Exploring the statistical potential of micro-databases

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1. Introduction

Monetary and financial statistics provide valuable input to the decision-making process by both national central banks and governments and are pivotal in research and analysis on the activity of the different economic and financial agents.

Producing high-quality and timely monetary and financial statistics is a key responsibility of national central banks. Ensuring that these statistics remain fit-for-purpose implies keeping pace with financial innovation, assessing the statistical impact of innovations at the earliest possible stage and making the necessary amendments in a well-timed manner, if possible without overburdening the reporting agents and by making a more efficient use of the data already available. In recent years, new ways of collecting data and compiling statistics have been implemented with a view to meeting the users' growing need for real-time, detailed, coherent, reliable and comparable data.

The financial turmoil of 2007–2009 highlighted potential (and actual) gaps in the statistical framework, at both national and international level. In particular, the crisis revealed important gaps in information for the purposes of financial stability analysis, namely concerning counterpart data. The development of micro-databases and administrative records[2] reporting can make a major contribution to overcoming some of these shortcomings (see also D'Aguiar and Lima, 2009). They permit us to develop knowledge about the activities of economic and financial agents at a more detailed level and allow for the drawing of conclusions that would not be possible should one rely solely on aggregated data. Micro-data, as a set of administrative individual registers, have a huge potential for statistical use.

Banco de Portugal has developed and manages several databases that have proved to be of paramount importance in monitoring and assessing developments in the Portuguese financial system, especially at the present conjuncture. This paper offers a practical example of *Banco de Portugal*'s experience in using micro-databases and item-by-item reporting for statistical purposes, highlighting the advantages of this approach as regards financial innovation, and reducing the data gaps evidenced by the recent financial crisis. Empirical evidence focusing on securities statistics is included.

The remainder of this paper is structured as follows: Section 2 briefly describes the micro-databases used by *Banco de Portugal* in the production of statistics; Section 3 explains the valuable contributions of micro-databases in a financial crisis context; Section 4 provides some empirical evidence concerning micro-databases on securities; Section 5 concludes.

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[2] In this paper, "administrative records" are taken to be *"information that is routinely collected by organizations, institutions, companies and other agencies in order that the organization can carry out, monitor, archive or evaluate the function or service it provides"* (Calderwood and Lessof, 2006).

2. Description of micro-databases developed and used by *Banco de Portugal*

In the last 10 years, *Banco de Portugal* has been developing and maintaining several databases based on item-by-item reporting, with proven results in reducing or eliminating previous information gaps. In particular, it has been exploring the statistical potential of various sources of information, including the Securities Statistics Integrated System (SSIS) database, the Central Credit Register (CCR), the Central Balance Sheet Office (CBSO) database and prudential supervision information.

For a better understanding of the way *Banco de Portugal* has been using these databases to produce statistics, I will proceed with a brief description of each of them.

2.1 The SSIS database

The SSIS database is an information system created in 1999 and managed by the Statistics Department that stores data on securities issues and portfolios on a security-by-security and investor-by-investor basis.[3] It gathers in a single database detailed data on issues and securities holders, and includes stocks and transactions of securities other than shares (short- and long-term) and shares and other equity (financial derivatives are still not included in this database, despite the pressure on the part of the users to integrate them into the reporting scheme). Both stocks and transactions are collected on a monthly basis. Information is acquired by ISIN code and afterwards is classified according to the European System of National and Regional Accounts (ESA 95) classification of financial instruments.

In the segment on issues, information is collected on securities issued by resident entities in Portugal, either issues taking place in the Portuguese market or in external markets. Data on issues are collected from several sources such as Euronext, the Securities Market Commission (SMC), the General Government, *Interbolsa*, commercial databases, etc. As regards securities portfolios, detailed information is collected on investments by residents in domestic and foreign securities, as well as on the portfolios of non-resident investors in domestic securities. This information is reported by Monetary and Financial Institutions (MFI), dealers, brokers, the SMC, and other resident entities.

On the issues side, the system allows for the collection, validation and production of statistics on securities issued by resident sectors in Portugal and abroad. On the portfolios side, the SSIS database allows for the development of statistics on MFI (MFI's securities portfolios and investment funds statistics), on the balance of payments and international investment position (b.o.p./i.i.p.) (the Portuguese portfolio invested abroad, and the foreign portfolio invested in Portugal), and on financial accounts (for the segments covering securities other than shares and shares and other equity).

The usability of this system is directly related to the data's granularity and consistency as regards financial instruments, counterparties and market concentration.

The development of the SSIS database is being done on a continuous basis, and the foreseeable enhancements include integration with the Centralised Securities Database (CSDB) managed by the European System of Central Banks (ESCB).

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[3] In the case of investors belonging to the households' institutional sector, data are aggregated by the investor's country. See Aguiar (2008) and Aguiar *et al*. (2009) for more details.

2.2 The CCR database

The CCR is an administrative database created in 1978 by *Banco de Portugal* to provide credit-related information to the participants (financial institutions) and to help them in their assessment of the risks attached to extending credit. In 1996 the use of the CCR data was extended for other purposes such as statistics, banking supervision and regulation, and economic research and policy. This database is managed by the Statistics Department.

The data reported to this database include, *inter alia*, amounts outstanding of loans granted to individuals and organisations, by type and purpose (interbank market balances are excluded), potential liabilities, type and value of collateral or guarantee securing the loan, securitised loans, syndicated loans, loans used to back mortgage bonds and other (separately identified), and credit defaults. The participants are both suppliers and users of CCR data.

This system has full coverage of the credit provided by financial institutions due to the very low reporting threshold (minimum of €50 per credit balance), and monthly credit balances are reported for each individual borrower by participants, who have the duty of reporting the individual identification of the borrowers, indicating only whether they are individuals or organisations. The more detailed sectoral classification of the borrowers within the scope of the CCR is internally established by *Banco de Portugal*, by the SSIS, thus ensuring the same high quality, consistency and flexibility of standards in sectoral classification.

The CCR database is used in the production of MFI statistics and Other Financial Institutions (OFI) statistics (in the segment on credit liabilities) and of financial accounts statistics (in the segment covering MFI and OFI credit liabilities). Furthermore, it permits further analysis of the credit data and additional breakdowns to existing statistics (such as loans granted by MFI and by OFI), broken down by type, by purpose, by institutional sector, by branch of economic activity, by region and by size), which is a main source for a better assessment of credit developments.

2.3 The CBSO database

The CBSO is a database of economic and financial information on a representative sample of Portuguese non-financial firms, developed since 1999 by the Statistics Department. The information is based on quarterly and annual accounting data of each reporting company. The data composing the CBSO database are reported by Non-Financial Corporations (NFC) under the so-called Simplified Corporate Information (SCI) system, which is a joint electronic submission of accounting, fiscal and statistical information that companies usually have to remit to the *Ministry of Finance,* the *Ministry of Justice*, the *National Statistics Office*, and *Banco de Portugal*. It allows companies to fulfil four reporting obligations through a single submission, entirely paper-free, in one moment in time.

The information available in the CBSO database has several uses related to NFC statistics. Firstly, it makes a valuable contribution to the b.o.p./i.i.p. statistics (in the segment on external trade, trade credits, direct investment, and loans granted by foreign credit institutions), and a key contribution to the financial accounts statistics (in the segment on trade credits, own funds, inter-company loans, pension funds and loans granted by private shareholders). Furthermore, it aims to contribute to a better understanding of the economic and financial situation of Portuguese NFC and provides regulators with data relevant to the pursuit of their duties, including economic analysis and financial stability analysis. The published statistics, the sector tables, and the additional use of international databases – Bank for the Accounts of Companies Harmonised (BACH) and European Sectoral References Database (ESD) – allow the development of several analyses of individual data and comparable aggregate data for the sector of economic activity/company size class, and to compare the financial performances of single firms considering their sector and size. The ratios that are produced are a source of control of the developments in NFC accounts.

2.4 Prudential supervision information

Banco de Portugal is responsible for the prudential supervision of credit institutions, financial companies and payment institutions with a view to ensuring the stability, efficiency and soundness of the financial system. The supervisory function is supported by a micro-database managed by the Banking Supervision Department that includes items from the balance sheet and income statement of each of the institutions supervised by *Banco de Portugal*.

Banco de Portugal has a long-standing tradition of fruitful cooperation between the Statistics Department and the Banking Supervision Department. In particular, the Statistics Department has access to the accounting data submitted for supervisory purposes, which allows the compilation of statistics that, besides complementing the existing ones – including statistics on Non-Monetary Financial Institutions (NMFI) – serve as an additional means to cross check their quality and internal consistency.

3. Valuable contributions of micro-databases in a crisis context

Despite the large amounts of financial data at the disposal of national central banks, the recent financial turmoil highlighted the need for initiatives aimed at improving the availability of information and overcoming possible statistical shortcomings related to the lack of an accurate view of the functioning of the economy. These initiatives should be twofold: they must allow for a better understanding of the past and, more importantly, they must provide statisticians and analysts with real-time inputs to prevent negative situations and to better tackle them beforehand. The use of administrative databases to complement traditional macro statistics, together with new data requirements and the need to minimise the reporting burden for respondents, brought to the fore the issue of further re-using and sharing of micro-data.

In a crisis context, statistical agencies are more exposed to external scrutiny and are ultimately expected to provide convincing answers to the public at large about the different economic and financial issues that need clarification. *Banco de Portugal* is by no means an exception. Since the beginning of the current financial crisis the requests to *Banco de Portugal* for additional information and analysis have been more frequent than usual and more attention has been given to its statistical output. The *Banco de Portugal* use of micro-databases is related not only to statistical purposes but also to the need to monitor and/or to assess market developments, and to trace economic scenarios. In the context of the financial crisis, these databases have proven to be an excellent way to keep track of events that would hardly have been noticed without the availability of more granular data. In practice, micro-databases on securities, credit registers, central balance sheet offices and supervisory information have the potential to make a valuable contribution to complement the data provided by the conventional statistical systems (particularly in relevant and timely statistics that may be used as early warning indicators), and to enhance responsiveness to *ad hoc* information requests from the users. Furthermore, this type of database has lower reporting and maintenance costs, provides high-quality data, is likely to give better coverage of the population, offers greater flexibility to the compilation process, and allows for the derivation of new statistical outputs almost in real time.

Going further into the details provided by micro-databases, the disaggregated data and the concomitant greater flexibility in exploring data and building statistical analysis allow further research in specific areas of knowledge and in-depth understanding of the economy (see also Lane, 2003 and 2007). Moreover, they make it possible to make more informed decisions than the ones based on estimations or forecasts. Economic and political decisions are most of the time taken on the basis of ratios and estimations derived from aggregated data, thus not taking into account important details that can only be seen at an itemised level.

Micro information has the potential to mitigate some of the information gaps so that the decision process can be optimised when the characteristics and frictions of market players are taken into account and permits analysts to calculate marginal, rather than average effects.

The micro-databases developed by *Banco de Portugal* contain detailed data on balance sheet positions of the MFI, OFI, NFC and households sectors, and allow us to analyse leverage, liquidity and market exposures in systemically important institutions with geographical, sectoral and currency breakdowns (including counterpart information). Moreover, with micro-data it is possible to have information on the main players of the Portuguese market, their financial transactions and respective impact on the economy. In particular, the CCR database is an excellent tool for carrying out structural analyses in terms of credit and detailed tests on the concentration of risk of the different economic agents.

In the wake of the financial crisis, central banks have been dedicating an increased interest to the monitoring of economic agents' risk exposures. These are not restricted to one single risk, but rather to several different risks – some of them reflected in rate spreads, others hidden in the activity and only observed with detailed analysis. With micro-data one can assess the impact of plausible but low-probability macro-financial risk scenarios on the solvency of a set of financial institutions. Indeed, by using micro-data one can assess the internal investment policy of the banks for their own portfolio, on behalf of their clients, and of large Portuguese investors, and monitor the dependence of our agents in terms of one country (country risk), the concentration of Portuguese investments in one or more countries in one specific security (debt securities, equity, investment funds shares), or the concentration of investments in one specific company. These analyses allow the central bank to manage the risk inherent to their strategy, to anticipate events on investors' holdings, to trace future problems in their accounts and, ultimately, to take remedial action in time. In practical terms, if one MFI, searching for higher returns, invests a substantial part of its clients' deposits and other funds in offshore centres or troubled economies, there is a high element of risk associated with those investments. With micro-data one can anticipate and monitor the risk of those investors and follow the evolution of those accounts more frequently (e.g. monthly), instead of having an annual aggregate.

Given the strategic importance of this type of data, the Statistics Department of *Banco de Portugal* has developed a very thorough set of procedures to ensure a high level of quality and control over the data. On the compilers side, the quality of the financial statistics, the data control checks, and the identification of inconsistencies are facilitated and enhanced if data are collected on an individual basis. Also, item-by-item reporting enables greater accuracy and better data monitoring. Once the classification of information for statistical purposes is done by the statistical experts, in line with a common methodological framework, and valuation adjustments follow uniform criteria, the data reported by the different agents are coherent and comparable, and allow for cross-checking with other data sources. On the reporting agents' side, despite the high amount of individual registers (possible due to information technology innovations), it is easier for them to report monthly granular data rather than aggregated data over a larger period of time. Once the reporting agents learn the methods of reporting and how to use the information systems to report the data, it is easier and less prone to error to send individual registers than to aggregate data according to several statistical criteria (aggregate reporting usually means a greater burden in terms of details and breakdowns to be reported every time new or additional output requirements emerge).

Another benefit of using item-by-item reporting is the contribution that some specific registers of a single database have as inputs to the development and production of other statistics (for example, registration data are useful in building and maintaining lists of units as the starting points for surveys, and transaction data can be used for new statistical products or even additional details of already existing statistics). The different areas of the Statistics Department follow pre-defined production processes and the integration of the available

databases allows for efficiency gains even in the cross-checking of data between the different areas. Moreover, the different databases follow the same classification standards, which leads to accuracy and higher integration between statistics. In addition, data from one database can be complemented with economic and financial indicators from other databases, which allows for a more complete picture of the whole economy. In this case, attention must be paid to the statistical function of *Banco de Portugal* as an important auxiliary to the supervision function. Furthermore, the SSIS and CCR databases allow us to cross micro-data and even to cross micro-data provided by reporting agents to different departments of the central bank in order to detect inconsistencies and enable a corrective action in time.

A valuable contribution of micro-data extracted from the SSIS and CCR databases is the possibility to construct the so-called “From-whom-to-whom tables”. These are double-entry tables that allow for evaluation of which institutional sectors are financing the economy, in terms of securities and credit. These tables show the holdings of various financial instruments by the different institutional sectors, on both the asset and the liability side. Their major contribution is related to the ability to simulate propagation of local shocks in the system.

Furthermore, an important point not directly related to the essence of the data but, instead, to the reporting institution is the data reported quality index. From a practical point of view, the custodians that reveal constant inconsistencies in the reported data demonstrate fragility not only in data quality but also inside the bank structure. This situation is a signal that the merging of accounts into one singular database and the transmission of data within the functional structure are not working efficiently and can lead to default and missing information from the reporting agent. When this situation occurs the technical team reviews the data sent in more detail. Several contacts are made with the institution to pose questions in order to have the best approximation to the reality and to not affect the global data.

At a global level micro-databases have been enabling the harmonisation of methodologies to compile high-frequency statistics, which is a main goal to facilitate comparison and aggregation of data across countries. In a crisis context this allows us to compile at a very detailed level the euro area statistics with a high degree of confidence. This initiative is paving the way to a global European exchange of data on loans and securities with significant value-added to the statistical function, at a more global level.

4. Empirical evidence derived from micro-databases

In this section I will provide some insight on the empirical results that can be obtained from the combination of the different databases available in the Statistics Department of *Banco de Portugal*.

4.1 Detailed analysis on a company-by-company basis

I start by an illustration at the most granular level. Contrarily to a system that stores aggregated data, micro-databases allow the construction of detailed analysis by each individual company. This analysis may consider, namely: structure of assets and liabilities (in terms of deposits, loans, securities and credit); the interlinks between domestic companies and/or with others domiciled abroad; the diversification/risk exposure of portfolio investments in different companies and countries; and the concentration in terms of sources of funding. Furthermore, it is possible to evaluate the evolution of these items over time.

As such, in addition to the aggregate values of total debt, debt-to-equity ratios and portfolio investments, which can be obtained from the macro-data, the value added from crossing

multiple micro-databases is illustrated in Figure 1, where one can see the layout of a detailed analysis that can be built on a single company basis.

Figure 1

Disaggregated information on financial assets and liabilities, by company

Information on financial assets and liabilities of Company XXX				
	Year N-1, month t-1	Year N-1, month t	Year N, month t-1	Year N, month t
Assets				
Deposits				
Resident				
Non-resident				
Debt securities				
Resident				
Company A				
Company B				
Non-resident				
Company XA				
Company XB				
Shares and other equity				
Resident				
Company C				
Company D				
Non-resident				
Company XC				
Company XD				
Trade credits				
Resident				
Non-resident				
Liabilities				
Loans				
Resident				
Bank A				
Bank B				
Non-resident				
Debt securities				
Resident				
*Company A**				
*Company B**				
Non-resident				
*Company XA**				
*Company XB**				
Shares and other equity				
Resident				
*Company C**				
*Company D**				
Non-resident				
*Company XC**				
*Company XD**				
Trade credits				
Resident				
Non-resident				

On the assets side, one can see not only the portfolio investment strategy the company is following over time but also, and most importantly, in which companies/sectors it is (dis)investing. Foreign direct investment operations can also be clearly identified. Similarly, on the liabilities side, in addition to the financing strategy the companies may have adopted (bank loans, debt or capital) it is possible to identify which entities are indeed financing the Portuguese corporations. For bank loans, we can assess the level of relationship banking established for a given company, in terms of, for example, number of creditors, concentration of banking loans, main creditor. For debt and capital issues, although to a more limited extent, it is also possible to ascertain the identity of the stakeholders for the most relevant operations, who has been (dis)investing in the Portuguese economy through the

non-financial corporations and how the domestic companies relate to each other. Interestingly, the economic relationships between different types of lenders can also be inferred, i.e., whether the main lending bank may hold other relevant positions in debt or capital issued by the company.

This type of table has been very recently developed in response to the growing data requests from the decision makers.

4.2 Understanding the interlinks within an economy

The combination of the different databases available in the Statistics Department of *Banco de Portugal* culminates in the compilation of the financial accounts for the economy as a whole including the different sectors and their interlinks.

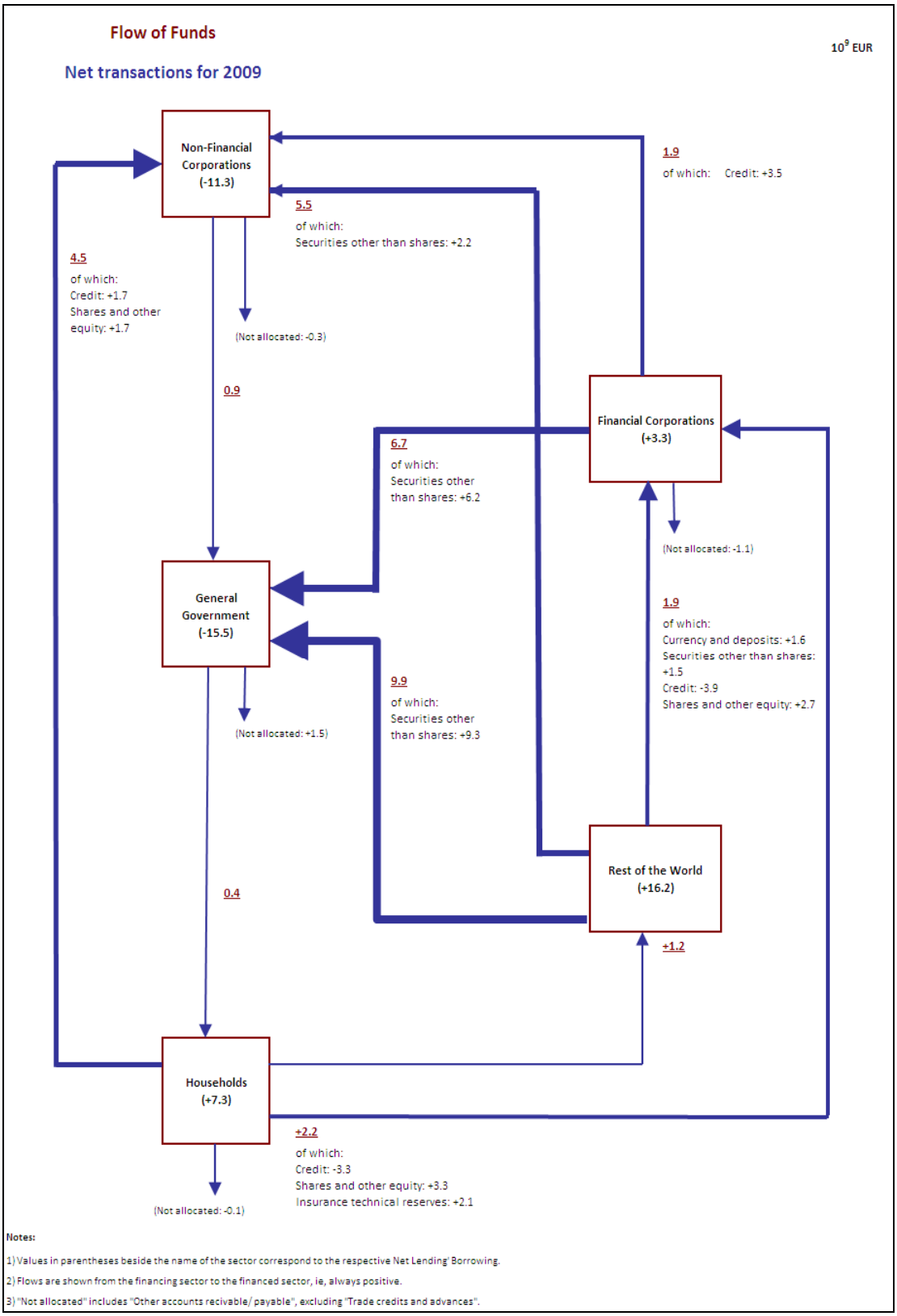
Figure 2 shows the flow of funds for the Portuguese economy, which reveals the net lending/borrowing of each sector vis-à-vis the remaining ones, including the Rest of the World (RoW). The availability of counterpart information at micro level for loans, debt securities and shares and other equity is crucial for the compilation of this exercise.

In 2009, the financing needs of the Portuguese economy amounted to 16.2 billion Euros. The main flows of capital were generated between the RoW and the General Government (GG), Financial Corporations (FC) and GG, and the RoW and NFC. The GG and the NFC were the institutional sectors with more financing needs.

In line with most European countries which had to adopt exceptional measures for the support of the real economy and the financial sector in 2009, the net borrowing of the GG increased dramatically compared to previous years, amounting to 15.5 billion Euros in 2009 (4.9 in 2008). The funds provided to the GG were mainly through the acquisition of securities other than shares by the RoW and the FC, with a total amount of 16.6 billion Euros.

Figure 2

Flow of funds for the Portuguese economy, 2009



The NFC exhibited less financing needs compared to previous years mainly due to a decrease in investment in line with the negative growth of the economy. They were mainly financed by the RoW (5.5 billion Euros) and households (4.5 billion Euros).

In turn, households increased their net lending ability from 3.2 billion Euros in 2008 to 7.3 billion Euros in 2009, as a result of a fall in final consumption and investment and an increase in the savings rate. Households applied their savings in the funding of NFC and FC (mainly), through the acquisition of shares and other equity and insurance technical reserves, partially outweighed by the credit received from the FC to finance part of their expenses.

This type of flow of funds analysis can also be performed at a more detailed level, namely for individual financial instruments such as debt securities and shares and other equity. Making use of counterpart information available from the SSIS one can thus obtain "From-whom-to-whom" tables for these instruments.

In the "From-whom-to-whom" table for securities other than shares (Figure 3), one can observe some evolution in the financing structure of sectors considering the comparison between the first quarter of 2007 and the fourth quarter of 2009. First of all, the outstanding amount of securities other than shares issued by resident sectors reached the highest amount ever, with a growth rate of 76% between the two quarters.

Analysing in more detail the exhibited tables, it is worth emphasising the growth of securities other than shares issued by the MFI. The outstanding amount rocketed after the outbreak of the financial turmoil and an increase of 253% in the amount outstanding of securities other than shares was verified in the last quarter of 2009, comparing with the first quarter of 2007. This increase was accompanied by a change in the funding structure of this sector which was related to head offices resident in Portugal issuing directly rather than through their affiliates abroad. At the end of 2009 the RoW held 57% of this amount compared to 31% in the first quarter of 2007. This increase was compensated by a decrease in the relative weight of debt securities held by households, in part explained by an increase in their risk aversion and preference for more traditional investments like deposits.

Analysing the issues from Other Financial Intermediaries and Financial Auxiliaries (OFIFA), it is worth noting the holdings by MFI. This is mainly related to the acquisition of securitised bonds linked to securitisation operations involving Portuguese banks as a means to have more assets eligible for collateral in the ESCB monetary policy operations.[4]

The GG has also issued a large amount of debt securities, with a growth rate of 33% in the two considered periods, which was mainly acquired by non-residents.

[4] Securitisation operations by Portuguese banks typically involve a financial vehicle that buys the loans through the issuance of securitised bonds (if the vehicle takes the form of a securitisation firm) or securitisation units (if the vehicle takes the form of a securitisation fund). These bonds or units may be directly bought back by the originator or by a third non-resident entity which will eventually be held also by the originator.

Figure 3

"From-whom-to-whom" tables for securities other than shares

Securities other than shares - Stocks in 2007 Q1

10^6 Eur

Holding Sector \ Issuing Sector	NFC		MFI		OFIFA		ICPF		GG		RoW	
NFC	147	0.5%	110	0.5%	119	1.1%	0	0.4%	15	0.0%	1,522	1.6%
MFI	10,046	37.3%	3,044	13.3%	1,126	10.6%	0	0.0%	5,012	5.7%	26,776	28.4%
OFIFA	1,534	5.7%	1,220	5.3%	4	0.0%	0	0.1%	57	0.1%	19,514	20.7%
ICPF	2,909	10.8%	2,705	11.9%	649	6.1%	19	20.2%	3,437	3.9%	36,162	38.3%
GG	51	0.2%	34	0.1%	0	0.0%	0	0.0%	7,253	8.3%	1,872	2.0%
Households	281	1.0%	8,625	37.8%	878	8.2%	66	71.2%	34	0.0%	8,582	9.1%
RoW	11,938	44.4%	7,078	31.0%	7,871	73.9%	7	8.0%	71,854	82.0%	-	-
Total	26,905	100.0%	22,816	100.0%	10,648	100.0%	93	100.0%	87,662	100.0%	94,428	100.0%

Securities other than shares - Stocks in 2009 Q4

10^6 Eur

Holding Sector \ Issuing Sector	NFC		MFI		OFIFA		ICPF		GG		RoW	
NFC	221	0.5%	472	0.6%	280	1.4%	3	1.7%	61	0.1%	1,491	1.2%
MFI	19,317	46.5%	12,392	15.4%	11,033	55.4%	0	0.0%	10,351	8.8%	55,859	46.4%
OFIFA	966	2.3%	2,688	3.3%	178	0.9%	0	0.1%	362	0.3%	10,850	9.0%
ICPF	3,084	7.4%	7,502	9.3%	394	2.0%	112	59.2%	2,988	2.5%	43,395	36.0%
GG	58	0.1%	43	0.1%	0	0.0%	0	0.0%	7,726	6.6%	1,711	1.4%
Households	1,044	2.5%	11,486	14.2%	806	4.0%	73	38.3%	110	0.1%	7,155	5.9%
RoW	16,838	40.5%	46,049	57.1%	7,232	36.3%	1	0.6%	96,239	81.7%	-	-
Total	41,528	100.0%	80,632	100.0%	19,923	100.0%	189	100.0%	117,838	100.0%	120,462	100.0%

In terms of shares and other equity, one can observe a slight increase in some sectors (such as NFC and OFIFA) and a reduction in other sectors, as a result of two different driving forces: the issuance of equity and, at the same time, a decline in equity's prices over this period. This data is summarised in Figure 4.

Figure 4

"From-whom-to-whom" tables for shares and other equity

Shares and other equity - Stocks in 2007 Q1

10^6 Eur

Holding Sector \ Issuing Sector	NFC		MFI		OFIFA		ICPF		RoW	
NFC	133,210	42.3%	6,222	12.7%	6,702	7.4%	490	11.4%	33,428	46.4%
MFI	9,603	3.1%	1,314	2.7%	9,166	10.1%	968	22.5%	9,459	13.1%
OFIFA	13,108	4.2%	8,188	16.7%	5,047	5.5%	1,181	27.4%	9,725	13.5%
ICPF	3,822	1.2%	1,874	3.8%	2,367	2.6%	11	0.3%	9,832	13.7%
GG	5,171	1.6%	13,486	27.5%	3,663	4.0%	0	0.0%	2,865	4.0%
Households	82,285	26.1%	7,478	15.2%	30,316	33.3%	641	14.9%	6,701	9.3%
RoW	67,580	21.5%	10,474	21.4%	33,683	37.0%	1,015	23.6%	-	-
Total	314,779	100.0%	49,036	100.0%	90,944	100.0%	4,305	100.0%	72,011	100.0%

Shares and other equity - Stocks in 2009 Q4

10^6 Eur

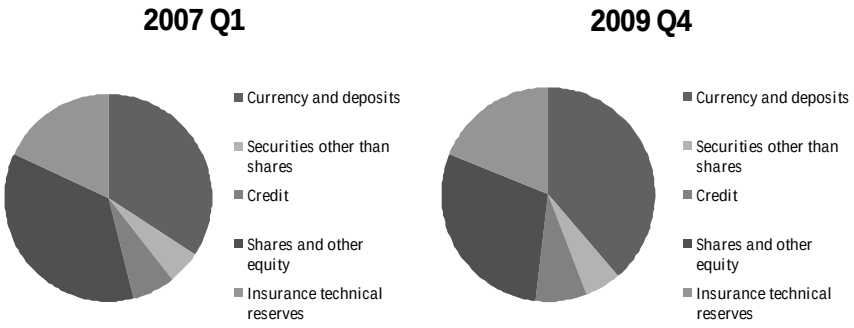
Holding Sector \ Issuing Sector	NFC		MFI		OFIFA		ICPF		RoW	
NFC	149,223	45.1%	5,674	12.5%	7,652	8.3%	261	7.3%	35,896	52.5%
MFI	14,405	4.4%	729	1.6%	8,498	9.2%	944	26.4%	13,331	19.5%
OFIFA	13,752	4.2%	6,795	15.0%	4,303	4.7%	1,087	30.5%	3,897	5.7%
ICPF	2,715	0.8%	537	1.2%	4,752	5.2%	13	0.4%	6,543	9.6%
GG	3,598	1.1%	18,849	41.5%	4,049	4.4%	0	0.0%	3,898	5.7%
Households	81,110	24.5%	6,597	14.5%	17,623	19.1%	217	6.1%	4,829	7.1%
RoW	65,826	19.9%	6,264	13.8%	45,338	49.2%	1,047	29.3%	-	-
Total	330,629	100.0%	45,446	100.0%	92,216	100.0%	3,569	100.0%	68,394	100.0%

Regarding the issues from OFIFA, again one can note the impact of securitisation operations, evidenced in the acquisition of securitisation units by non-residents.

Furthermore, there was a sharp reduction in households' holdings of investment funds shares. The value at end-2009 results from the combination of the households' disinvestment in riskier assets with the decline in the value of these assets in the event of the financial crisis. In fact, analysing in more detail the households' portfolio (Graph 1), it is possible to observe that, while in the beginning of 2007 shares and other equity were households' main asset (36%), at end-2009 the pole position was held by currency and deposits with 39%, 5 p.p. more than in early 2007.

Graph 1

Structure of households' portfolio



5. Final remarks

The experience of *Banco de Portugal* concerning the use of micro-data has revealed many advantages for the production of statistics and assessment of developments in the financing structure of the Portuguese economy. The advantages of this approach exceed largely the burden of managing so much data, considering the benefits from a refined quality control that allows for more reliable statistics and transparent data, higher compilation flexibility, and an enhanced responsiveness to *ad hoc* information requests from the users.

The analyses that can be built up with data extracted from micro-databases, including the "From-whom-to-whom" tables and the flow of funds, make valuable contributions to explorations of how the risk exposures and dependencies across sectors are influenced by developments in assets and liabilities of other sectors. These analyses have revealed that micro-databases can be a future improvement to deal with data gaps, at both national and international level, namely concerning counterpart information. In particular, I consider that the coverage of these databases in terms of the different financial instruments with the various levels of detailed information, namely by individual investor, by country, by the main financers, and by main counterparties, allow for the compilation of valuable statistical outputs which are of key importance for the policy makers. First and foremost, micro-databases allow for the understanding of the different relations established across the different economic agents. Extended to a global scale, with the sharing of similar data across national data producers, the benefits could be spread out worldwide.

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