless, central banks should assign the highest priority to this essential task.

Central banks are both users and producers of statistics. They started producing statistics because they needed high quality data, particularly with reference to their longer-run goals and the conduct of monetary policy. Today, they keep developing this function not only to meet their own data requirements but also because they understand the value and the importance of statistical information for social and economic development and for financial stability.

This paper describes the increasing importance of statistics dissemination in Banco de Portugal *(hereafter also referred as "the Bank") and the on-going work to implement a Customer Relationship Management model for the statistical function in the Bank.*

Keywords: Customer Relationship Management, information management, statistical communication, statistical literacy

Disclaimer: This paper was presented at the "*XX Jornadas de Classificação e Análise de Dados*", an event that took place at *Universidade do Minho*, on 11-13 April 2013. The analyses, opinions and findings expressed in the paper represent the views of the authors, which are not necessarily those of the Banco de Portugal or of the Eurosystem.

1 INTRODUCTION

The credibility of statistics produced by the European Central Bank (ECB) and the national central banks

1 The authors would like to thank Luís D'Aguiar for the useful comments provided

* *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

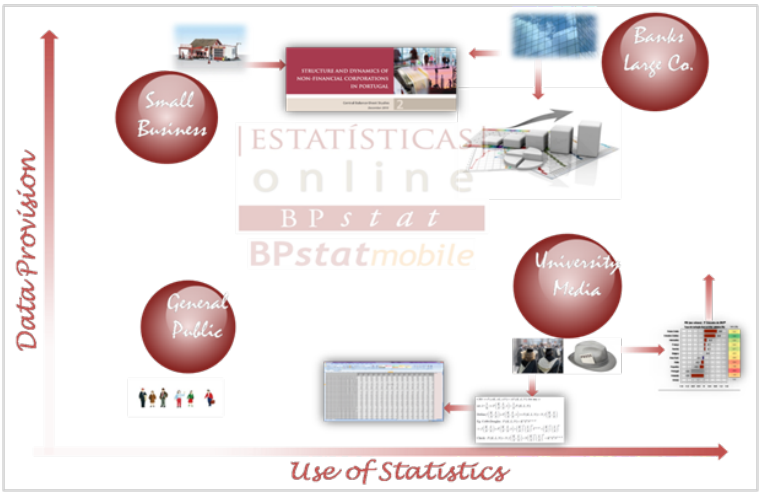
(NCBs) of the European Union, collectively referred to as the European System of Central Banks (ESCB), is of the utmost importance for maintaining the public's confidence in the institutions (see Alvarez, 2010). The credibility of statistics is principally the result of the quality and utility of the statistics produced.

Statistical producers are always focused in the quality dimensions of data, applying international standards, improving the collection and production systems and monitoring via quality indicators the outcome of the statistical processes. However, quality in itself may not be enough – even if one could produce "perfect figures", in case statistics users are not able to derive knowledge from these data to incorporate in their decision-making processes, they may not see any value in such statistics.

We cannot forget that the quality of the statistical outputs is very much dependent upon the quality of the data received from the different economic agents. As the large majority of the users are also data providers, they have to be seen as "prosumers" (see Tofler, 1980), *i.e.*, they are not only statistical users but also, in a certain way, statistical producers (see Figure 1).

Figure 1

STATISTICAL USERS AND DATA PROVIDERS



Against this background, statisticians need to change their approach from "users" to "clients" and "partners". This is not just a matter of semantics. Clients need to be satisfied – they are the main target in any industry. With this in mind, the Statistics Department of the Bank has been investing significantly in improving the communication of its statistics, particularly in the course of the last few years. The Bank's vision in this field is to grow a partnership with the clients to create a powerful relationship leading to a win-win strategy for both parties. Therefore, the implementation of a Customer Relationship Management (CRM) will allow the formation of individualised relationships with clients, with the aim of enhancing clients' satisfaction and increasing the quality and utility of the statistics produced.

2 THE INCREASING SUPPLY OF STATISTICS

In 2004 the Statistics Department decided to take some serious decisions to improve the Bank's statistical communication, aiming at disclosing highly credible and very accessible statistics. Different goals were defined for 2005 and 2006.

In January 2005, the *Statistical Bulletin* was substantially improved, including the release of new statistics, *inter alia*:

- National financial accounts (transactions and financial assets and liabilities).
- Central credit registers statistical information.
- Statistics on non-financial corporations from the central balance-sheet database.
- Seasonally-adjusted series of the balance of payments statistics.

During 2005, other important achievements were:

- The monthly publication of the *Statistical Bulletin* in CD-ROM (started in January).
- The publication of statistical press releases, which started in April with "New tables of the *statistical bulletin* on credit granted to non-financial corporations".
- The intranet version of the new statistical dissemination system "BP*stat* | Statistics online" (BP*stat*) was released in July.
- The participation of the Statistics Department in the Eurosystem project to disclose simultaneously in all the Member-States the euro area statistical aggregates and the national contributions (started in December – see Eurosystem statistics in BP*stat*).

The main goal was accomplished in 19 January 2006 – BP*stat* was disclosed for all users, allowing a free and easy access to the public information stored in the internal statistical databases of the Bank, including data and metadata and a new set of services and functionalities.

Several new developments have been implemented since 2005. Just to mention the latest:

- In June 2011 a new statistical domain called "Main Indicators" started to be produced (and it is today the second most demanded).
- In February 2012 a new version of BP*stat* for mobile devices (BP*stat mobile*).
- With the February 2012 issue of the *Statistical Bulletin*, the Bank initiated the release of an extensive set of data on the indebtedness of the resident non-financial sectors (published under the new Chapter K of the *Statistical Bulletin*), which combined, for the first time, different dimensions of analyses (*e.g.*, debtor and creditor sectors, type of financial instrument, original maturity, economic activity and size of the company) – an innovative achievement (even by international standards) that was only possible due to the unique characteristics of the statistical system managed by the Bank.

3 THE INCREASING DEMAND FOR STATISTICS

As the availability of data increases, so increase data requirements. But other factors were also behind the huge raise in the demand for statistics, *inter alia*:

- A higher interest on the part of the users in understanding and following the evolution of the financial crisis of 2007-08 and its aftermath.
- A superior ease of access to the statistical information, in view of the enhancements in statistical metadata, the improvement of the search engine, the release of analyses and graphs and the launching of BP*stat mobile*.

4 THE IMPLEMENTATION OF A CRM

In the "old days" the statistics were published in the *Statistical Bulletin* and the statistical dissemination was very much focused in providing data either to the Bank's internal users, or to the Portuguese government (mainly the Ministry of Finance) and to a number of international organisations.

Presently, the interaction with the statistical users is a daily job. Whether by phone, *e-mail* or via bilateral meetings, designing specific statistical products and satisfying specific data needs is the common practice.

The Bank has been producing indicators that show the progress that has been achieved in the supply of statistics, particularly since the inception of the Statistics Department in 28 April 1997. On the demand side, some indicators on access to and use of data are also being produced. Also, a set of comprehensive indicators is available on the data disseminated to the international organisations that receive statistical data from the Bank on a daily basis. However, for other external clients the available indicators are still incomplete – the large majority are quantitative and only in 2012 qualitative indicators started to be produced. Currently, it is already possible to know the specific uses and needs of the different audiences and several indicators are being produced, for example:

- Number of registered users in BP*stat*.
- Distribution along the day, the month or the year of the access to the statistics.
- Information each type of users is particularly interested in.
- Statistical domains or specific statistics that are more (less) accessed.
- Information that is printed or exported, its frequency and by whom.
- Information in which users are particularly keen on receiving alerts.
- Information users select to introduce in the analyses they save in their personal areas.
- Statistics that users would like to be further developed.

To deal with this new paradigm the Bank needs an infrastructure capable of helping to manage the relationships with the users and that continuously collects information on the uses and needs of the different audiences with a view to developing tailor-made products. In other words, the Bank needs to apply principles of client's management.

The development of a CRM model for the statistics function in the Bank is currently on-going and several indicators are already available and will soon be produced on a regular basis.

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II MICRO-DATABASES: POTENTIAL FOR STATISTICS

IMPACT AND BENEFITS OF MICRO-DATABASES' INTEGRATION ON THE STATISTICS OF THE BANCO DE PORTUGAL*

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ABSTRACT

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. This presentation will address the benefits and problems to be dealt with when two or more data-sources are to be integrated.

Keywords: micro-data, infrastructure, integration, knowledge

1 INTRODUCTION

Economies are constantly faced with new challenges. To remain relevant, official statistics have to keep up with the rapid changes of modern times, which typically require the availability of commensurate statistical data that users may exploit in an accurate and reliable way. Policy-makers, financial supervisors and regulators, just to name a few, require as much rich and timely information as possible to take appropriate decisions.

The Banco de Portugal (hereinafter referred as 'the Bank') – or any other major producer of official statistics, for that matter – has to ensure that the statistics for which the Bank is accountable retain relevancy over time and are able to cope with the speed and the scope of the main stakeholders' ever-increasing demand for comprehensive, detailed and high-quality information.

However, the process of continuously adapting the statistical output to new phenomena has a number of serious limitations. Conventional data collecting systems cannot simply keep on expanding indefinitely to cope with the ever-increasing need to fill the information gaps perceived by the users or in anticipation to their possible future data requirements. Amongst the possible motives for not pursuing recurrently this approach one could point out, *inter alia*, the following:

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- The resulting overburdening of respondents goes against well-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 around five years, in the case of the Eurosystem statistical reporting systems). This time-lag could even be further extended, should the revision result from a major methodological change, as it is often the case.
- *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.

In fact, the response given by conventional data collecting systems to new statistical demands – stemming from, *e.g.*, the need to conduct macro-prudential analysis 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 more and more central banks have been reusing the available micro-data, thus recognising that such information is both useful and necessary to respond to the data requirements of the complex world we live in, and to better address new issues and challenges as they arise.

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.

2 CHANGING THE STATISTICAL PARADIGM

Data are critically important in making well-informed decisions. Poor quality data or, *a fortiori*, lack of data can lead to an inefficient allocation of resources and imposes high costs on the society. In ever more complex economies, the traditional approach to the compilation of official statistics – *i.e.*, producing standard statistical tables that can only address a set of predefined questions – is becoming increasingly insufficient and ineffective.

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 *e.g.* data from administrative sources not originally intended for statistical purposes or even data related to the Bank's 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 response burden of the reporting agents.
- **Increased flexibility and agility** 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 (Aguiar *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 statistical purposes. Obvious candidates are data from existing Central Credit Registers, as well as data from Central Balance Sheet Offices databases and information collected within the framework of the Bank's prudential supervision function. The experience of the Bank in this area has shown that the use of such information for statistical purposes can lead to a significant reduction of the response burden, higher data quality and lower costs.

On the 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 – *e.g.*, exchanging micro-data on significant cross-border mergers and acquisitions that need to be recorded symmetrically in the respective statistics of both affected countries (Liebscher *et al.*, 2008).

3 MICRO-DATABASES MANAGED BY THE BANCO DE PORTUGAL

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 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, 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), 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 yearly submissions of information by corporations, in a single, paper-free, electronic form, to fulfil reporting obligations of accounting, fiscal and statistical nature.

Besides complementing and helping to cross-check the information gathered through the conventional channels, these micro-data have proved to be of great importance to the understanding of the developments in the Portuguese financial system, especially in the wake of the recent global financial crisis.

So far, this approach has permitted, *inter alia:*

- **Improving the responsiveness to new users' requirements**, particularly those arising from *ad hoc* information requests, with proven results in reducing or eliminating data gaps and in monitoring and assessing the evolution of 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** (*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.

As an example, the use of the available micro-databases for the compilation of the Portuguese flow-of-funds within the national financial accounts has been 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.

4 DEEPENING DATA INTEGRATION

In keeping with such course of action, the Bank has been developing an approach that, once completed, will allow for a higher level of integration of the available administrative and survey data. The goal is to achieve a significant enhancement of the basic data infrastructure without jeopardizing the provisions in the legislation, codes of practice and protocols that protect data confidentiality. In addition, a reduction in respondent burden and an increase in the breadth and depth of the information available to policy-makers and researchers are expected.

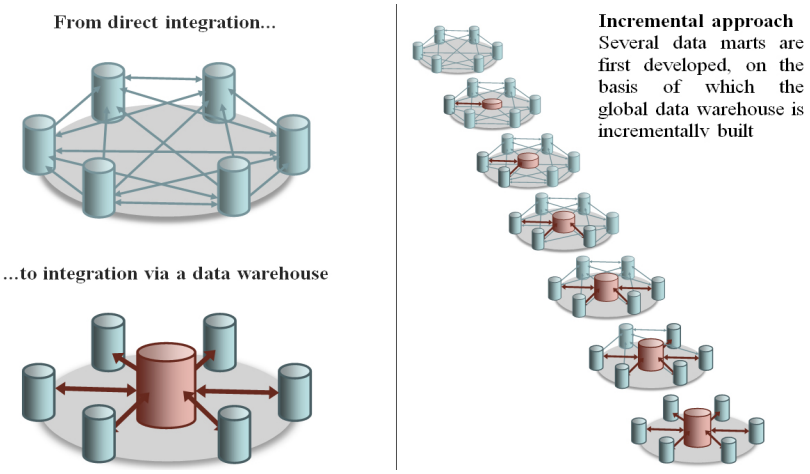
An architecture based on business intelligence – broadly defined as a category of applications (*e.g.*, decision support systems, query and reporting, online analytical processing, statistical analysis, forecasting, and data mining) and technologies for gathering, storing, analyzing, and providing access to data, to help a variety of users to make better business decisions (Terzić, 2008) – 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 (Aguiar *et al.*, 2011):

- 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.

- A **centralised reference database**, to provide common reference data (*e.g.*, identification criteria for the relevant entities that are observed, characterisation of variables and classifications) and to enable the linkage of information across different sources and systems.

- A **data warehouse approach**, to guarantee a central access point to all statistical data, independently of the input source or the production process. This implies, *inter alia*, a data structure specified on the basis of common criteria, valid across the different sets of data.

Figure 1



At the moment, the Bank's statistical information subsystems are in the process of being reformulated according to this model: the SSIS and the balance of payment and international investment position statistics, on one hand; the CBSD and the CCR, on the other hand.

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. Integration of micro-data is a powerful approach to enrich the already available information – *e.g.*, by allowing efficient cross-data comparisons and quality checks among the different statistical domains. Surely, this is easier said than done – it is a rather complex process and, pending on the degree of integration to be achieved, it can be characterised by different features.

The prevailing, stand-alone, islands of information may be very diverse, making it technically difficult to create homogeneous information systems. In addition, there are many different **practical and methodological problems that must be previously addressed** when two or more sources are to be integrated, *inter alia* (Di Zio, 1998):

- 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) –, identification criteria, reference periods (annually, quarterly,...), variables and classifications.
- Adjusting for measurement errors (accuracy) and for missing data.
- Deriving variables.

However, such shortcomings may very well be offset by the possible **benefits of integrated data sets**. The latter include, according to 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.
- Possibly reducing respondent burden.

These benefits could be illustrated by the following case, extracted from the Bank's own statistics: a given corporation, providing annual accounting data under its IES reporting obligations, might also be answering to the Bank's ISII survey (*Inquérito sobre Investimento Internacional*) and, at the same time, having its securities issues and holdings recorded in the SSIS database; in an integrated system, it would be possible to ensure the compatibility of these data at a micro-level, thus providing a powerful tool for the compilation of financial accounts (which require that total uses equal total resources in the domestic economy). Nonetheless, as referred above, having a partial integration, *e.g.* one that allows for a unified view on two different sub-systems like the CBSD and the CCR, clearly enriches analytical data awareness. In fact, the idea of pooling together all the data on financial or non-financial corporations available at the Banco de Portugal is rather appealing; it would allow us to have a more specific and detailed view on this particular institutional sector. In the case of the financial corporations, the advantages would be even stronger should we take into account the information of yet another important subsystem: the data used for supervisory purposes.

5 CONCLUDING REMARKS

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

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, albeit at a non-negligible cost, it is important to reflect on how such revolution can be used to introduce new and more effective procedures.

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.

A data integration process is complex and can be characterised by different steps. One of these steps is adopting a unified view on the existing micro-data data sources creating a customised view on a sub-set of data (*e.g.* the financial or non-financial sectors).

Integrated micro-data have the potential to support, if need be, the drilling down of the most summarised 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 (D'Aguiar *et al.*, 2011).

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III THE IMPLEMENTATION OF THE NEW INTERNATIONAL MANUALS

PENSION STATISTICS FOR THE NEW ESA: COMPILATION, MODELLING AND SOME RESULTS FOR PORTUGAL IN 2011*

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1 INTRODUCTION

In the context of the revision of the European System of National and Regional Accounts (ESA), the compilation of pension entitlements becomes more important as European countries face serious challenges due to social security deficits. The importance of this issue becomes visible in the revised ESA with the inclusion of a new chapter - chapter XVII - dedicated to the recording of pension schemes. The creation of a new Supplementary Table, to be compiled on a mandatory basis, is one of the most relevant changes in the new ESA. This table, which aims to record opening and closing positions as well as transactions and other economic flows, will cover data on all of pension schemes included as social insurance (including social security). This change is in line with the new System of National Accounts 2008 (SNA 2008).

In Portugal, the compilation of this information has been addressed in the context of the Contact Group on Pensions under the aegis of the Committee on Monetary, Financial and Balance of Payments Statistics (CMFB). Annual voluntary reports have been sent to Eurostat and the European Central Bank since 2007 (reference year).

This paper includes four sections. In section 2 the methodological framework of pension statistics is presented, section 3 shows the data compilation, modelling and results for Portugal and, finally, in section 4 future developments are discussed.

2 METHODOLOGICAL FRAMEWORK

2.1 Main concepts

Pension entitlements are classified in the 2008 SNA as a subcategory of the financial asset category 'Insurance, annuities, pension and standardised guarantees schemes', and show the extent of financial claims both existent and future pensioners hold against either their employers or a fund designated by the employers to pay pensions earned as a part of the compensation agreement between the employer and the employee.

* OECD - Australian Bureau of Statistics, Workshop on Pensions

As a consequence of the recognition of the entitlements as being an asset of the households, it is necessary to show them as being built up by contributions over the period of employment. For actual contributions from employees, it is straightforward. For actual contributions by employers, those are rerouted from employers to households through the entity that is responsible for the pension's scheme liabilities. For unfunded amounts an employer contribution is imputed and then rerouted to households.

The entitlements due under pension schemes comprise two elements: one when the formula determining the amount of the pension is agreed in advance (as under a defined benefit scheme) and one where the amount of the pension depends on the performance of specific financial assets (a defined contribution scheme). For the former an actuarial estimation of the liabilities of the pension provider is needed; for the latter the market value of the financial assets held by the pension fund on behalf of the future beneficiaries is used.

2.2 Supplementary Table

There are three main reasons for changing the treatment of unfunded employer retirement pension schemes from the 1993 SNA to the 2008 SNA: firstly, different accounting for funded and unfunded schemes leads to different effects on key variables like income, saving, financial assets and liabilities; secondly, unfunded employer schemes are particularly significant for the general government and the public sector and in light of demographic developments and the foreseeable fiscal burden from ageing populations in almost all developed countries, there is an well-founded interest in having available more comprehensive statistical information on commitments of governments; and thirdly, convergence of statistical and accounting international standards, the last (International Public System Accounting Standards - IPSAS) already recognising unfunded employer retirement pension obligations as liabilities.

Within the discussion of the new international statistical standards, namely 2008 SNA, discussions were held concerning the degree of harmonisation in the recording of pension entitlements in the national accounts, when the underlying institutional reality differs significantly across countries. Pension assets (or future rights) in countries with mainly capitalised systems are recorded as household wealth, while future pension rights in countries with government managed *pay-as-you-go* schemes are not recorded. Consensus was reached on distinguishing pension schemes managed by general government which should be recorded in the core national accounts, from those schemes that should be recorded only in a new Supplementary Table on pensions (like social security schemes).

The overall aim of the table is to present the opening and closing stocks of pension entitlements of all social insurance pension schemes (including social security) and the transactions and other economic flows during the period that account for the difference between the opening and the closing positions.

Estimated pension entitlements derived for government managed *pay-as-you-go* schemes are not measures of fiscal sustainability, which require elaborate modelling simulations, they rather correspond to the resident and non-resident households´ assets which are also liabilities of the other institutional sectors namely, non-financial corporations, financial corporations, general government and rest of the world.

According to the 2012 *Ageing report: 'Economic and budgetary projections for the EU-27 Member States (2008-2060)*', from Directorate General for Economic and Financial Affairs (DG ECFIN) and Economic Policy Committee's Ageing Working Group, sustainability gaps emerge because the discounted values of all future primary balances are too small to offset current debt. The European Union gross pension expenditure is projected to increase from 11.3% of GDP in 2010 to 12.9% in 2060.

The ageing of population raises challenges from an economic point of view. Policy-makers need to ensure long-term public finances sustainability and in this context future pension expenditure has to be taken into account, especially as Europe is in the midst of the deepest recession in decades which is putting unprecedented stress on economies.

A Contact Group (CG) on the statistical measurement of the assets and liabilities of pension schemes in general government was established by the CMFB in 2008 and took over the follow-up work of a Task Force (TF) with the same designation mandated in 2006.

The TF/CG has developed an international compromise on the treatment of pension schemes in the updated SNA, particularly focusing on the treatment of unfunded government-managed pension schemes and developed a standard Supplementary Table on pension schemes which provides a complete accounting of pension entitlements (stocks and related flows) for all pension schemes in social insurance, including social security pension schemes.

In this framework, and in the context of the new ESA regulation, the Supplementary Table (see Table 1) is to be provided every three years, in compulsory terms, by all European Union countries, within a 24 month timeliness, with reference date as from 2015 onwards (*i.e.*, starting in 2017). Data collected serve a double purpose of supplying the users with an overview of pension scheme data and of providing the means by which more comparable data could be achieved across countries worldwide.

Table 1

SUPPLEMENTARY TABLE ON PENSION SCHEMES IN SOCIAL INSURANCE

Relations	*Row No.*	**Recording**	Standard national accounts						Not in the standard accounts		Total Pension	Counter-parts:	Counter-parts:
		Pension manager	Non-general government			General government					Schemes	Pension entitlements of resident house-holds	Pension entitlements of non-resident households
			Defined contributio n schemes	Defined benefit schemes and other non-defined contri-bution schemes	Total	Defined contri-bution schemes	Defined benefit schemes for general government employees			Social security pension schemes			
							Classified in financial corporations	Classified in general government	Classified in general government				
		Column number	A	B	C	D	E	F	G	H	I	J	K
		Opening balance sheet											
	1	Pension entitlements (incl contingent pension entitlements)											
		Changes in pension entitlements due to transactions											
Σ 2.1 to 2.4 – 2.5	2	Increase in pension entitlements due to social contributions											
	2.1	Employer actual social contributions											
	2.2	Employer imputed social contributions											
	2.3	Household actual social contributions											
	2.4	Household social contribution supplements											
	2.5	Less: Pension scheme service charges											
	3	Other (actuarial) change of pension entitlements in social security pension schemes											
	4	Reduction in pension entitlements due to payment of pension benefits											
2 + 3 - 4	5	Changes in pension entitlements due to social contributions and pension benefits											
	6	Transfers of pension entitlements between schemes											
	7	Change in entitlements due to negotiated changes in scheme structure											
		Changes in pension entitlements due to other flows											
	8	Changes in entitlements due to revaluations											
	9	Changes in entitlements due to other changes in volume											
		Closing balance sheet											
1+ Σ 5 to 9	10	Pension entitlements (incl. contingent pension entitlements											
		Related indicator											
	11	*Output*											

The Supplementary Table is broken down by type of pension manager, by nature of pension schemes and by changes in the stocks of pension entitlements due to transactions and other flows. In this respect, columns show core and non-core accounts general government defined benefit schemes and social security, pension schemes according to its manager (non general government and general government), and nature of pension schemes (defined contribution and defined benefit). The rows in the table exhibit opening and closing stocks in households' pension entitlements, and changes in positions due to transactions, revaluations and other changes in volume.

The distinction between those schemes whose entitlements are carried forward to the core accounts and those which are not should be based on the analysis of a set of criteria regarding the type of social insurance scheme to be applied to the individual pension scheme. With this concern:

- The closer the government employer scheme is to the prevailing social security scheme, the less likely it is to appear in the core accounts;
- The less the benefits of a social insurance scheme are tailored to the specific characteristics of the individual and the more they are applicable to the population at large, the less likely it is to appear in the core accounts; and
- The greater the ability of the government to alter the benefit formula of a social insurance scheme, the less likely it is to appear in the core accounts.

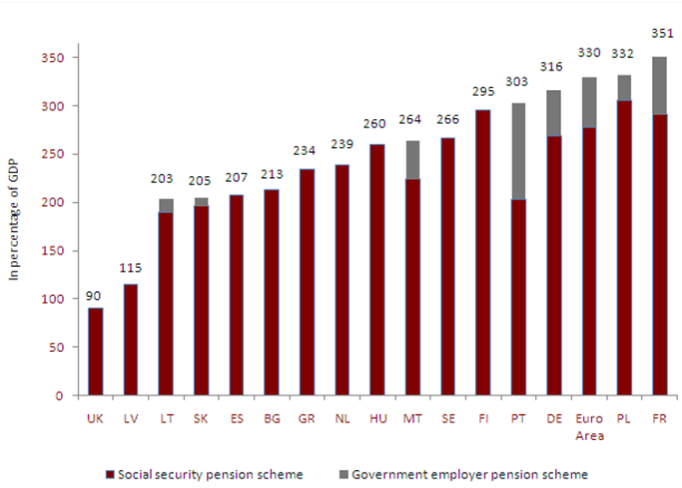
In order to ensure harmonisation across countries among the figures available at the Supplementary Table, some assumptions underlying the estimation of the data are considered relying on demographic, social and economic factors that characterize the economy: pension entitlements are obtained separately for survivors, disability or invalidity type benefits provided for within a pension scheme, and only of a social insurance type; benefits which are the type of social assistance or due to individual saving schemes are not to be recorded; social contributions are gross of taxation; the entitlements are estimated on an accrued to date basis, which corresponds to the present value of the current and of the projected future pension benefits paid to all pensioners and current workers, using a discount factor based on yields of central government bonds considered to be sufficiently liquid and mature; real wages changes on pension entitlements in national accounts follow the Projected Benefit Obligation (PBO) approach, which assumes a non-zero (usually positive) future development of real wages, unlike the alternative Accumulated Benefits Obligation (ABO) approach considering zero future changes in real wages only taking account of wages' growth due to inflation; demographic assumptions, notably mortality and fertility rates, are based in the comparable demographic data compiled by Eurostat (EUROPOP).

For the purpose of estimating the pension entitlements, the TF considered three different approaches: National models; Pension Reform Options Simulation Toolkit (PROST) developed by the World Bank; and Intergenerational accounting-based model developed by the Research Center for Generational Contracts of the *Albert-Ludwigs Universität Freiburg*.

A cross country analysis made by the TF/CG upon the use of the results provided by the Supplementary Table for 2007 (see Chart 1), the latest international data available shows that pension entitlements were very large across European countries, especially for social security. These results stress out that Finland had the highest position of pension entitlements under social security pension scheme (295% of the respective GDP) and United Kingdom the lowest (90% of GDP). Portugal was clearly the country in which government employer pension scheme had the highest weight in pension entitlements when compared with the remaining EU countries.

Chart 1

CROSS-COUNTRY COMPARISON (2007, PBO)



Source: Pension entitlements in EU countries - analysis of country data provided by the Contact Group on Pensions, CMFB, 2009

3 DATA COMPILATION, MODELLING AND SOME RESULTS FOR PORTUGAL IN 2011

3.1 Characterising the Portuguese pension schemes

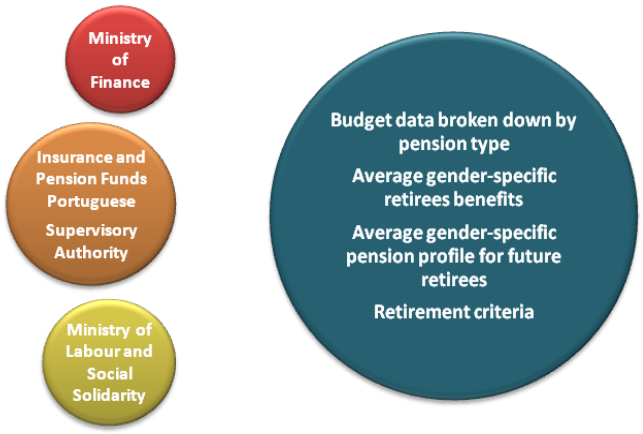
In Portugal, as in many other European countries, there are two main pension schemes: social security general scheme which includes mainly private employees (*Regime Geral da Segurança Social* (SS)) and the civil servants' pension scheme which includes government employees (*Caixa Geral de Aposentações* (CGA)). Both systems are unfunded defined benefit schemes on a *pay-as-you-go* basis. From 2006 onwards new civil servants are enrolled in the social security general scheme, *i.e.*, CGA became closed for new admissions. The sustainability and payment of CGA pension scheme is mainly ensured by transfers from the State budget.

3.2 Organisational issues, data sources compilation and model

In Portugal data are compiled under an institutional co-operation between Banco de Portugal and Statistics Portugal, using basic data from the following institutions (see Chart 2):

Chart 2

DATA SOURCES FOR PENSION STATISTICS IN PORTUGAL



In 2010, a contract between Banco de Portugal and the Research Center for Generational Contracts of the *Albert-Ludwigs Universität Freiburg* was signed with the purpose of delivering a report and an estimate for the Portuguese pension entitlements according to a model developed by this university: '*Estimating pension entitlements of government employer and social security pension schemes in Portugal*'. This model was developed in conformity with the pension entitlements of EU countries calculated by the TF/CG.

Pension entitlements estimates are provided by an actuarial cross section country model based on the following assumptions: the accrual estimation of the pension entitlements were obtained under the accrued to date gross liabilities approach of the government pension schemes; the Projected Benefit Obligations (PBO) approach was considered; the GDP growth rate was assumed to be 1.7% for Portugal, according to the Ageing Working Group assumptions (2007-2060); wages were expected to grow at a rate of 1.5%; the discount rate was considered to be 3% which corresponded to the ten year average of Euro area ten-year government bond yields; the employment rate was assumed to be constant; the demographic assumptions relied on the EUROPOP2008 figures for mortality and fertility rates (migration was ignored); the estimation work and the formulation was supported and developed by a *Matlab* programme.

Under this model the current pension payments and the present value of pensions to be paid in the future are calculated on the basis of accrued rights; no rights can be accrued after the base year - neither by present nor by future workers. The core presumption is a projection of per capita future pension benefits based on today´s existing retirees´ benefits.

As stated in Müller, C. *et al* (2009), the accrued-to-date liabilities of the base year b of the pension scheme, ADL_b are calculated according to the following formulation:

$$ADL_b = \sum_{t=b}^{b+D} \sum_{k=b-D}^{b} \frac{\left(p_{t,k}^{exist} + p_{t,k}^{fut}\right)}{(1+r)^{t-b}} C_{t;k}$$

This means that in every period t, the existing retirees' pension benefits $P_{t,k}^{exist}$ and the pension rights accrued until the base year $P_{t,k}^{fut}$, which are both discounted by the factor $(1+r)$ for every future year $t-b$, are multiplied by the number of members of the age cohort $C_{t;k}$. This is done for every age-group, beginning with the ones born in $k=b-D$, which goes back 100 years prior to the base year.

With reference to Table 1 above, the Portuguese pension schemes can be grouped into the following categories: column C, 'Standard national accounts, Non-general government, Total', including 'Defined contribution schemes' and 'Defined benefit schemes and other non-defined contribution schemes', fulfilled with figures from autonomous pension funds classified in the financial corporations' sector in the financial accounts item 'Insurance technical reserves', which is obtained from information reported by the Insurance and Pension Funds Supervisory Authority and by the association of the insurance and reinsurance companies (*Associação Portuguesa de Seguradores* - APS); for pension funds the annual data reported by the Insurance and Pension Funds Supervisory Authority is broken down into quarters, using the information on assets revaluations and the net amount of payments to the funds (gross contributions minus pensions paid); for insurance companies the departure is the annual information sent by the APS; the quarter breakdown is obtained by using the evolution of the corresponding aggregated reported by the Insurance and Pension Funds Supervisory Authority. Column E, 'Standard national accounts, General government, Defined benefit schemes for general government employees, Classified in financial corporations', relies upon data reported by the Insurance and Pension Funds Supervisory Authority. Column G, 'Not in the standard national accounts, General government, Defined benefit schemes for general government employees, Classified in general government', relies upon figures from the Civil servants' pension scheme – CGA. Column H, 'Not in the standard national accounts, General government, Social security pension scheme', is fulfilled with figures from Social Security general scheme – SS.

3.3 Main results

Table 2 presents the results for Portugal, where pension entitlements as of 2011 amounted to 209.3 billion euro for the Civil servants' pension scheme and to 348.2 billion euro for the Social Security general scheme, representing, respectively, 122% and 204% of GDP, summing up to 326% of GDP. In comparison with previous years, these results reflect a slight reduction, namely in the Social security pension entitlements attaining 216% of GDP in 2010 (see Almeida *et al.*, 2011), which may be associated to the effectiveness of the reforms taken in the period 2006-2008, namely: the inclusion of a sustainability factor in accordance with changes in the life expectancy; indexing rules - pensions are now linked to CPI as well as to the real GDP growth; lifetime wages are accounted for and accrual rates are set according to the workers' wages and the length of their contributory career; incentives to prolong the working life and the penalties for early retirement, reinforcing the mechanisms for the protection of long contributory careers; introducing a ceiling to higher pensions; and promoting active ageing. In 2011, there was also a wage cut. All these reforms reduced the pension entitlements.

Table 2

SUPPLEMENTARY TABLE FOR PORTUGAL - 2011

Relations	Row No.	Recording	Standard national accounts						Not in the standard accounts		Total Pension Schemes	Counter-parts: Pension entitlements of resident house-holds	Counter-parts: Pension entitlements of non-resident households
		Pension manager	Non-general government			General government							
			Defined contribution schemes	Defined benefit schemes and other non-defined contribution schemes	Total	Defined contribution schemes	Defined benefit schemes for general government employees			Social security pension schemes			
							Classified in financial corporations	Classified in general government	Classified in general government				
		Column number	A	B	C	D	E	F	G	H	I	J	K
		Opening balance sheet											
	1	Pension entitlements (incl contingent pension entitlements)	L	L	16 843	0	177	0	197 219	373 735	587 974		
		Changes in pension entitlements due to transactions											
Σ 2.1 to 2.4 – 2.5	2	Increase in pension entitlements due to social contributions	L	L	L	0	40	0	20 861	32 813	53 713		
	2.1	Employer actual social contributions	L	L	L	0	28	0	1 908	8 664	10 600		
	2.2	Employer imputed social contributions		L	L		0	0	7 462		7 462		
	2.3	Household actual social contributions	L	L	L	0	2	0	1 433	5 088	6 524		
	2.4	Household social contribution supplements	L	L	L	0	9	0	10 058	19 060	29 128		
	2.5	Less: Pension scheme service charges	L	L	L	0	0	0	L	L			
	3	Other (actuarial) change of pension entitlements in social security pension schemes								(45 486)	(45 486)		
	4	Reduction in pension entitlements due to payment of pension benefits	L	L	L	0	48	0	8 750	12 872	21 670		
2 + 3 - 4	5	Changes in pension entitlements due to social contributions and pension benefits	L	L	L	0	-9	0	12 111	(25 545)	(13 443)		
	6	Transfers of pension entitlements between schemes	L	L	L	0	0	0	0	6 030	6 030		
	7	Change in entitlements due to negotiated changes in scheme structure	L	L	L	0	0	0	0	0	0		
		Changes in pension entitlements due to other □o□s											
	8	Changes in entitlements due to revaluations	L	L	L	0	0	0	0	0	0		
	9	Changes in entitlements due to other changes in volume	L	L	L	0	9	0	0	0	9		
		Closing balance sheet											
1+ Σ 5 to 9	10	Pension entitlements (incl. contingent pension entitlements	L	L	16 843	0	177	0	209 330	348 190	574 540		
		Related indicator											
	11	*Output*	*L*	L	L	L	L	0	L	L	L		

4 FUTURE DEVELOPMENTS

An institutional framework including the relevant national entities – Banco de Portugal, Statistics Portugal, Ministry of Finance, Ministry of Labour and Social Solidarity is being developed with the purposes of collecting the necessary pension basic data, ensuring the provision of data on time and with quality, compiling pension statistics to fulfil the reporting obligations to international organisations and analysing the results.

The main reason to gather these entities relies on the fact that the data providers will be involved in the process of data compilation from the beginning; they will participate on the definition of the methodology and will share the responsibilities for the compilation and all the expertise from several domains is used to improve the estimations and procedures developed in the final results.

The model used for the estimation of the Supplementary Table data is based on an actuarial approach; however, it does not consider the financial sustainability of the pension regimes. A dynamic general equilibrium model, considering some additional assumptions, might overcome this issue since it will rely upon the: use of national specific assumptions; comparison of the results with the Freiburg model; incorporation of some specifications in order to measure the main changes and future reforms related

to pension schemes in Portugal; the possibility of making sensitivity analysis measuring the impact of social security reforms and demographic changes in the calculation of pension entitlements; analysis of the sustainability of social security schemes.

Besides being a useful tool for policy makers to support their decisions, the public diffusion of the Supplementary Table should be accompanied by a solid explanation in order to guarantee the correct interpretation of its results.

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IV INDICATORS OF MACROECONOMIC IMBALANCES

MEASURING EXTERNAL DEBT IN A CONTEXT OF MACROECONOMIC IMBALANCES*

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ABSTRACT

The exploitation of new methodologies and indicators is considered valuable in measuring a key macroeconomic indicator like the external debt. The recent Portuguese economic developments illustrate the need and usefulness of having a multidimensional approach of this indicator, with several balance of payment items, such as the current and the capital account balances, the foreign direct investment or the reserves assets being carefully analysed when reading the external conditions faced by the economy. Only such an approach can provide with a comprehensive measure of external debt consistent across the range of debt instruments, institutional sectors and valuation methods used. This paper develops an assessment of external debt measures and concludes about their potential advantages and disadvantages. Comparisons are made by focusing on alternatives like gross external debt against net external debt, external debt vis-à-vis international investment position, and external debt at nominal value against external debt at market value.

Keywords: external debt; valuation; debt instruments; institutional sectors

1 BACKGROUND

In today's globalised world no country can be fully insulated from what happens in the global economy. The current international economic and financial crisis proved it, as its transmission has occurred largely through the balance of payments (BoP) channel, which has a great relevance in the assessment of the country's vulnerabilityto external exposure. Two of the BoP components - the current and the capital accounts balances - mirror the

* 59th World Statistics Congress organised by the ISI - International Statistical Institute

saving and investment behavior of the economy. When a country runs a current account deficit, it is building up liabilities to the rest of the world that are financed by flows in the financial account. The macroeconomic impact of a current account deficit depends on how the country is using imported capital, as well as how much it has borrowed from abroad in the past. Even if the country is inter-temporally solvent, its current account deficit may become unsustainable if it is unable to secure the necessary financing. According to the IMF (2012), while some countries, such as Australia and New Zealand, have been able to maintain current account deficits for several decades, others such as several European countries experienced sharp reversals of their current and capital accounts during the recent global crisis. Such reversals presented themselves highly disruptive because private consumption, investment, and government expenditure had to be curtailed abruptly when foreign financing started to be no longer available and, indeed, the countries were forced to run large surpluses to repay in short order what they borrowed in the past. Persistent current account deficits generally lead to a rise in a country's external indebtedness, causing a rise in both the credit risk premium and the borrowing costs.

Chart 1 shows the evolution of these variables for the four euro area countries that requested financial assistance from the European Union (EU), European Central Bank (ECB) and International Monetary Fund (IMF): Greece, Ireland, Portugal and Spain. As one might observe, over the last decade these countries have been building up large external imbalances, reaching current account deficits of 15%, 6%, 13% and 10% of the GDP, respectively, with levels of the gross external debt that exceeded 100% of the GDP.

Chart 1

CURRENT ACCOUNT, INVESTMENT AND SAVING

Source: ECB, IMF

This critical state of accumulated external indebtedness was possible through the participation of these countries in the euro area, arising from the behavior of private agents and from public policies deeply inappropriate to the demands of a new regime arising from the adoption of the single currency. The economic and financial adjustment programmes were prepared with the goal of allowing countries to return to a path of sustained growth within a framework of financial stability, as also to re-establish the confidence of participants in international financial markets and to restore the sustainability of their external debts.

Debt sustainability is assessed on the basis of indicators of the debt stock. Different methodologies can be used when measuring the external exposure of a country, through a multidimensional exploitation of the range of debt instruments, institutional sectors and valuation methods used. Only such an approach can provide a comprehensive analysis of this current and useful theme.

In section 2 we will develop an assessment of external debt measures, applying them to the Portuguese case and conclude about their potential advantages and disadvantages. In section 3 we will summarize the conclusions and build up some recommendations.

2 COMPARING EXTERNAL DEBT INDICATORS

For the purpose of this analysis external debt is based on the fact that if a resident has a current liability to a nonresident, that requires payments of principal and/or interest in the future. This liability represents a claim on the resources of the resident's economy, being an external debt of that economy. The liabilities may include debt securities, such as bonds, notes and money market instruments, as well as loans, deposits, currency, trade credits and advances due to non-residents (IMF, 2012). The debt could be issued with different maturity profiles by different institutional sectors such as the general government, the banks and the other sectors. Although not always available, other additional details would be useful to improve the analysis, like the geographical breakdown of creditors and debtors and the residual maturity in addition to the original one.

2.1 Gross external debt against net external debt

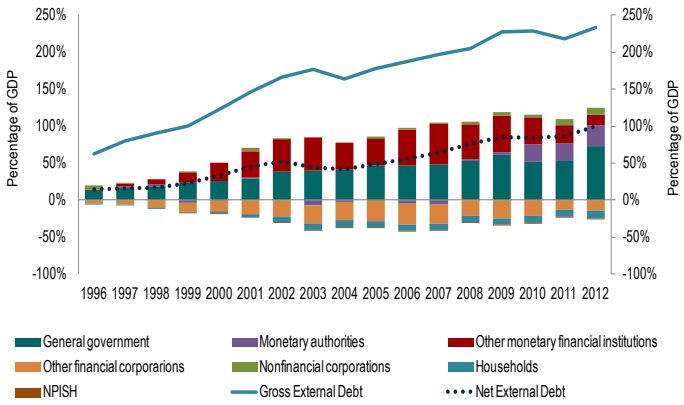
Gross external debt, at any given time, is the outstanding amount of those actual current, and not contingent, liabilities by the residents of an economy that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to nonresidents. For some, gross external debt *per se* only captures one side of an economy's external exposure to international debt markets. For others, net external debt (obtained by subtracting from the gross external debt liabilities the related gross external debt assets), could provide additional insights into the sustainability of external debt. The recently massive use of certain types of financial contracts, such as repurchase agreements, securities lending, collateralised loans and securitisation issues, tend to drive up gross external debt figures. This is because these types of financial contracts simultaneously create new debt positions in both assets and liabilities, which can only be offset by using the net external debt as an indicator. While large and increasing gross external debt positions only provide an indication of accumulating imbalances in, and the potential vulnerabilities of, an economy, significant net external debt levels provide a clearer picture on the existence of such problems (Dias, 2010). Large imbalances in the net external debt and large net interest payments are a credible early warning signal of rising risks concerning the ability of the economy to successfully meet its external financial obligations, particularly in periods of economic distress or when hit by an external shock.

Chart 2 illustrates the evolution of these two measures in the Portuguese economy. Although they have the same trend, there is a gap between the gross and the net external debt series, which reflects the above referred developments on the asset side. The gross external debt has increased noticeably over the last years. At the end of 2012, it amounted to 233% of GDP, which means an increase of 132 percentage

points (p.p.) since the end of 1999, the year that marked the beginning of the 3rd phase of the European Monetary Union, *i.e.*, the introduction of a single currency in the area. If one focuses the analysis on the net external debt, it reached 100% of the GDP at the end of the last year. Until 2010, only three institutional sectors had a relevant weight on the net external debt: general government, other monetary and financial institutions and other financial corporations. After 2010, Banco de Portugal started to have an important role as an intermediary in the increased financial dependence of Portuguese banks from the ECB, as also as due to the disbursements received in the context of external financial assistance, since the second half of 2011.

Chart 2

GROSS EXTERNAL DEBT VIS-À-VIS NET EXTERNAL DEBT – PORTUGAL



Source: Banco de Portugal

2.2 External debt against international investment position

Beyond external debt indicators, other kinds of measures can contribute to the enrichment of the analysis, of which, the IIP. The IIP translates the overall net external financial position of a country, *i.e.*, measures the respective external financial assets minus liabilities, which includes, in addition to the net external debt, the net position in equities, financial derivatives and reserve assets.

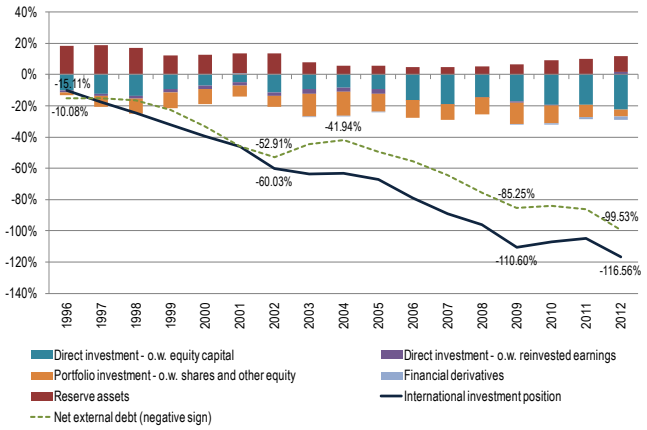
The new methodological manuals, such as the Balance of Payments and International Investment Position Manual, 6th edition (BPM6), give increased emphasis to the IIP statistics in international accounts compilation and analysis, by recognizing that although balance of payments analysis has an important role in understanding sustainability and vulnerability, IIP data are useful for other purposes, such as measuring rates of return of external financial investment, analyzing economic structure, and studying the relationship with domestic sources. Additionally, IIP and other external macroeconomic indicators are included in the Macroeconomic Imbalances Procedure scoreboard, which is a surveillance mechanism that aims to identify potential risks early on, prevent and correct harmful macroeconomic imbalances in the EU.

Chart 3 shows the evolution of the net external debt and of the IIP for Portugal. As one can observe, the two series are almost coincident until 2001, the point in time when a stable gap starts to emerge. The reasons why this occurred are related to the decrease of the weight of the reserve assets since the Portuguese accession to the euro area. The highest gap started on 2004 and was caused by the

worsening of the current and capital accounts translating a raise of the financing needs, which was covered by external funding of equity capital through foreign direct and portfolio investments.

Chart 3

NET EXTERNAL DEBT VIS-À-VIS INTERNATIONAL INVESTMENT POSITION – PORTUGAL



Source: Banco de Portugal

2.3 Excluding foreign direct investment liabilities from external debt

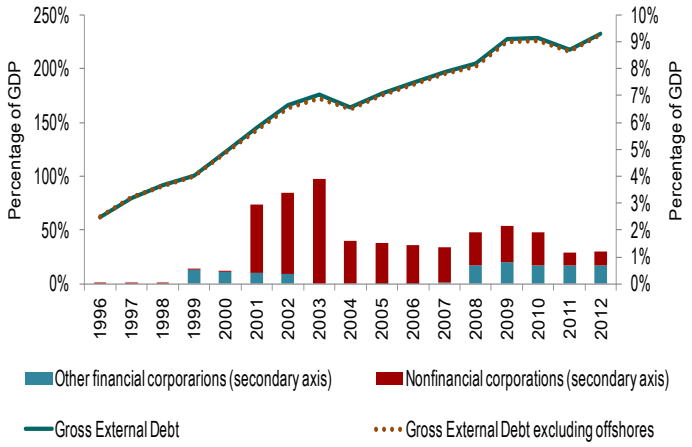
Residence is a key concept to the definition of external debt. Some issues could, however arise, regarding the inclusion or not of some entities to which the concept of residence could be difficult to implement, such as enterprises located in free trade and other offshore zones, or the case of the special purpose entities (SPE). According to the international standards, enterprises located in offshore zones should be attributed to the economies in which they are located. On the other hand, SPE are always treated as separate institutional units if they are resident in a different territory to their owners.

Thus, debt issues on the balance sheet of entities legally incorporated or domiciled in an offshore center are to be classified as external debt of the economy in which the offshore center is located. Any subsequent on-lending of the funds raised through such debt issues to a nonresident, such as to a parent or subsidiary corporation, is classified as an external asset of the offshore entity and external debt of the borrowing entity.

IMF (2012) encourages separately identification of the gross external debt of the country, namely if the size of offshore liabilities related to the rest of the economy has a significant weight.

Chart 4

GROSS EXTERNAL DEBT EXCLUDING OFF SHORES - PORTUGAL



Source: Banco de Portugal

Chart 4 above represents the Portuguese gross external debt excluding offshore activity. As one can observe through the secondary axis, the exclusion of this kind of activity has a small and decreasing impact on the external debt, representing less of 5% of the GDP, mainly due to the non-financial corporations' activity.

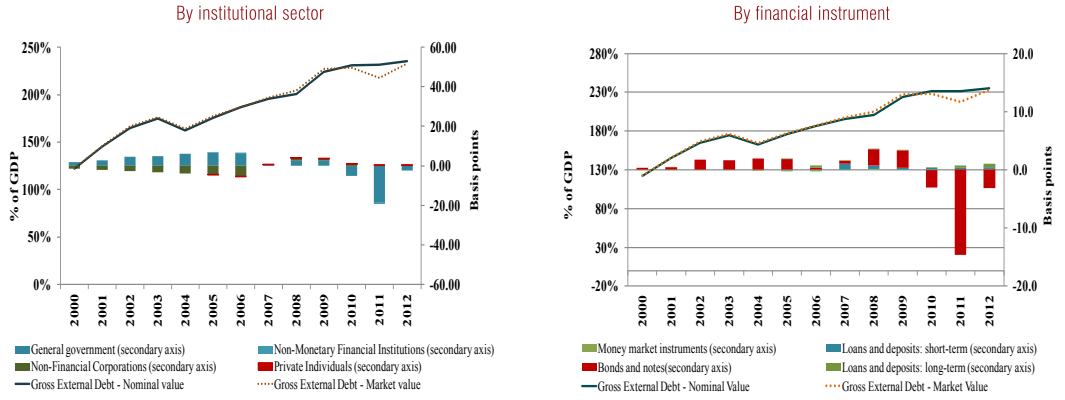
2.4 External debt at nominal value against external debt at market value

The new international manuals encourage the valuation of the gross external debt position both at nominal and at market value. The nominal value of a debt instrument is a measure of value from the viewpoint of the debtor, because it is the amount that he/she owes at any moment in time to the creditor. This value is typically established by reference to the terms of a contract between the creditor and the debtor. The market value is determined by the prevailing market price, which provides a measure of the opportunity cost to both the creditor and the debtor.

Chart 5 evidences the evolution of the Portuguese gross external debt both at nominal and at market value. Until the end of 2009, the difference between these two approaches was insignificant. In the first half of 2010, developments in financial markets were mainly determined by concerns on sovereign credit risks which impacted the valuation of the Portuguese sovereign debt. Actually, in 2011, the decrease of the external debt at market value was mainly due to a drop in the government bonds' price, which was related to the perception of an augmented sovereign risk and inherent risk premium rise. However, this effect is not observable when analysing the external debt at nominal value. This also applies to the Maastricht debt, the general government debt at nominal value, reported to the European Commission in the context of the Excessive Deficit Procedure.

Chart 5

GROSS EXTERNAL DEBT AT NOMINAL AND MARKET VALUE - PORTUGAL



Source: Banco de Portugal

3 CONCLUSIONS AND RECOMMENDATIONS

Many governments of advanced economies are dealing with large external deficits and increasing external debts. Some of these countries find themselves with high levels of external debt, and in some cases they will be close to double the existing figures before the recent financial crisis. Some European countries, which requested external financial assistance – Greece, Ireland, Portugal or Spain -, are currently under enormous pressure to control their levels of external debt. Indeed, the recent economic developments illustrate the need and usefulness of having a multidimensional approach of this indicator.

Gross external debt is simply the stock of outstanding external debt. Net debt is the difference between gross debt and the related financial assets that the country holds *vis-à-vis* the rest of the world. According to OECD data, the difference between gross and net debt could be very large for some countries like Japan, or be very close like Greece. The net debt could be an appropriate measure of external indebtedness, if one considers a country with a significant amount of assets which need to be considered when thinking about the solvency of its external accounts. There are, however, some concerns with the concept of net debt. In addition to some measurement questions (which assets to include, at which value), a country needs to refinance all its gross debt and not only the net part, so in terms of flows, the gross debt matters.

External debt statistics together with the IIP have continuously become important inputs in the process of economic policy formulation. IIP provides very comprehensive information for monetary authorities that find it important to explain external sector developments, its sustainability and impact on the domestic sector and to induce any necessary changes through policy actions.

International standards defend that debt issues on the balance sheet of entities legally incorporated or domiciled in an offshore center are to be classified as external debt of the economy in which the offshore center is located. In some economies, separate identification of the gross external debt of resident offshore entities is useful, because of the potential size of their liabilities relative to the rest of the economy.

The measurement of external debt of both nominal and market values seems to be valuable, mainly in periods of market instability, allowing a more accurate analysis.

All of these analyses should be completed by the use of detailed data, such as breakdowns by institutional sector, financial instrument, residual maturity or geographical counterparty.

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V NATIONAL FINANCIAL ACCOUNTS STATISTICS

THE DYNAMICS OF DEBT IN THE CONTEXT OF FINANCIAL ACCOUNTS – EVIDENCE FROM PORTUGAL*

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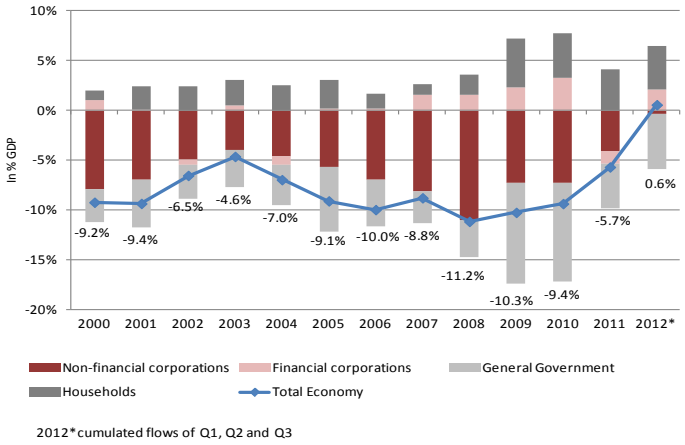
1 INTRODUCTION

Over the past decade, Portugal has deepened its divergence in terms of economic growth with respect to the euro area, mainly driven by the accumulation of external deficits and macroeconomic imbalances. The accumulated external indebtedness arose from the behaviour of private agents and of public policies inappropriate to the demands of a regime arising from the adoption of the single currency. In the beginning of 2011, in the context of a new outbreak of the sovereign debt crisis in the euro area, there was a significant build-up of international investors' concerns over the sustainability of the public finances and the intertemporal dynamics of the Portuguese external debt. Deteriorating access conditions to international funding markets made the recourse to external financial assistance unavoidable, which was confirmed in the beginning of April. The main purpose of the Economic and Financial Assistance Programme for Portugal is to guarantee the financing of the Portuguese economy for a period that allows implementing a gradual and structural correction of the imbalances in public finances and external accounts, in addition to preparing and implementing the structural reforms required to reverse the main structural impediments to the economy's growth potential.

* *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

Chart 1

NET LENDING (+) / NET BORROWING (–) IN % OF GDP



*Cumulated flows of Q1, Q2 and Q3

Notwithstanding the above, the monetary and financial conditions of the Portuguese economy deteriorated over the course of 2011. The Portuguese economy suffered a strong contraction which intensified during the course of the year, reflecting an adjustment of public and private sector balance sheets, despite robust export growth. In 2012 the combination of a strong contraction in domestic demand with a remarkable robustness of exports implied a significant adjustment of the goods and services account and accordingly of the current and capital account. This decline in external borrowing requirements reflected a reduction of the rate of investment in the economy and an increase in the domestic savings rate. In fact, in 2012 the Portuguese economy recorded a net external lending of, measured by the global surplus of the current and capital accounts, 0.8 per cent of GDP; this surplus occurs after an upward trend observed since 2009, mainly influenced by the evolution of the international trade in goods. Reference should also be made to the fact that the external financing profile was substantially different from that observed since the inception of the euro area, with the financial account having been funded through a reduction of financial assets *vis-à-vis* the rest of the world, in contrast to the usual funding through an increase in external liabilities. This profile accentuates the trends observed since the onset of the international financial crisis in 2007, reflecting the increasingly lower international financial integration of the Portuguese economy.

2 NATIONAL ACCOUNTS DATA

In the present context, it is important that the relevant data is available for analysing the behaviour of the economic agents and for identifying trends in the economy. The national accounts provide an integrated framework for recording transactions and assets and liabilities among the economic agents of an economy, which are grouped into institutional sectors: non-financial corporations, financial corporations, general government, households, non-profit institutions serving households and the rest of the world. The integrated economic accounts show which financial assets are acquired and which liabilities are incurred by which sectors. The flow-of-funds analysis allows detailing the financing by counterpart sector and type of financial instrument. It is also possible to focus our analysis on the stocks, *e.g.* the outstanding liabilities of each institutional sector.

The debt dynamics can be further analysed more specifically for each institutional sector. The debt can be decomposed into different components and one interesting way to do so is by explaining the difference between the balance 'net borrowing' and the change in debt. This analysis is currently undertaken for general government, in the context of the Excessive Deficit Procedure (reporting of Maastricht deficit and debt) which is commonly called by 'deficit-debt adjustment' or 'stock-flow adjustment'.

Along this paper, changes in debt will be evaluated, for this sector, through the following expression:

$$\left(\frac{D_t}{GDP_t}-\frac{D_{t-1}}{GDP_{t-1}}\right)=\frac{\overline{-B9_t}}{GDP_t}+\frac{AFA_t}{GDP_t}+\frac{OCD_t}{GDP_t}+\left(\frac{D_{t-1}+IP_t}{GDP_t}-\frac{D_{t-1}}{GDP_{t-1}}\right) \qquad (1)$$

where $\overline{-B9_t}$ corresponds to the primary surplus, AFA_t to transactions in financial assets net of transactions in liabilities other than debt, OCD_t corresponds to other flows, such as revaluations. In the context of this analysis and taking into account the actual weight of the interest paid (IP_t), it is possible to isolate this amount from net borrowing, which is represented in the last share in the sum.

The debt dynamics can be analysed in a similar way for the non-financial corporations where the concept of debt used is what can be identified as 'corporate debt': loans and non-consolidated securities other than shares. It would be possible to present the debt decomposed into transactions in financial liquid assets (TLA_t), in other changes in debt (OCD_t) and in a component that might be called as 'long-term financing gap' ($LTFG_t$), as shown in the expression (2):

$$\left(\frac{D_t}{GDP_t}-\frac{D_{t-1}}{GDP_{t-1}}\right)=\frac{TLA_t}{GDP_t}+\frac{LTFG_t}{GDP_t}+\frac{OCD_t}{GDP_t}+\left(\frac{D_{t-1}+IP_t}{GDP_t}-\frac{D_{t-1}}{GDP_{t-1}}\right) \qquad (2)$$

The component TLA_t is defined as inventories of goods, currency, deposits, debt securities, mutual fund shares and trade credits receivable less trade credits payable. In addition, the $LTFG_t$ would aim to capture the long term investment (non-financial assets and financial assets other than liquid assets) that is not financed with corporate equity in broad terms.

3 MAIN DEVELOPMENTS SINCE 2007

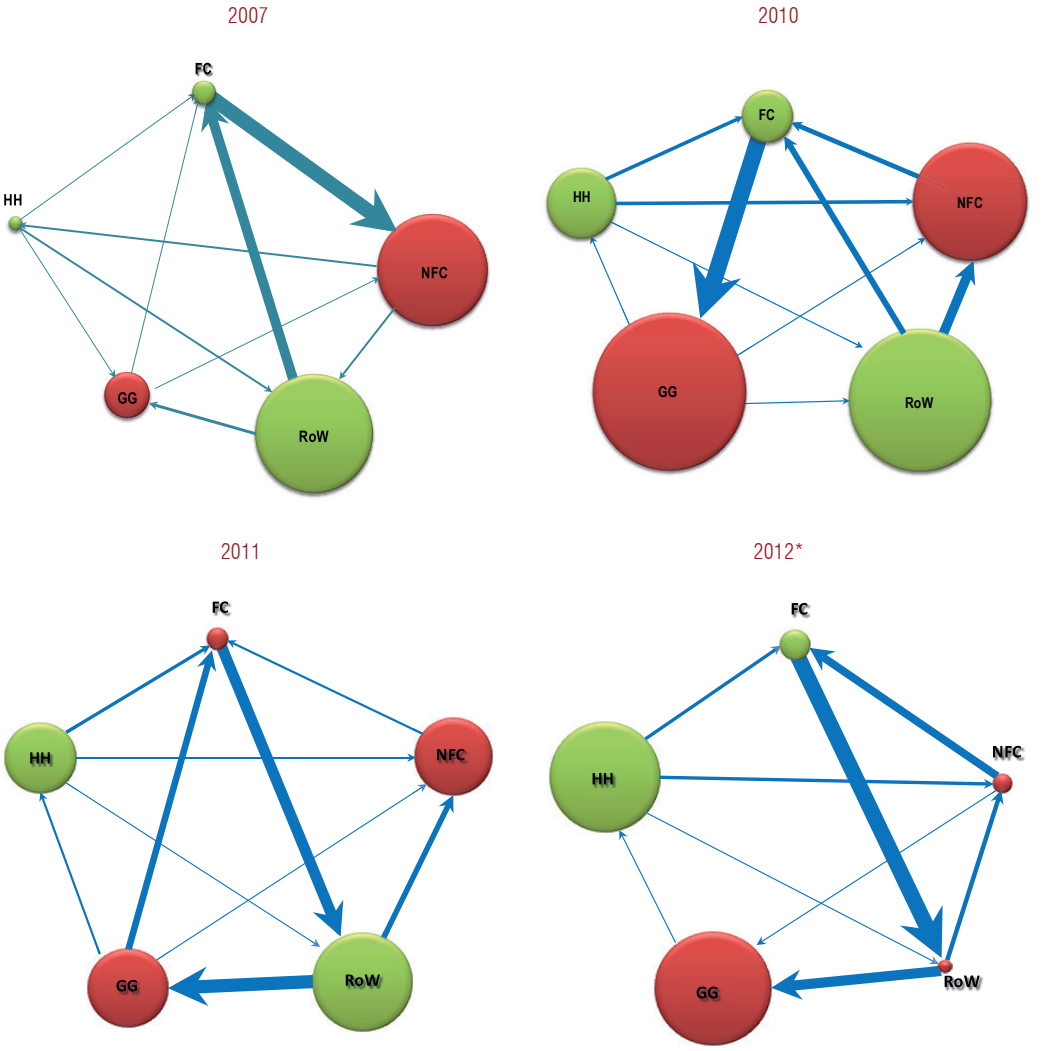
Since 2007, following the international financial crisis, a change in the net lending / net borrowing of the several resident institutional sectors was observed.

The chart displayed below aims at illustrating the flow of funds (net) observed between the various institutional sectors, comparing the year 2007 with 2010, 2011 and 2012*. The diameter of the circle is proportional to the financial saving of each sector (filled in green if positive and red if negative). The dashes' width is proportional to the inter-sector relations. In 2007, the large inter-sector flows were registered in the financing provided by the rest of the world to the financial corporations, which channeled those funds mainly to the non-financial corporations. In 2010, contrarily to what had happened in 2007, the inter-sector flows revealed a strong involvement of the financial corporations, in particular the banking sector, in financing the general government. In this period, the rest of the world financing was mainly directed to the non-financial corporations and the financial corporations.

*Cumulated flows of Q1, Q2 and Q3

Chart 2

FLOW OF FUNDS



Legend: NFC – non-financial corporations; FC – financial corporations; GG – general government; HH – households; RoW – rest of the world.

In 2011 and 2012* (2012Q1-2012Q3) a significant change in the financial savings was recorded as well as in the inter-sector flows. The efforts to reduce the general government deficit are observable in the chart together with the external financing of Portuguese public activities through the assistance programme. In the context of the Portuguese Economic Adjustment Programme, the structure of financing of general government (2011 and 2012*) contrasts significantly with that of the previous years, particularly in terms of the sharp increase in (external) loans and in the net redemption of securities other than shares (mainly held by non-residents). The non-financial corporations net borrowing was significantly reduced and the households maintained the savings trend. As already referred above, in 2012* the Portuguese economy recorded a net external lending as illustrated by the red circle of the rest of the world.

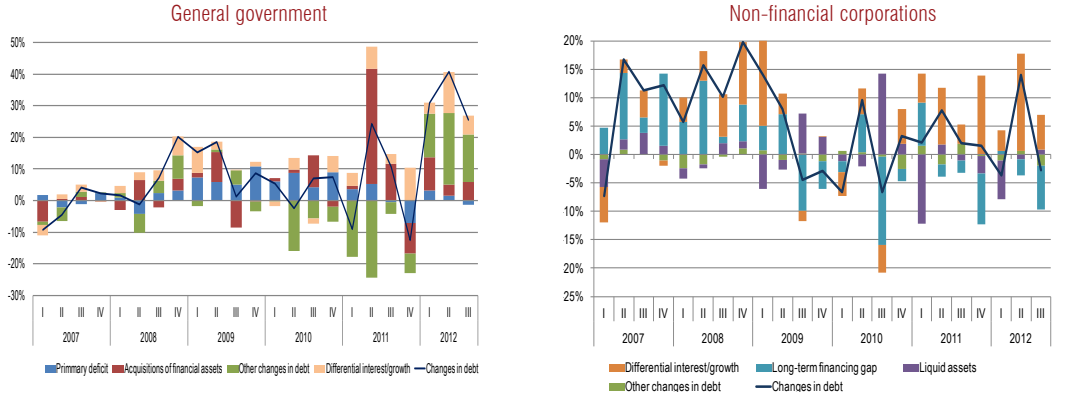
Based on the descriptions done in Section 2, about the factors that cause influence in the deficit-debt adjustments, it is proposed, in this section the analysis of the debt dynamics for both the general government and non-financial corporations sectors.

Until the mid of 2011, most of the general government debt developments were driven by the primary deficit which had a particular contribution to debt growth since the end of 2008. From 2010 onwards, changes in debt were strongly influenced by the increase of the Portuguese long-term yields – in the

context of a deep sovereign debt crisis referred above – which reflected itself as a strong devaluation of the Portuguese security debt component. In 2012, a movement of revaluation of Portuguese sovereign debt reverses this pattern. The differential between the cost of the debt and its growth, which until 2008 had an insignificant weight, became broadly positive, notably during the two last years. Acquisitions of financial assets, also with a historically minor weight became rather important during the crisis, particularly in the second quarter of 2011 due to the disbursements received in the context of external financial assistance but not yet used.

Chart 3

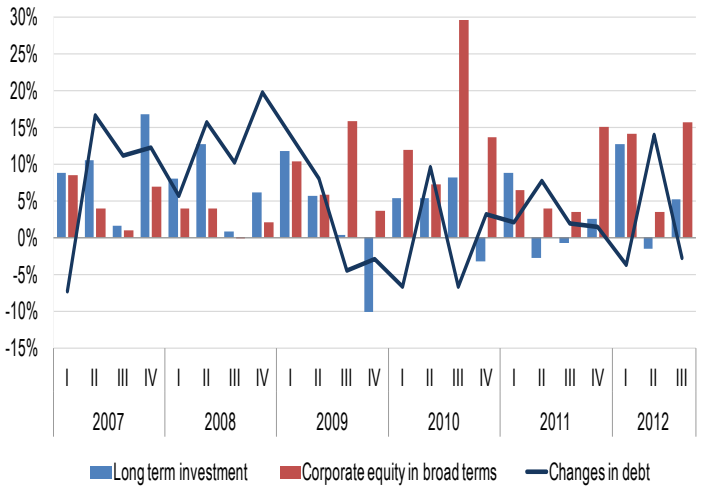
CHANGES IN GENERAL GOVERNMENT AND NON-FINANCIAL CORPORATIONS' DEBT – PORTUGAL (% OF GDP)



When one compares the evolution of debt dynamics between the sectors under analysis, it is possible to observe a higher volatility of the series in the case of the non-financial corporations sector. To these changes contributed positively, until the end of 2008, the evolution of the LTFG hand in hand with the differential between interest and growth. The behaviour of this last series reflects the trend in the interest rates, notably their lower-level between 2009 and 2010. Since 2008 onwards the LTFG starts contributing negatively to the evolution of the debt, reflecting not only a decrease in the long term investment, but also the increase in the corporate equity, as shown in Chart 4.

Chart 4

DECOMPOSITION OF THE LONG-TERM FINANCING GAP – PORTUGAL (% OF GDP)



This development reveals implicitly the contraction of credit by the banks, as a consequence of the materialisation of credit risks and liquidity restraints. Changes in liquid assets, used as a proxy of working capital, reflect the weakness of the overall liquidity of the firms which were influenced by specific operations related to financial groups.

4 FINAL REMARKS

The full reopening of funding markets to national agents requires that the intertemporal solvency conditions of the various institutional sectors, particularly general government, are previously ensured. The adjustment of the Portuguese economy has also been mirrored in significant changes to the balance sheets of corporations and households, with an increase in savings rates and the gradual correction/stabilisation of previously high levels of indebtedness.

Financial accounts are a powerful tool to analyse risks and vulnerabilities in financial systems in a holistic way. Modelling the interlinkages between the sectors is equally important as this aims at revealing the channels through which local shocks can propagate wider in financial systems. Integrated accounts and from-whom-to-whom analysis are thus a necessary pre-condition.

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V NATIONAL FINANCIAL ACCOUNTS STATISTICS

THE PORTUGUESE ECONOMY SEEN THROUGH THE LENSES OF FLOW OF FUNDS: HOW INTER-SECTORAL RELATIONSHIPS EVOLVED IN 2000-2012[1*]

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ABSTRACT

Flow of funds data allow for a very comprehensive analysis of inter-sectoral relationships among the resident sectors of the economy and between these and the rest of the world. The Portuguese economy has undergone important shifts in its net funding patterns, against the backdrop of the sovereign debt crisis. We carry out who-to-whom analysis of the main developments in recent times to illustrate the usefulness of these data for analytical purposes and policy guidance.

1 INTRODUCTION

The outburst of the global financial crisis together with the more recent sovereign debt crisis have sparked the demand – by policy makers, market participants and the general public – for more detailed and timely statistics.

One particular statistical domain that has received plenty of attention is financial accounts and flow of funds data. Both have a wide range of applications, from monetary policy to financial stability and macroprudential policy. In fact, the crisis has shown the importance of monitoring the composition of balance sheets with an eye on mismatches (maturity, currency, etc.) as well as the interconnections between the different sectors of the economy. The G20 data gaps initiative has identified the need for "balance sheet approach (BSA), flow of funds, and sectoral data more generally" under its recommendation 15 (see IMF, 2009).

The main purpose of this paper is to provide an overview of the main developments in the Portuguese economy in recent times using flow of funds data and to illustrate how a more extensive use of these data at the Banco de Portugal has added value to the analytical framework of financial accounts. The data are particularly important at the current juncture as they allow keeping track of the significant changes in the patterns of inter-sectoral relationships within the economy. In this sense, they are fundamental to understand and better grasp the impacts of the crisis on the funding patterns of the Portuguese economy. The paper will also briefly present the current compilation experience of flow of funds at the Banco de Portugal.

1 We thank Olga Monteiro, Paula Menezes and Paulo David for helpful discussions and comments

***** OECD Working Party on Financial Statistics

2 FLOW OF FUNDS COMPILATION AND THE USE OF MICRO-DATABASES AT THE BANCO DE PORTUGAL

Financial accounts data include both the transactions and the financial positions of the different institutional sectors of an economy. Flow of funds data are a subset of the financial accounts, establishing the net transactions, on a who-to-whom basis, between the different domestic sectors of a given economy as well as with the rest of the world. More specifically, according to the SNA2008, "the flow of funds is a three dimensional presentation of financial statistics where both parties to a transaction as well as the nature of the financial instrument being transacted are elaborated" (see §27.9). These data are therefore very rich and encompassing datasets as they give an overall picture of the whole economy. Whereas most datasets are confined to specific sectors – monetary financial institutions (MFI) balance sheet data, balance of payments, general government statistics, etc. – financial accounts (and hence also, by definition, flow of funds) are the only system where all sectors of an economy are put together in a single framework, in an integrated and balanced manner. This enables to comprehensively track the relationships and interconnections between the different sectors of an economy.

The compilation of financial accounts in Banco de Portugal is done on a quarterly basis and is carried out using different sets of primary statistics, originating from the Banco and other external sources[2]. Starting with the former, the most important building blocks are monetary and financial statistics, balance of payments and international investment position statistics, central balance-sheet database and securities statistics. Turning to external sources, these mainly relate to information pertaining to insurance corporations and pension funds as well as to general government accounts. The compilation is done under a quadruple-entry basis, whereby each transaction is recorded for the two institutional sectors involved and as a change in both assets and liabilities[3]. In practice, this is achieved by constructing highly detailed who-to-whom matrixes with information on creditor and debtor sectors, financial instrument and assets/liabilities[4].

One aspect that has been gaining relevance in recent times is the usage of micro-databases. There are, in general, numerous advantages to this approach for the architecture of most statistical systems. We highlight two main advantages in the specific context of financial accounts.

On the one hand, from an input perspective, they are important to ascertain counterparts and construct who-to-whom matrixes. For instance, the Securities Statistics Integrated System at the Banco de Portugal is a security-by-security system with essential information on counterpart sectors, for both securities holdings and issues. The same also applies to other micro-databases, such as the Central Credit Register – which contains granular information on credit exposures – and the Central Balance Sheet Database – which contains accounting and financial information covering the universe for the specific institutional sector of non-financial corporations (NFCs) in Portugal[5].

On the other hand, from an output perspective, micro-databases and, in general, the availability of grainy information, boost a higher degree of flexibility which facilitates exploring the data and constructing tailor-made data reports. For this reason, they can better address users' *ad hoc* requests. One particular domain where these features have proved to be very useful is in the provision of recent detailed data requests within the external Economic and Financial Assistance Programme to Portugal. In fact, some of the data requests can only be fulfilled on account of the highly granular information contained in Banco de Portugal's micro-databases. In general, micro-databases have a valuable use in the flow of funds analysis, since they allow the comprehension of the interlinks within an economy and with the rest of the world and, when needed, drilling down to identifying micro-data.

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2 A more detailed account of financial accounts' compilation issues can be found in References of Banco de Portugal (2005b and 2005c).

3 Or in uses and resources, in non-financial accounts terminology.

4 Examples of these matrixes for loans and deposits can be found in the Annex.

5 For more information see References of Banco de Portugal (2005a, 2005d and 2008).

Turning to data availability and timeliness, annual Portuguese financial accounts data are available since 1995. Quarterly financial accounts data are available since the fourth quarter of 1997 for stocks and since the first quarter of 1998 regarding transactions. A full set of financial accounts with counterpart sectors is available since the fourth quarter of 2006 for stocks and the first quarter of 2007 for transactions. Moreover, given that they typically lie at the end of the statistical compilation chain, financial accounts data are only available after all other statistical domains and therefore normally with a longer time lag. Notwithstanding, this timeliness cost must be weighed against the completeness and richness of the data. Flow of funds data largely make up for this shortcoming by providing an encompassing picture of sectoral developments within the whole economy. The dissemination of Portuguese data is associated to the Eurosystem reporting deadlines. There are two main reference dates: a first and partial set of data – a "quick estimate" – is reported to the European Central Bank (ECB) at *t+80* days and is followed by a later sending of a larger and complete set of series at *t+110* days. The timeframe of the second data will be shortened during the coming exercises.

3 RECENT DEVELOPMENTS IN THE PORTUGUESE ECONOMY SEEN THROUGH THE LENSES OF FLOW OF FUNDS DATA

In this section, we provide an overview of recent developments in the Portuguese economy using flow of funds data. We start by providing a general overview of the major trends in savings and investment behaviour. We then move to a more detailed analysis.

3.1 General overview

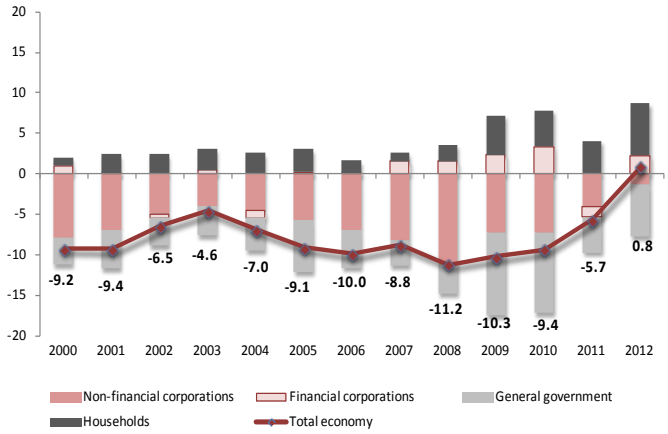
The Portuguese economy has been a net borrower of funds from the rest of the world. Focusing on the period from 2000 to 2012 plotted in Chart 1, the average net borrowing of the economy was 7.7% of GDP. Despite some moderation in the early 2000s (2002 and 2003), net borrowing resumed its increasing trend immediately thereafter. Funding needs reached a maximum of slightly in excess of 11% of GDP in the midst of the global financial crisis in 2008. Although smaller, they remained elevated in 2009 and 2010. Since then however, net borrowing has contracted impressively and even turned into a slight net lending of almost 1% of GDP in 2012.

In addition to the contraction in the overall net external borrowing of the economy, there are also important changes at the sectoral level. Traditionally, NFCs used to take up the lion share of net borrowing, followed by the general government. At the same time, households had a small surplus while the financial sector was close to balance for most of the period. Since 2009 however, net funding needs of NFCs declined while those of the general government further expanded, against the background of public stimulus packages and automatic stabilizers. The financial sector became a net lender in 2007, consolidated and even increased this position since then, despite an interruption in 2011. Households were the only sector that was always a net lender throughout, a characteristic which accentuated over time and also became more prominent recently, since 2009.

These developments mask significant changes in net flows within the sectors of the Portuguese economy. In the next section, to better illustrate the analytical power of this dataset, we dig deeper and provide a more thorough account of developments.

Chart 1

NET LENDING (+)/NET BORROWING (-) OF THE PORTUGUESE ECONOMY, 2000s (IN % OF GDP)



Source: Banco de Portugal and Instituto Nacional de Estatística

3.2 Detailed who-to-whom analysis

In what follows, we highlight three main periods characterised by distinct inter-sectoral patterns of the Portuguese economy. The first comprises roughly the period since Portugal joined the Eurozone and up until the build up to the crisis. The second period goes from the initial tensions in global financial markets on the back of the subprime crisis and until 2010, when the Greek crisis broke out. Finally, the third and last period encompasses 2011 and 2012 and is mainly marked by the start of the Portuguese external economic and financial assistance programme.

The analysis will be done resorting to flow of funds charts. These charts are constructed on a who-to-whom basis and display the net flows between the resident institutional sectors – financial sector, general government, non-financial corporations and households – and also the rest of the world. In these charts, the diameter of the circle is proportional to the financial saving[6] of each sector and is filled in green if it is positive and red if it is negative. Moreover, the dashes' width is proportional to the inter-sector relations.

a) 2000 – 2007

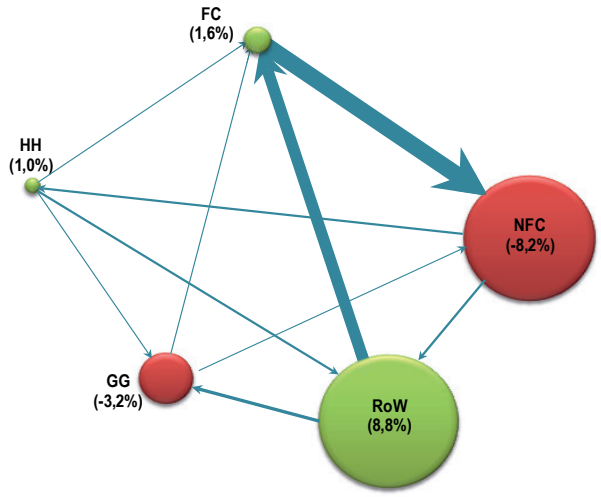
The financial sector was carrying out its typical intermediary role, raising funds from the rest of the world and from domestic sectors – households and the general government – and channelling these funds to the resident non-financial corporation (NFC) sector (see Chart 2). There was however a significant asymmetry between domestic and foreign sources, as domestic savings were clearly insufficient. Hence, the vast majority of the funding was coming from abroad – 15.6 billion euros from the rest of the world compared to 1.7 billion euros of households and the general government combined, in 2007.

Another important trademark was the rather contained funding needs of the general government at this point in time. Specifically, in 2007, the net borrowing of the general government was 3.1% of GDP (5.4 billion euros), the lowest level attained in the period from 2003 to 2012.

6 Financial saving is calculated as the difference between investments in financial assets and liabilities in a given period.

Chart 2

FLOW OF FUNDS OF THE PORTUGUESE ECONOMY, 2007 (IN % OF GDP)



Source: Banco de Portugal and Instituto Nacional de Estatística
Note: NFC - non-financial corporations; FC - financial corporations; GG - general government; HH - households; RoW - rest of the world

a) 2008 – 2010

In 2010, an important change in sectoral relationships took place with three main interrelated effects, as can be seen in Chart 3.

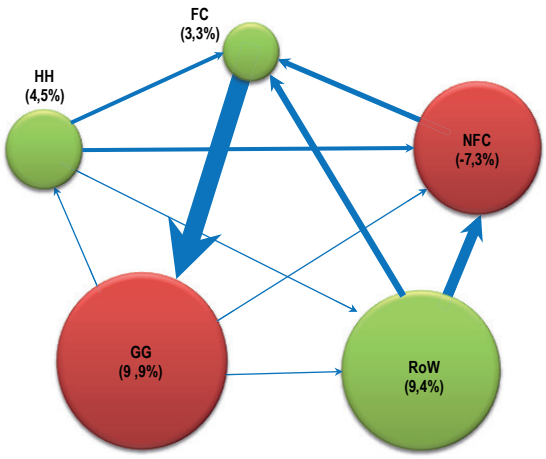
First, as mentioned, the overall financing needs were larger than before, with those of the general government ballooning to 9.9% of GDP (slightly down from 10.2% of GDP in 2009) or 17 billion euros; these were only partly offset by a decrease in the net borrowing of NFCs.

Second, at the same time that the needs were higher, the general government ceased to be able to tap financial markets to raise funding. In fact, there were net flows from the general government to the rest of the world in 2010, contrary to previous years, indicating the inability to issue debt securities in foreign fixed income markets together with the regular amortisation scheduling.

Third, the financial sector stepped in and most of the funding provided by financial corporations – chiefly by MFIs but also, albeit to a lesser extent, by non-deposit taking corporations – was channelled to the general government instead of to NFCs as before. The considerable change in the recipients of the domestic financial corporations' intermediation is particularly interesting to notice. In other words, domestic credit was diverted to the public sector and became less available to the private sector, which resembled a sort of crowding out effect.

Chart 3

FLOW OF FUNDS OF THE PORTUGUESE ECONOMY, 2010 (IN % OF GDP)



Source: Banco de Portugal and Instituto Nacional de Estatística
Note: NFC - non-financial corporations; FC - financial corporations; GG - general government; HH - households; RoW - rest of the world

Furthermore, rather surprisingly, NFCs became net lenders of the financial sector in 2010 – mainly on the back of reductions of previously obtained loans, which were larger than the decrease of deposits. At the same time, they were also able to raise a substantial share of their funding directly from non-residents, thus effectively bypassing the intermediation of the resident bank system, which was able to raise less funds from abroad than before the crisis. This was however likely the case mostly for large corporations which already had access to international markets – the access to funding of small and medium enterprises (SMEs) remained severely constrained.

a) 2011 and 2012

The third and final period begun in 2011 and was mostly influenced by the start of the Portuguese external financial and economic assistance programme. As before, there were three main developments that took place and which once more led to significant changes in funding patterns (see Chart 4).

First, the start of the financial assistance programme is mirrored in the net funds being channelled from the rest of the world directly to the general government sector. In this sense, inflows of official origin associated to the disbursements under the financial assistance programme replaced the previous inflows coming from private sources, impaired with the disruption of international financial markets.

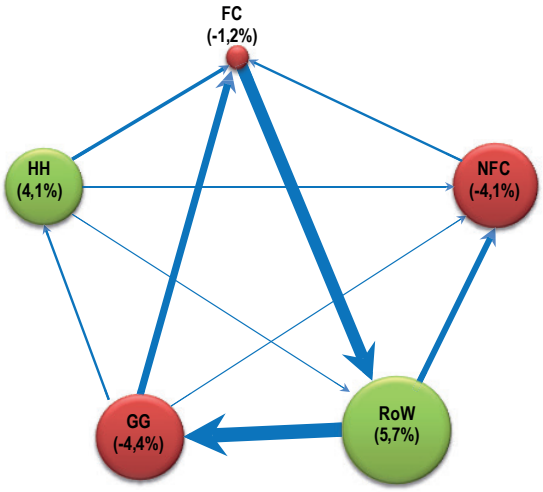
Second, the general government became a net lender of the financial sector. This was mainly on the back of the State support to banks as well as the placement of non-used funds from the financial assistance programme. The general government sector then turned into the *de facto* financial intermediate of the Portuguese economy, channelling the funds received from abroad to all resident sectors, mostly to the financial sector.

Third, MFIs and non-deposit taking financial corporations carried out intense sales of foreign assets in a context of both funding strains and regulatory indications for balance sheet restructuring, which largely involved stepping out of non-core markets and activities and the maintenance of programs to reduce credit exposures. Notwithstanding, an important movement in the opposite direction was the funding provided by the Eurosystem – largely channelled from the rest of the world to the national monetary authority under the so-called TARGET2 system –, which only partially made up for the outflows associated to the aforementioned

deleveraging process. This highlights the need to look not only at net flows but also gross flows, as the former, in some cases, might mask developments in the latter; this point will be taken up again later.

Chart 4

FLOW OF FUNDS OF THE PORTUGUESE ECONOMY, 2011 (IN % OF GDP)



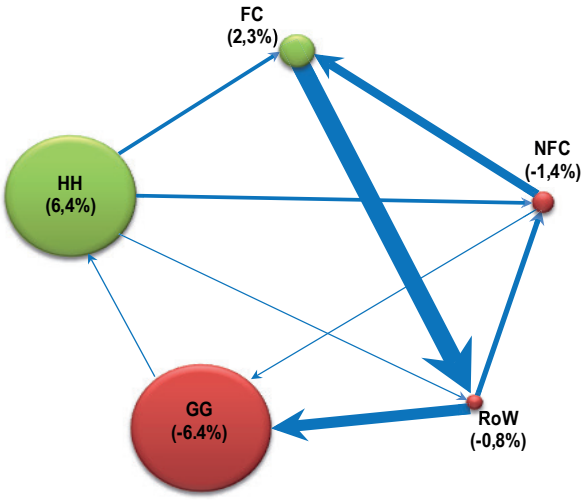
Source: Banco de Portugal and Instituto Nacional de Estatística
Note: NFC - non-financial corporations; FC - financial corporations; GG - general government; HH - households; RoW - rest of the world

Events in 2012 were qualitatively very much in line with those of 2011. Net flows from the financial sector to the rest of the world increased as the deleveraging of the financial sector *vis-à-vis* the rest of the world deepened in 2012 and the Eurosystem funding lost momentum. At the same time, foreign inflows into the general government moderated. Moreover, abating State aid flows to support troubled banks contributed to the general government becoming a net borrower of the financial sector instead of a net lender.

The combination of these two effects – *i.e.*, (i) lower inflows into the general government due to lower overall funding needs and (ii) higher outflows from the financial sector – led to a further important development, which is the shift of the rest the world from net lender to net borrower of the Portuguese economy (see Chart 5). On the non-financial side, this was mirrored in the sharp narrowing of the external current account deficit – and therein, in the trade balance – which eventually turned into a surplus.

Chart 5

FLOW OF FUNDS OF THE PORTUGUESE ECONOMY, 2012 (IN % OF GDP)



Source: Banco de Portugal and Instituto Nacional de Estatística
Note: NFC - non-financial corporations; FC - financial corporations; GG - general government; HH - households; RoW - rest of the world

4 DISCUSSION

The previous analysis shows how flow of funds data provides a clear insight of inter-sectoral relationships. Notwithstanding, an important point that should also be dully considered – and which can be applied to different contexts – is the need to be careful when looking at net figures. *Obstfeld* (2012) discussed how net and gross balance of payments flows should be used in a complementary way. Forbes and Warnock (2012) reassessed the literature on capital flows and surges using gross flows instead of net flows and arrived at the conclusion that previous studies were not capturing many of these episodes because they were focusing only on net flows. Furthermore, these considerations are not specific to financial flows, they also apply to financial stocks. In fact, financial stability and macroprudential authorities are increasingly focusing their attention on gross exposures – at the individual and aggregate levels – acknowledging possible channels liable to cause disruptions due to mismatches. Examples of the latter are short-term liabilities, especially if denominated in foreign currencies, which may be difficult to roll over and refinance in periods of elevated risk aversion and events of market disruption. One consequence of this is that even countries with net surplus positions might run into funding strains on account of the size and structure of their balance sheets.

Coming back to the particular case of Portugal, while strictly looking only at net flow figures in 2012 leads to the conclusion that the country was financing the rest of the world, in fact the country benefited from official funds to stay afloat, pertaining to both the financial assistance programme – which has already two years of existence and will run until mid-2014 – and Eurosystem liquidity provision. In other words, despite being a net lender of the rest of the world, Portugal is not financially self-sufficient.

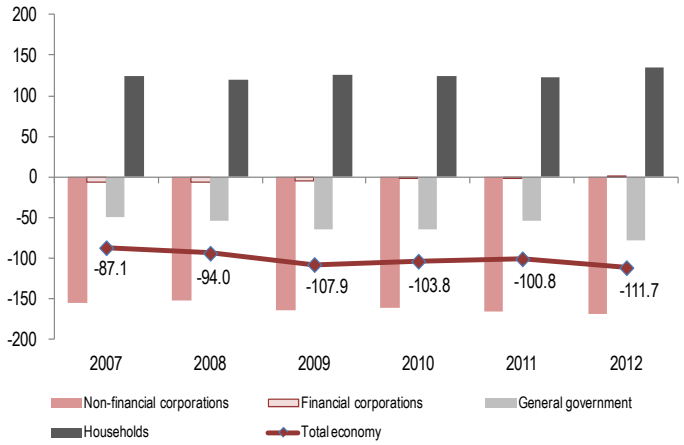
A key element to understand the nature of the funding strains is the rapid build up of substantial inter-sectoral financial exposures and especially between the domestic sectors and the rest of the world. Chart 6 shows that financial wealth – the net financial asset position of a given sector, *i.e.*, the difference between the stock of assets and liabilities – was close to -112% of GDP by the end of 2012. Most of the overall negative net financial asset position was driven by the NFCs. The general government also had a negative net financial asset position which, although being considerably smaller, has grown

significantly over the past couple of years, despite the sharp drop in market prices of the general government debt securities. Moreover, these two sectors were only partially offset by the household sector stock. Finally, the financial sector had a virtually zero position, which is in line with its intermediation role.

This clearly shows that the past accumulation of imbalances – not only *vis-à-vis* the rest of the world but also within the economy – is determinant for the current situation. Therefore, monitoring imbalances is an essential feature for policy analysis and guidance.

Chart 6

FINANCIAL WEALTH OF THE PORTUGUESE ECONOMY, 2000s (IN % OF GDP)



Source: Banco de Portugal and Instituto Nacional de Estatística

5 CONCLUSIONS

This article provides an analysis of recent developments in the inter-sectoral relationships of the Portuguese economy, especially in light of the global financial crisis and the sovereign debt crisis.

Flow of funds is a very useful framework in this context as it provides a unique way of looking into developments in the build-up to the crisis and since its outburst. Moreover, although the emphasis on this article was on financial saving, many other alternative uses[7] of these data – out of the scope of this article – are available such as, for instance, exploring the available breakdowns of financial instruments.

Furthermore, the analysis should be complemented with other data and sources. In particular, as stressed, one should be aware of the limitations of looking at net flows and should also consider gross flows. Gross flows and positions are fundamental in assessing imbalances and different types of mismatches which, at the current juncture, seem to play a significant role in explaining funding conditions of the (Portuguese) economy.

7 See also SNA2008, §27.9, §27.23, §27.37

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ANNEX I

Table I.1

WHO-TO-WHOM MATRIX OF THE PORTUGUESE ECONOMY, LOANS, 2012 (EUR MILLION)

CREDITOR SECTOR \ DEBTOR SECTOR	Non-financial corporations	Monetary financial corporations	Other financial intermediaries	Insurance companies and pension funds	General government	Households	Rest of the world
Non-financial corporations	0	6 706	2 132	0	-1 347	-308	555
Monetary financial corporations	-6 706	0	13 718	-245	-2 178	-5 129	249
Other financial corporations	-2 132	-13 718	0	0	2 771	-2 060	-254
Insurance companies and pension funds	0	245	0	0	0	-13	43
General government	1 347	2 178	-2 771	0	0	39	-26 719
Households	308	5 129	2 060	13	-39	0	-4
Rest of the world	-555	-249	254	-43	26 719	4	0

Source: Banco de Portugal

Table I.2

WHO-TO-WHOM MATRIX OF THE PORTUGUESE ECONOMY, DEPOSITS, 2012 (EUR MILLION)

CREDITOR SECTOR \ DEBTOR SECTOR	Non-financial corporations	Monetary financial corporations	Other financial intermediaries	Insurance companies and pension funds	General government	Households	Rest of the world
Non-financial corporations	0	-6 159	0	0	236	0	1 601
Monetary financial corporations	6 159	0	-574	-1 003	-1 351	1 137	10 313
Other financial corporations	0	574	0	0	12	0	-461
Insurance companies and pension funds	0	1 003	0	0	0	0	9
General government	-236	1 351	-12	0	0	1 648	-113
Households	0	-1 137	0	0	-1 648	0	-833
Rest of the world	-1 601	-10 313	461	-9	113	833	0

Source: Banco de Portugal

VI COMPILING STATISTICS: SPECIFIC CASE STUDIES

PROFITABILITY IN THE MANUFACTURING SECTOR IN PORTUGAL: EVIDENCE FROM MICRO-DATA[1*]

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ABSTRACT

Using data from the Central Balance-Sheet Database of the Banco de Portugal this paper evaluates the evolution of the profitability of the manufacturing sector over the period 2008-2011. This time-frame allowed us to assess the impact of the economic crisis in this sector's performance. The study was performed at the NACE Rev.2 Division level, enabling the analysis of the various manufacturing activities.

The paper found relevant profit persistence in manufacturing, as well as a high level of profitability in the pharmaceutical industry. A recovery in the profitability of traditional industries such as textiles, apparel and leather products was also found.

***Keywords**: Manufacturing, micro-data, profitability, transition matrices*

1 INTRODUCTION

In the last decades the manufacturing sector lost relevance in the Portuguese economy, mostly to the services sector. However, the economic crisis has led to a renewed interest in this sector as it can boost the economic recovery, mainly due to its impact on exports (European Commission, 2012).

Although there are already some detailed studies regarding this sector (*e.g.* Banco de Portugal, 2012), it is important to deepen such analysis in order to provide more detailed information. This paper uses individual company data to assess how manufacturing profitability is being affected by the economic crisis.

2 MANUFACTURING PROFITABILITY

2.1 Macro analysis

The average profitability of the manufacturing business sector, measured by the profit margin, increased 0.1 p.p. between 2008 (1.5%) and 2011 (1.6%). Compared to the non-financial corporations' total, this profitability moved from being 0.3 p.p. lower to 0.1 p.p. higher. During this time-frame, thirteen activities

1 This paper is part of a larger project on the Portuguese non-financial corporations' profitability. The authors are grateful to Mário Lourenço, Vítor Silveira and Filipa Lima for their valuable comments.

* *XX Jornadas de Classificação e Análise de Dados* (JOCLAD 2013)

reduced their average profitability, while eleven maintained or increased their performance. The variation ranged from -9 p.p. in *NACE 30 - Manufacture of other transport equipment* to +4.2 p.p. in *NACE 11 - Manufacture of beverages* (details on NACE classification are available in EUROSTAT, 2008).

Performing the same analysis using median values allowed us to identify some important biases caused by larger companies. For instance, while in average *NACE 30* - Manufacture of other transport equipment's profitability fell sharply, in median terms it increased (0.5 p.p.). This type of result highlights the heterogeneity between firms operating in the same activity and the need to go deeper into individual company data.

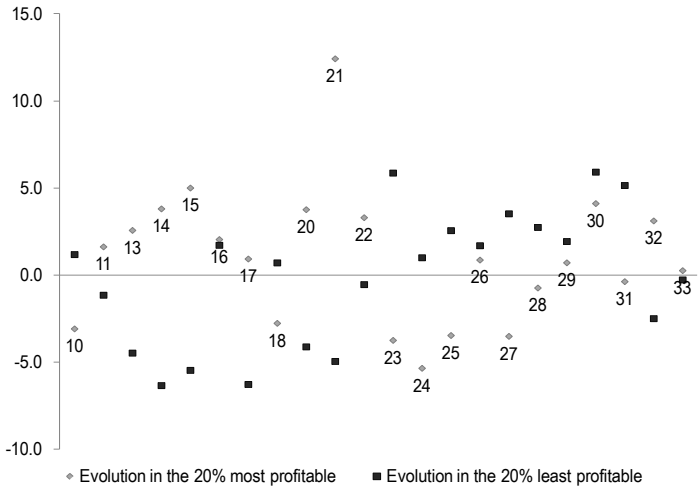
2.2 Micro analysis

As a first step to overcome the mentioned bias and understand in detail which activities performed better we selected the 20% most profitable companies and the 20% least profitable companies in manufacturing, both in 2008 and 2011. Firms were then grouped by NACE in order to allow the identification of the activities with more companies in each class.

Chart 1 shows that between 2008 and 2011 *NACE 21 - Manufacture of pharmaceutical products* had the best relative performance in this indicator. In 2008, more than 29% of the firms operating in this activity were among the most profitable in manufacturing. In 2011 that share rose 12 p.p. to 41%. Moreover, its share of low profitable firms decreased 5 p.p. (19% in 2008 to 14% in 2011). This is even more noteworthy if we notice that average profitability has decreased in this sector. Traditional manufacturing activities in Portugal, like *NACE 14 - Manufacture of wearing apparel* and *NACE 15 - Manufacture of leather and related products* also present improvements.

Chart 1

DIFFERENTIAL BETWEEN THE SHARE OF THE 20% MOST (LEAST) PROFITABLE FIRMS IN 2011 AND 2008, BY NACE DIVISION (P.P.)



NACE division 12 and 19 are not shown because they gather a reduced number of firms

On the opposite side, *NACE 23 - Manufacture of other non-metallic mineral products* stands out with a decrease of 4 p.p. in its share of high profitable firms and an increase of 6 p.p. in its share of low profitable firms.

2.3 Profit persistence

In order to have a better idea about the mobility and persistence of a company's profitability, transition matrices were calculated. The results suggest there is a high degree of persistence of profitability, with nearly 34% of the companies remaining in the same quintile in both periods. Also, mobility from one quintile to the neighboring quintiles is greater than to more distant ones: 18.4% climbed to the next quintile and 15.7% dropped to the class below.

Table 1 shows the proportions of firms that moved from one quintile to another over the period under analysis. The principal diagonal gives the proportions of firms in a particular part of the distribution that remained in that same quintile in both periods.

Table 1

TRANSITION MATRIX FOR MANUFACTURING PROFITABILITY

2008 \ 2011	[0-20th percentile]	]20-40th percentile]	]40-60th percentile]	]60-80th percentile]	]80-100th percentile]
[0-20th percentile]	**41.4%**	21.2%	9.5%	10.4%	17.6%
]20-40th percentile]	19.6%	**25.6%**	27.2%	16.4%	11.2%
]40-60th percentile]	14.3%	19.0%	**31.0%**	24.1%	11.6%
]60-80th percentile]	12.0%	18.0%	20.5%	**29.9%**	19.5%
]80-100th percentile]	12.7%	16.2%	11.8%	19.2%	**40.1%**

Persistence among very profitable (top quintile: 40.1%) and very unprofitable companies (bottom quintile: 41.4%) is stronger than for other firms. This evidence suggests that low profitability firms face serious difficulties to improve their performance while, on the other hand, top performing companies tend to sustain higher profitability over time.

Nonetheless, although relatively small in number, there are companies who are climbing (dropping) several classes between the two periods under analysis. *NACE 21 - Manufacture of pharmaceutical products* and *NACE 15 - Manufacture of leather and related products* stand out, as 19% of their companies went up by two or more quintiles between 2008 and 2011, while only less than 9% did the opposite transition. On the negative side, *NACE 27 - Manufacture of electrical equipment* had 20% of its firms going down two or more classes, while only 10% followed the opposite path.

It should be noted that this analysis may be to a certain extent affected by changes in the number of firms within each NACE and by the distribution of the profit margin across the manufacturing sector.

3 CONCLUDING REMARKS

Average indicators show that profitability in manufacturing, measured by the profit margin, was not much affected by the economic crisis. However, average values hide important heterogeneities within firms and activities.

This can be observed in the case of *NACE 21 - Manufacture of pharmaceutical products*, where the average profitability went down by 1 p.p. between 2008 and 2011, but, at the same time, its share of firms among the most profitable in manufacturing rose 12 p.p. and its share on least profitable dropped 5 p.p.. This proves the importance of exploring micro data in order to get a better idea of what is really happening with most firms within a business segment.

The results presented in this study highlight the fact that some traditional manufacturing industries in Portugal, like *NACE 13 - Manufacture of textiles*, *NACE 14 - Manufacture of wearing apparel* and *NACE 15 - Manufacture of leather and related products*, are also showing some signs of resilience to the economic crisis in terms of profit margins.

Finally, we also found evidence of profit persistence in manufacturing, which seems to be stronger among very profitable and very unprofitable companies.

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VI COMPILING STATISTICS: SPECIFIC CASE STUDIES

PENSION LIABILITIES IN A CONTEXT OF AN AGEING POPULATION: THE PORTUGUESE CASE*

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1 INTRODUCTION

Over the centuries the world population has changed! The 20th century was characterised by an enormous population growth which increased from 1.6 to 6.1 billion. According to the United Nation´s population estimates, the 21st century will be characterised by a global population ageing, with the proportion of people above 60 years old increasing from currently 10% to 25%-45% by 2100. Acceleration in the speed of population ageing is expected over the coming decades. This trend is not, however, homogeneous in all countries. In fact, today we live in a demographically divided world with some regions, namely African and Arab countries, growing very fast, while other regions like Europe, East Asia and North America age rapidly.

To cope with ageing problems, some European Union (EU) countries are promoting reforms to provide a sustainable social security for the next decades. Portugal also faces this challenge, as its population is ageing fast.

This paper examines the economic effects of population ageing, namely in the estimation of pension liabilities. After the introductory section, section 2 provides information on the demographic trends and the economic impact for the European countries, with some references to the international context. Section 3 provides a detailed characterisation of the ageing process in Portugal and the impact on households' pension entitlements or employers' liabilities and, in this context, the measurement of Portuguese pension entitlements is described. Section 4 concludes.

2 AGEING IN EUROPE: TRENDS; ECONOMIC IMPACTS

2.1 Demographic trends

According to the World Bank estimates, in July 2012 the world population accounted for 7,022 million individuals. As the world's population grows, it is also ageing, in particular in developed countries. By

* OECD - Australian Bureau of Statistics, Workshop on Pensions

2050, the world population of those over the age of 60 is projected to triple, reaching 2 billion people.

Ageing is a phenomenon which affects all European Member states and is characterised by two main factors. According to Mink (2008), one is the increase in life expectancy, which is expected to rise in the euro area by a further six years for men and five years for women by 2050. The main reason behind the longer lives is a lower mortality rate at older ages. A second factor is related to the decrease of women´s fertility rate. A "baby-bust" phenomenon followed the "baby boom" of the post-World War II. In all euro area countries, fertility rates are below the natural replacement ratio at which the size and age structure of the population remain stable. This situation leads to an increase in the old age dependency ratio, measuring the population aged 65 and over as a percentage of the population aged 20-64, which, according to Eurostat projections, will reach almost 60% in 2050, comparing to 30%, approximately, in 2005.

2.2 Economic impacts

In most European countries, pension systems are characterised by public schemes predominantly of a *pay-as-you-go* (PAYG) type. The PAYG systems levy social contributions on the working population, while paying benefits to the retired, but usually without the close person-based relationship between individual contributions and benefits that characterizes fully funded schemes. When there are no ageing problems in a PAYG system, low contribution rates are sufficient to cover benefits of a relatively small number of beneficiaries, but as the scheme matures, benefits paid out tend to exceed contributions (Jaeger and Chand (2008)). This requires increases in social contributions, or budget transfers. Considerable additional deficits are likely to emerge under PAYG systems, as the proportion of the retired rises.

The ageing of population has, therefore, some important economic consequences. These demographic effects have implications in many economic areas, as in the labour market and in the budgetary framework. With respect to the labour market, size and composition of labour supply will be affected. The proportion of older workers increases and fewer new workers enter in the labour market. According to the European Commission, the employment rate of older workers for the EU25 is projected to massively increase from 47% in 2010 to 59% in 2025. Under the assumption of unchanged labour productivity growth, demographic trends imply a decline in real GDP growth from its average 1995-2005 level of 2.1% to around 1% by 2050. The real GDP per capita growth will also decline.

Ageing will also pressure government financing, ageing related expenditure will increase budget deficits related to social expenditures, such as pensions, health care and social assistance.

According to the European Central Bank, for most euro area countries, in the absence of any reform, the demographic change will cause an increase of 3 percentage points (p.p.), approximately, in GDP due to pension expenditures in 2050.

The economic and social concerns of ageing for the European economies are being discussed in the literature. Population ageing will emerge as a key trend in Western economies over the next decades. Its impacts in economic and social developments will be of utmost importance in the near future. Population ageing will contribute to a reshaping of the labour force. However, it will also lead to an increase in dependency ratios and, consequently, in the average marginal propensity to consume, shifting saving/consumption decisions and having an impact in the global saving and investment balance. According to Merola and Sutherland (ECB, 2012), the ageing trend will simultaneously increase age-related public spending and narrow the tax bases, raising issues on the sustainability of public debt.

The ageing trend is likely to drive a protracted reduction in saving ratios in Western economies, which relied significantly on the saving for retirement by the baby-boom generation. The decline in savings will determine an increase in worldwide real interest rates with non-negligible impacts in global investment and technical progress, limiting potential output growth. Given the public nature of most pension systems, imbalances in the social security are a contingent claim on government revenues, thereby playing a key role on debt sustainability.

According to Braz *et al*. (2013), population ageing phenomena will be even more important for European Union economies, in particular for those in the euro area, which are subject to a common monetary policy. In this framework, a widening of the macroeconomic imbalances cannot be discarded, given that ageing trends and impacts are unlikely to be identical across member states and policy responses may differ, reflecting country-specific fiscal policy features. This suggests that a coordinated policy response would be key in fostering economic and financial stability in the euro area.

3 STYLISED FACTS FOR PORTUGAL

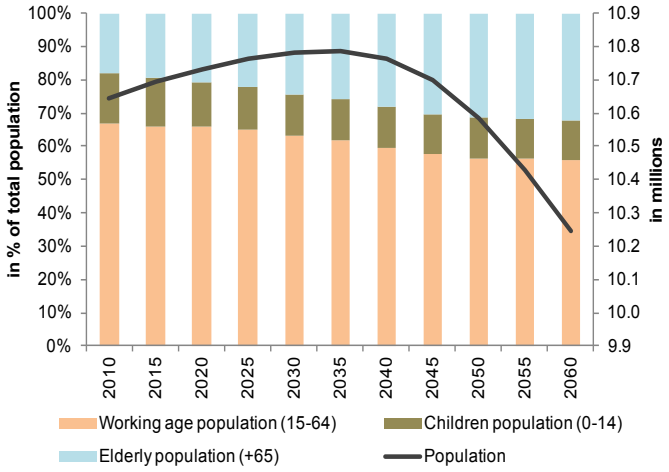
3.1 Demographic trends

According to the 2012 "E*conomic and budgetary projections for the EU-27 Member States (2010-2060)*", the ageing of Portuguese population is mainly caused by lower fertility rates. In fact, Portugal was one of the countries which had the lowest observed fertility rate in 2010 and also the lowest projected one for 2010-2060. According to the estimates, a decrease of total population is projected for this period and the ratio of elderly population will increase. The old age dependency ratio (+65 years old) is estimated to increase from 29% in 2010 to 62% in 2060.

Chart 1 shows this demographic path. There is an increase of the elderly population (above 65 years old) and a decrease of the working age population (15-64). At the same time, total population is projected to diminish from around 10.6 million in 2010 to 10.2 million in 2060.

Chart 1

DEMOGRAPHIC TREND FOR PORTUGAL



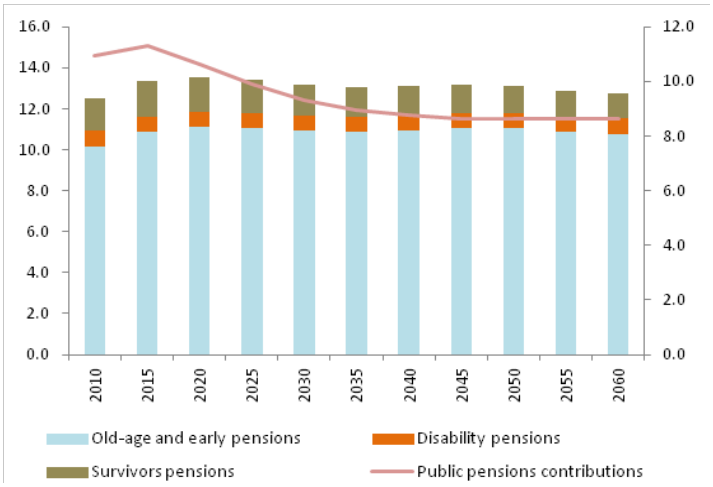
Source: 2012 "Economic and budgetary projections for the EU-27 Member States (2010-2060)"

3.2 Economic impacts

The increase of ageing population in Portugal will lead to a deficit between social contributions and social benefits in the social security system. Chart 2 shows an increase of the old-age pensions for the period 2010-2060, and disability and survivors pensions remaining stable along this period. Total public pension contributions tend to decrease as there are less working people contributing to the pension scheme.

Chart 2

MACROECONOMIC PROJECTIONS FOR CONTRIBUTIONS (LEFT-AXIS) AND FOR PUBLIC PENSIONS (RIGHT-AXIS) IN PORTUGAL (AS % OF GDP)



Source: 2012 "Economic and budgetary projections for the EU-27 Member States (2010-2060)"

3.3 Statistical measurement of pensions

To measure the economic impacts of ageing, statistical data plays an important role, in particular for quantifying the impact of ageing on pension households' entitlements or employers' liabilities, which is a crucial tool to help policy makers in their decision-making process.

In the context of the revision of the European System of National and Regional Accounts (ESA), a *Contact Group* (CG) on *the statistical measurement of the assets and liabilities of pension schemes in general government*, was established by the Committee of Monetary, Financial and Balance of Payments Statistics (CMFB) in 2008. Within this framework, a Supplementary Table was required to be fulfilled with the aim of identifying the opening and closing stocks of pension entitlements of all social insurance pension schemes (including social security) and the transactions and other economic flows during the period that account for the difference between the opening and the closing positions. Within the discussion of the new international statistical standards, one issue concerned the degree of harmonisation in the recording of pension entitlements in the national accounts, when the underlying institutional reality differs significantly across countries. Pension assets (or future rights) in countries with mainly capitalised systems are recorded as household wealth, while future pension rights in countries with government managed *pay-as-you-go* schemes are not recorded. Consensus was reached on distinguishing pension schemes managed by general government which should be recorded in the core national accounts, from those schemes that should be recorded only in a new Supplementary Table on pensions (like social security schemes).Portugal was a member of this Contact Group and efforts have been developed in order to estimate its pension liabilities. With this purpose, a contract between Banco de Portugal and the *Research Center for Generational Contracts of the Albert-Ludwigs Universität Freiburg* was signed to develop a report and an estimation for the Portuguese pension liabilities or entitlements: "E*stimating pension entitlements of government employer and social security pension schemes in Portugal*". This model was developed in conformity with the recommendations of the CG for the calculation of pension entitlements of EU countries.

Pension entitlements estimates were provided by an actuarial cross section country model based on the following assumptions: the accrual estimation of the pension entitlements were obtained under the accrued to date gross liabilities approach of the government pension schemes; the Projected Benefit Obligations

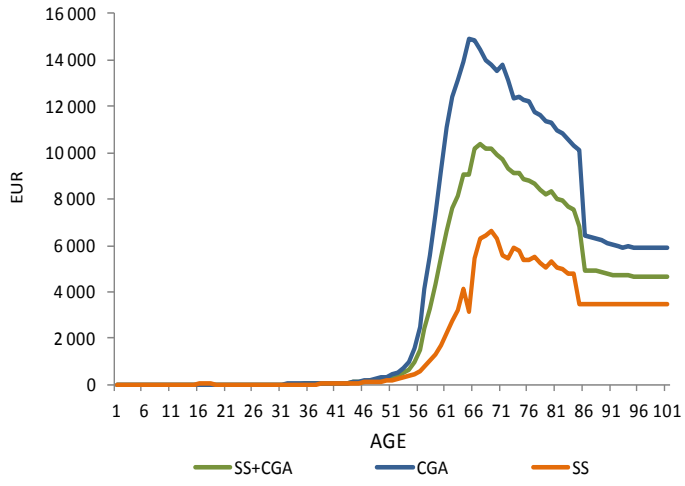
(PBO) approach was considered - which assumes a non-zero (usually positive) future development of real wages, unlike the alternative Accumulated Benefits Obligation (ABO) approach considering zero future changes in real wages only taking account of wages' growth due to inflation; the GDP growth rate was assumed to be 1.7% for Portugal, according to the Ageing Working Group assumptions (2007-2060); wages were expected to grow at a rate of 1.5%; the discount rate was considered to be 3%, which corresponded to the ten year average of Euro area ten-year government bond yields; the employment rate was assumed to be constant; the demographic assumptions relied on the EUROPOP2008 figures for mortality and fertility rates (migration was ignored); the estimation work and the formulation were supported and developed by a *Matlab* programme.

Population data used for the estimations consisted of several indicators, namely: number of pensioners in the base year and their development over the comings decades. Other indicators like fertility rates, mortality rates and life expectancy were derived from EUROPOP projections. Population contributors and beneficiaries were reported by Social Security and Civil Servants' pension scheme, broken down by type of pension (old age, survivors and disability).

Chart 3 illustrates the projection of the age-gender specific pension profiles for the Civil Servants' scheme (*Caixa Geral de Aposentações* - CGA) and Social Security scheme (*Segurança Social* - SS).

Chart 3

PENSION PROFILE OF CGA AND SS, AVERAGE BENEFIT PER PARTICIPANT (2011, IN EUR)



Source: Own calculations by Banco de Portugal

This profile reflects old age, survivors and disability pensions. There is a drop of benefits mainly for male cohorts aged 65 and older. Under this model the actual pension payments and the present value of pensions to be paid in the future are calculated on the basis of accrued rights; no rights may be accrued after the base year - neither by present nor by future workers.

The core presumption is a projection of per capita future pension benefits based on today´s existing retirees´ benefits. The profile was obtained using information on average pension payments and beneficiaries, under the formula using micro pension data:

$$PRF_{b,k} = \sum_{k=1}^{101} \frac{Benef_b}{Pop_{b,k}} p_{b,k}^{avg}$$

where $PRF_{b,k}$ represents the average profile, $P_{b,k}^{avg}$ the average pension payments to the number of beneficiaries $Benef_b$ and $Pop_{b,k}$ the population for a specific cohort *K* and base year *t*.

As stated in Müller, C. *et al.* (2009), the accrued-to-date liabilities of the base year *b* of the pension scheme, ADL_b are calculated according to the following formulation:

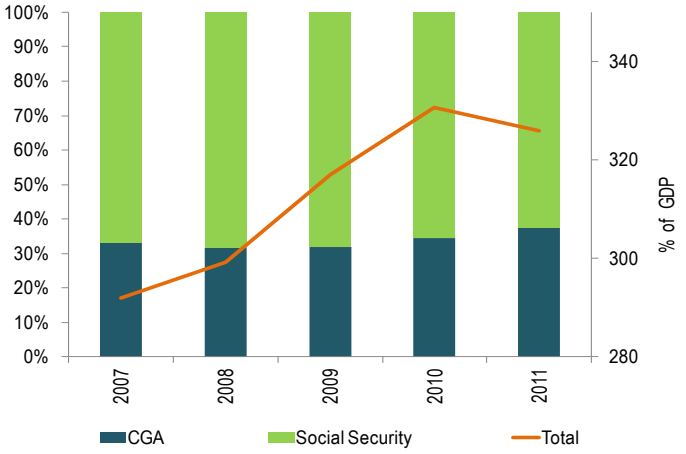
$$ADL_b = \sum_{t=b}^{b+D} \sum_{k=b-D}^{b} \frac{\left(p_{t,k}^{exist} + p_{t,k}^{fut}\right)}{(1+r)^{t-b}} C_{t;k}$$

This means that in every period *t*, the existing retirees' pension benefits $P_{t,k}^{exist}$ and the pension rights accrued until the base year $P_{t,k}^{fut}$, which are both discounted by the factor (1+*r*) for every future year *t - b,* are multiplied by the number of members of the age cohort $C_{t,k}$. This is done for every age-group, beginning with the ones born in *k=b-D*, which goes back 100 years prior to the base year.

The estimation of pension entitlements or liabilities obtained under the Freiburg Model for Portugal is plotted in Chart 4. Total pension liabilities increased between 2007 (292% of GDP) and 2010 (331% of GDP). In 2011 there was a slight decrease in pension liabilities (reaching 209.3 billion euro for the civil servants' pension scheme and 348.2 billion euro for the Social security general scheme, representing, respectively, 122% and 204% of GDP, summing up to 326% of GDP).This can be associated with the reduction in wages which occurred in this year. Between 2007 and 2011, Social security´s liabilities represented almost 70% of total pension liabilities.

Chart 4

PENSION LIABILITIES FOR PORTUGAL: 2007- 2011



Source: Own calculation by Banco de Portugal

These results are linked to the fact that in Portugal, the main system is PAYG and the population is ageing, which pressures, from a long term perspective, the pension system.

In this regards, some reforms were taken in 2002. The Government introduced a new benefit formula for old age pensions in order to take into account individual lifetime contributions. Under the old calculation formula, the best 10 years out of the last 15 years were considered and an accrual rate of 2 per cent was applied irrespective of the length of the workers career. Under the new formula lifetime wages (up to a maximum of 40 years) are accounted for and accrual rates (ranging from 2 per cent and 2.3 per cent) are set according to the workers' wages and the length of their contributory career. These new rules will not only lead to a stronger link between contributions and benefits, but also to a reduction of future pensions.

Additionally, in 2006, a tripartite agreement on the reform of social security was signed, enabling the introduction of new measures and the reinforcement of the measures already taken in 2002. In fact, due to the long transition rules established within the 2002 reform, the expected impact upon the social security system would be very slow. In that sense, one of the measures taken in the 2006 reform was the introduction of new rules enabling an anticipation of the transition to the new pension benefit formula. Another significant measure was the establishment of a new rule regarding the annual increases of pensions, abandoning the indexation to the national minimum wage in favour of indexation to Consumer Price Index, as well as to the real Gross Domestic Product growth. Another significant step taken in 2006 was the introduction of a sustainability factor which adjusts pensions (from 2008 onwards) in accordance with changes in the life expectancy. Other measures introduced within the 2006 reform consisted in: reinforcing the mechanisms for the protection of long contributory careers; introducing a ceiling to higher pensions; and promoting active ageing (giving bonuses to those who decide to extend their working lives beyond the legal retirement age and increasing penalties for early retirements).

Pension reforms that have been legislated during the last years in Portugal are one of the main factors responsible for the revisions of projected changes in pension expenditure over the long term. However, changes in the demographic and macro-economic assumptions may as well have influenced this result.

4 MAIN CONCLUSIONS

In the last years population has been ageing in all European countries. This demographic trend urges structural reforms. In Portugal, governments took some reforms especially between 2002 and 2006, to improve the financing of the future pension expenditure.

The national accounts' Supplementary Table on pension may be a crucial tool to provide information on pension liabilities, since it provides enriched information, allowing consistent comparisons between private and general government pension schemes and permitting evaluate pension liabilities among between countries. The corollary of this additional information should be the development of some effective policies to promote a sustainable social security system, namely across Europe.

Countries should be aware of the consequences of the ageing process and policy makers should keep in mind that the main challenge of the policy reforms and efforts to maintain a sustainable pension system is to ensure that the demographic trends promote sustainable economic growth, ensure international security and allow for the values of democracy and human rights.

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