The Centralised Securities Database (CSDB) - Standardised micro data for financial stability purposes

Asier Cornejo Pérez and Javier Huerga[1]

Abstract

The Centralised Securities Database (CSDB) is a security-by-security database which contains reference, price and ratings data for more than six million active debt securities, equity shares and investment fund units issued worldwide. The CSDB is accessible by the entire European System of Central Banks (ESCB) and is updated on a daily basis with input from several commercial data providers and more than twenty national central banks. It provides full micro data on securities by all issuers, including the financial sector. This standardised database is already used across several statistical and non-statistical domains and provides all users with a single set of information, herby reducing asymmetries and inconsistencies in the data analysis.

After introducing the relevance of security-by-security databases to support the compilation of consistent and comparable securities statistics in the context of the G-20 Data Gaps Initiative and the new Handbook on Securities Statistics, a brief introduction to the CSDB is provided, and concrete examples on how CSDB could contribute to financial stability analysis are presented in this note. The examples include aspects like the refinancing needs of deposit-taking corporations (DTCs), i.e. banks, their funding structure in terms of securities, the costs of financing, their risk on the basis of ratings, the degree of standardisation and other possible uses of the CSDB. Examples at national and euro area level on these issues are presented only for illustration of the potential use of a security-by-security database, being neither official statistics nor policy recommendations.

Keywords: Financial stability indicators, euro area, debt securities, security-by-security databases

JEL classification: G21 Banks • Depository Institutions • Micro Finance Institutions • Mortgages, G32 Financing Policy • Financial Risk and Risk Management • Capital and Ownership Structure • Value of Firms • Goodwill

1. Introduction

Securities statistics is one of the areas in which room for improvement was identified by the Financial Stability Board and the International Monetary Fund in their report to the G-20 Finance Ministers and Central Bank Governors in 2009.[2] The benefit of improved securities statistics was agreed by all G-20 economies and the G-20 Finance Ministers and Central Bank Governors have recently concluded that providing consistent and comparable securities statistics is a priority for their statistical work for the period 2015-2021 in the context of the second phase of the Data Gaps Initiative[3]. Good securities statistics are crucial both to understand the diversification of funding sources and the exposures of both issuers and creditors, including the nonfinancial sector.

There is growing evidence that this objective requires a more diverse statistical compilation and can better be addressed through security-by-security databases (s-b-s). This is also recognised in the Handbook on Securities Statistics (*Handbook*), which was completed in 2015 following recommendation 7 on the G-20 report. The *Handbook* provides a high level description of the potential content and benefits of a security-by-security database.[4] Furthermore the *Handbook* explicitly mentions the Centralised Securities Database (CSDB) as a prominent example of a s-b-s database.

If we link these developments with the increasing interest in micro-data for economic analysis, it is somehow surprising the current limited use of CSDB for financial supervision purposes in the European System of Central Banks (ESCB). This limited use is possibly due to lack of knowledge about the CSDB and absence of a user-friendly tool to access the data. The objective of this paper is to address the first of these obstacles by presenting the main features of the CSDB and its usefulness as source of data for financial stability purposes. This is expected to increase awareness on the potential uses of CSDB and s-b-s databases in general.

The paper is organised as follows. Section 2 provides general remarks on micro data and standardisation followed by section 3 with a description of the CSDB, covering its content, data flow and current uses. Section 4 presents a number of concrete examples on how the CSDB could be used for financial stability purposes, such as refinancing needs of financial institutions, funding through securities, the costs of financing of these institutions, risks analysis based on ratings information and degree of implementation of international standards like the LEI among all securities issuers. Section 5 concludes with a general assessment of the potential use of the CSDB for financial stability purposes.

The examples in this paper are illustrations of the potential of the CSDB in the financial stability area and not intended as an in-depth analysis or policy recommendations. The indicators shown have been selected and calculated by the authors and are not official ECB statistics.

---

[2] ` Recommendation 7 in the "The Financial Crisis and Information Gaps", Financial Stability Board and International Monetary Fund, 29 October 2009.

[3] New recommendation 7 in the "Sixth Progress Report on the Implementation of the G-20 Data Gaps Initiative", Financial Stability Board and International Monetary Fund, September 2015.

[4] Refer to Annex 4 of the "Handbook on Securities Statistics", Bank for International Settlements, European Central Banks and International Monetary Fund, 2015.

2. Micro-data and standardisation

2.1. Micro-data versus macro-data

A s-b-s database, like the CSDB, offers features that cannot be matched by pre-aggregated data. Micro-data can be compiled on a multipurpose basis and be customised ex-post for each specific analysis or used to produce new aggregates in a flexible way without recurring to multiple requirements to reporting agents. The CSDB also offers attributes not covered in aggregate data and the possibility to combine them.

S-b-s databases also allow the use of micro-data as such, permitting to analyse individual or specific groups of instruments and issuers. In this way the complete picture comes up, going beyond just aggregates or averages. For example, by using the CSDB it is possible to extract the full distribution of any particular attribute contained in it.

Timeliness is an additional advantage of the CSDB. In a s-b-s data individual information does not need to pre-aggregated but rather can be individually received and recorded on a daily basis. While the implementation of new statistical standards typically takes years, a large part of the new concepts in the Handbook on Securities Statistics can almost immediately be applied by using a s-b-s database. Some examples using the CSDB are later presented in this note. The information provided s-b-s is also efficient from the point of view of statistical compilers as it allows to check the data only once for multiple purposes

Moreover, s-b-s databases, like the CSDB, are also for the benefit of reporting agents. Typically reporting agents need to adjust their information systems to comply with statistical and supervisory reporting. A s-b-s database reduces the burden on reporting agents by limiting their reporting obligations, given that the rest of the information can be completed by the statistical compiler by using different sources and the database.

2.2. Standardisation

The use of international standards in financial markets is necessary in order to ensure transparency. In the case of securities, two international standards are especially needed, namely the International Securities Identification Number (ISIN)[5] and the Legal Entity Identifier (LEI)[6]. The ISIN uniquely identifies the negotiable instruments, the LEI uniquely identifies the institutions, in particular the issuers of negotiable instruments.

Precisely, one of the key features of s-b-s databases is standardisation. While aggregate data may hide different non-harmonised components, the compilation of s-b-s data requires the existence and application of unique identifiers.. In turn,

---

[5]   As defined in the *Handbook*, para. 2.3, one of the criteria for a financial instrument to be considered negotiable is to be allocated an ISIN.

[6]   The importance of data standardisation in respect of securities through the adoption of international standards, e.g. LEI, has been explicitly recognised in the recent progress report on data gaps - "Sixth Progress Report on the implementation of the G-20 gaps initiative", Financial Stability Board and International Monetary Fund, September 2015.

standardisation permits further links between different databases increasing the usefulness of individual data, e.g. permitting to connect issuers and holders of securities.

The CSDB only contains securities which have an ISIN. Given that the CSDB is a database on securities a unique identification of the securities is needed in order to avoid duplicities. If the ISIN code were not required double (or higher number) of entries of the same security would occur, resulting in the uselessness of the whole data. It is recognised that this approach may leave outside CSDB part of the market. However, it ensures that most and the most relevant securities are correctly and uniquely recorded in the CSDB.

Fact-finding exercises reveal that debt securities without ISIN issued in the euro area may amount to less than 1% of the total amount outstanding, although may be more relevant in particular countries and sectors. The case of listed shares without ISIN in the euro area is irrelevant. Nevertheless the amount of other types of securities (e.g. investment funds) issued without ISIN may be more substantial but is difficult to prove because the very absence of a unique international identifier makes it more difficult the compilation of statistical data.

Regarding the LEI, due to its current incomplete implementation the CSDB accepts different type of identifiers, paying especial attention to proprietary identifiers of commercial data providers and national identifiers provided by NCBs. These identifiers are particularly relevant as they are used, in the absence of full implementation of the LEI, to group the securities under the common issuer.

At the same time, a s-b-s database can also be used to monitor the degree of implementation of international standards. For example, the CSDB can be used to monitor the degree of implementation of the LEI among issuers of securities, as shown in section 4.

3. The Centralised Securities Database (CSDB)

3.1. A brief description

Operational since 2009, the CSDB is a s-b-s database with the aim of holding complete, accurate, consistent and up-to-date information on all individual securities relevant for the statistical and, increasingly, non-statistical purposes of the ESCB. It is a single information technology infrastructure that contains reference data on securities (e.g. outstanding amounts, issue and maturity dates, type of security, coupon and dividend information, statistical classifications, etc.), issuers (identifiers, name, country of residence, economic sector, etc) and prices (market, estimated or defaulted) as well as information on ratings (covering securities, issuance programmes, and all rated institutions independently of whether they are issuers of securities).

The CSDB covers securities issued by EU residents; securities likely to be held and transacted in by EU residents; and securities denominated in euro, regardless of the residency of the issuer and holders. The CSDB currently contains information on over six million non-matured or "alive" debt securities, equities and mutual fund shares/units plus approximately nine million matured or "non-alive" (e.g. matured, early redeemed or cancelled) securities. Chart 1 illustrates this coverage.

Developed by the ECB, the CSDB is jointly operated by the members of the ESCB and it is only accessible by them, i.e. it is not available for public purposes. The CSDB uses data from commercial data providers, national central banks and other existing sources. Based on automatic algorithms, the most plausible value for each attribute is selected and gaps (in particular for prices and income) are filled with reliable estimates. The system makes use of expertise within the ESCB to enhance data quality.[7]

The CSDB provides consistent results and harmonisation of concepts and calculations for all users together with efficiency in the data reporting, which reduces the burden from reporting agents, and improves the data compilation process.

Chart 1

Scope of securities covered in the CSDB

The total set falls within the heavy black line, and the sub-sets A to C. Coverage in D will be further extended as necessary, when transactions in or holdings of securities in this category are reported
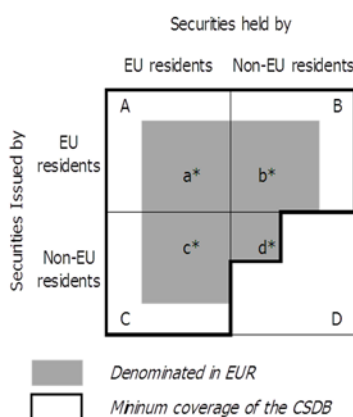
In September 2015, the nominal values of debt securities issued by all euro area residents amounted to approximately €16.7 trillion, with more than 80% denominated in euro. The total market capitalisation of quoted shares was around €6.3 trillion. By sector, debt securities account for more than 45% of the total government debt, 47% for monetary and financial institutions and 7% of the outstanding borrowing of non-financial corporations.

3.2.   Information data flow

The CSDB is a multi-source system that receives approximately 2.5 million prices and 300.000 records on reference information per day. The data is acquired automatically from all sources by the transactional system accessible via a web user interface, also called CSDB Portal. Upon reception, the data is compared against the existing or previously reported information. If large deviations are detected on the provision by

---

[7]   In accordance with the Guideline ECB/2012/21 of 26 September 2012 on the data quality management framework for the Centralised Securities Database.

one source, the data will be stopped to be further analysed by the system operators, aiming at ensuring data stability and data quality. Moreover, invalid data are filtered out at the start of the process.

Chart 2

Centralised Securities database information flow
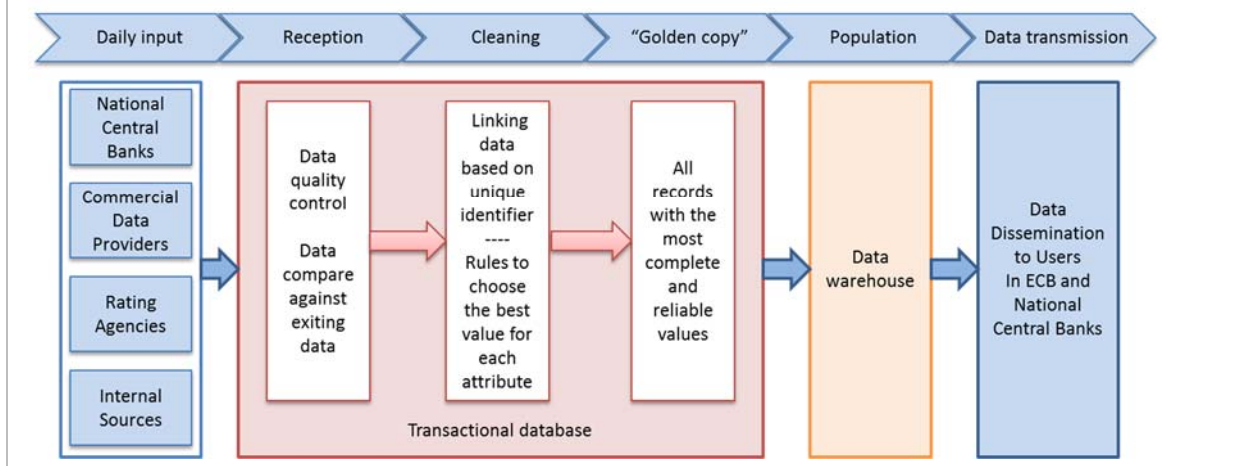
Once data reception has finalised, the pooled data usually contains inconsistent information that needs to be cleaned. This "cleaning process" is automatically started by the system every evening. This is done on the basis of automatic rules to choose the best (most plausible) value for each attribute where sources might be equal or contradictory. One of the main steps of this process is the grouping of the information provided by each source.

Following the standards, the CSDB uses the International Securities Identification Number (ISIN) as the unique identifier for grouping on instruments information. On the entity identification, currently several identifiers are being used for grouping, but the Legal Entity Identifier (LEI) is also loaded since December 2014 and the use of the LEI as the unique entity identifier is foreseen for the future.

Prices and other information may be missing for some securities, especially private placements, unquoted equities and rarely traded securities. The CSDB contains automatic routines to fill the gaps, which depend on the nature of the missing information, what other relevant information is available, and the type of instruments. Using information from the same or similar securities, and also statistical estimation methods where necessary, the CSDB fills the gaps in the best, most consistent way possible. The result is a "golden copy" of the data, which combines the best features of the sources drawn on.

This golden copy is extracted on a monthly basis to the second module of the system, the data warehouse. Since October 2015, daily extractions are also done for a subset of securities, including among them eligible assets for ECB monetary policy operations and government securities. Data is produced with a timeliness of t+6 days

for monthly information and t+1 for daily data, which provides users with very quick information. The data are released to end-users and the whole ESCB.

Box 1

CSDB development – agile versus waterfall approach

Being a micro database, the CSDB data model speaks the language of the financial markets and its generic approach allows developing the system in smaller and quicker iterations. One of the main characteristics of the CSDB is the iterative-incremental approach in the development process. As opposed to the waterfall approach, the CSDB has around three releases per year, approximately every 4-6 months. This development process helps to satisfy user needs quicker and more effectively.

The development is technically guided and promotes automation version reliance manual work. It is driven by experience and not only by theoretical requirements which increases efficiency. Moreover, the CSDB development ensures transparency and flexibility together with a common solution for all purposes.

3.3. Current users

Overview of current CSDB users

Table 1

Statistical purposes	Non-statistical purposes
Balance of payments statistics	Monetary policy
Investment Fund Statistics	Fiscal policy
Financial Vehicle Corporation Statistics	Market operations
Securities Holdings Statistics	Risk management
Securities Issues Statistics	Research
Other	Other

4. Usage of CSDB for financial stability purposes – examples

The CSDB can be used to compile all basic statistics on securities issues by country, sector, original maturity or currency as established in the Handbook. At the same other more advanced indicators can also be produced. This section provides a set of specific examples where the CSDB data could be used for financial stability purposes. It is noted that all data in this paper have been extracted from the CSDB, which may deviate in some cases from other data sources. Furthermore, the data presented are the results of ad-hoc calculations by the authors and not official statistics. The examples are intended as illustrations of the potential of the CSDB in the financial stability area and not intended as an in-depth analysis or policy recommendations.

4.1.   Refinancing needs

Refinancing needs of debt securities, also called debt service, refers to the necessary funds in order to honour the obligations in respect of the interest and, at redemption, of the principal of the securities issued. Refinancing needs are a relevant component of financial stability analysis, as concentration of deposit-taking corporations (DTCs), i.e. banks, refinancing needs in the very short-term and/or in particular points in time may be an indication of current or future liquidity difficulties. Aggregate statistics usually provide data in terms of the original maturity of the securities issued, typically with a short-term/long-term breakdown. However, aggregates according to original maturity do not permit to know the refinancing needs over time. For that reason the *Handbook* recommends the compilation of statistics according to remaining maturity in addition to the traditional breakdowns by original maturity.

A s-b-s database such as the CSDB makes it possible to calculate scheduled future redemption for each individual security and aggregate them according to remaining maturity criteria. Following the recommendations in the *Handbook* it is possible to calculate figures according to the original maturity breakdown, short-term (up to one year) / long-term (over one year) and divide the original long-term figures into those with a remaining maturity up to one year and those over one year. In this way it is possible to know all securities maturing in one year time, aggregating short-term securities and long-term securities maturing in the short-term.

Table 2 shows the amount outstanding on alive debt securities issued by euro area DTCs in all currencies, with a breakdown by country. Data according to both original maturity and remaining maturity are presented. The data show the relevance of having information by remaining maturity in addition to the traditional original maturity. For example, while only around 11% of the amounts outstanding in the euro area are short-term according to the original maturity, more than 29% are short-term according to remaining maturity. The differences are especially large in some small countries (e.g. Lithuania, Slovenia, Lithuania, Ireland), but also quite relevant in larger countries (e.g. Germany, Spain).

Debt securities issued by DTCs

Table 2

Debt securities issued by DTCs amount outstanding breakdown by euro area countries and original/residual maturity, end-Sept 2015 (Eur bn, percentage)

|	Total securities	Original maturity			Remaining maturity		
		Short-term	Long-term	% Short-term/Total	Short-term	Long-term	Short-term/Total
Austria	163.4	9.3	154.1	5.7%	36.5	126.9	22.4%
Belgium	51.1	24.9	26.2	48.8%	27.4	23.7	53.6%
Cyprus	2.3	0.0	2.3	0.8%	0.1	2.2	2.7%
Estonia	0.0	0.0	0.0	62.5%	0.0	0.0	62.5%
Finland	93.7	10.3	83.5	11.0%	25.9	67.8	27.7%
France	1,159.0	214.5	944.6	18.5%	359.2	799.8	31.0%
Germany	1,432.4	141.0	1,291.4	9.8%	437.8	994.6	30.6%
Greece	57.9	44.7	13.2	77.3%	52.7	5.2	91.0%
Ireland	58.6	6.3	52.4	10.7%	21.4	37.2	36.5%
Italy	636.9	0.4	636.5	0.1%	148.6	488.3	23.3%
Latvia	0.8	0.0	0.8	0.2%	0.2	0.5	30.7%
Lithuania	0.0	0.0	0.0	51.7%	0.0	0.0	76.1%
Luxembourg	55.6	14.0	41.6	25.2%	24.1	31.5	43.3%
Malta	0.4	0.0	0.4	0.0%	0.0	0.4	2.3%
Netherlands	550.4	45.9	504.5	8.3%	136.6	413.9	24.8%
Portugal	63.9	0.0	63.9	0.0%	10.3	53.6	16.2%
Slovakia	4.3	0.0	4.3	0.2%	0.9	3.3	22.3%
Slovenia	1.2	0.0	1.2	0.0%	0.4	0.8	30.4%
Spain	330.7	15.0	315.7	4.5%	82.2	248.5	24.9%
Euro area	**4,662.6**	**526.3**	**4,136.3**	**11.3%**	**1,364.4**	**3,298.2**	**29.3%**

Source: Authors calculations, Centralised Securities Database (CSDB)

A more granular picture of the refinancing needs of DTCs, either individually or at any aggregation level it is also possible by using CSDB s-b-s data.

For example, refinancing needs of debt securities issued by DTCs in the four largest issuers of debt securities in the euro area are presented in chart 3. The chart contains debt securities principal amounts to be redeemed (no interest payment), with a breakdown by remaining maturity. Debt securities have been grouped by number of years to redemption, rounding up. Securities with a remaining maturity above 15 years have been grouped under the category "+15".

Chart 3

Debt securities issued by DTCs

Debt securities issued by DTCs amount outstanding, end-Sept 2015, by remaining maturity (years, Eur bn)
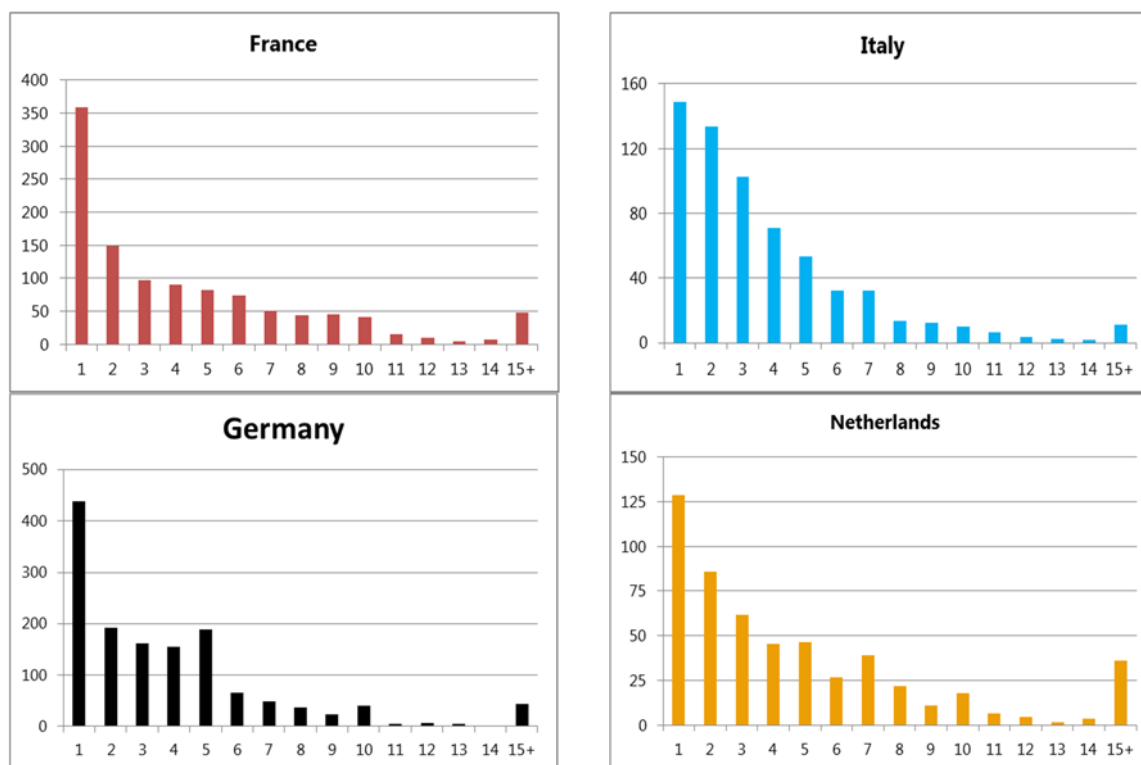
Source: Authors calculations, Centralised Securities Database (CSDB)

4.2. Securities Funding of Deposit-taking Corporations

The funding structures of the entities also matter for financial stability purposes. A contribution to the global financial crisis came from the overreliance by some DTCs on certain types of funding, in particular wholesale funding and, some DTCs were vulnerable because their equity capital levels were inadequate.

Since the crisis, new regulations have aimed to make financial systems safer (including Basel III capital and liquidity regulations and over-the-counter [OTC] derivatives reforms) and ensure financial stability. . Without entering into risks considerations, there are some indications that healthy DTCs tend to have more equity and less debt (in particular less short-term debt), lower loan-to-deposit ratios, and more diversified funding structures that improve DTCs' stability.

The complete funding structure of the bank covers equity, debt securities, loans and deposits. In this context, the information on the CSDB allows to analyse how bank funding structures in terms of marketable liabilities and capital have changed over time, in the area of securities, and how these structures affect financial stability. Chart 4 shows the evolution of the securities funding structure for Italy and Spain since 2012 to 2015. The ratios are calculated based on the total amount outstanding for debt securities and the market capitalisation of the equity for each reference date. The

information for equity is based on market prices. Moreover, the CSDB allows looking into the breakdowns based on original maturity or based on residual maturity.
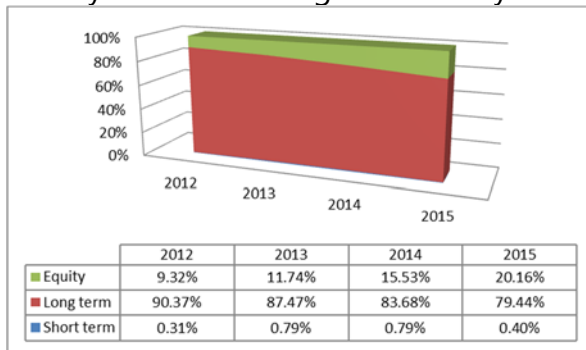
In both countries the tendency shows a reduction of the relative weight of debt securities and progressive increase of equity. For Italy, long term debt experienced a reduction of more than 10% based on original maturity. However, when looking at the structure based on residual maturity, the payments on less than one year remain around 20%, which indicates a reduction on the payments over one year. For Spain, DTCs have experienced larger changes possibly due to the distress suffered by the Spanish DTCs during the financial crisis and the corrections on capital ratios are much larger. Based on original maturity, the long term debt securities reduced from 79% to 60% from 2012 to 2015. Moreover, the same pattern can be seen in the analysis based on residual maturity with a drop of the payments in more than one year from 63% to 47%. When comparing both countries, the ratios of Italian DTCs are much larger than the Spanish DTCs.
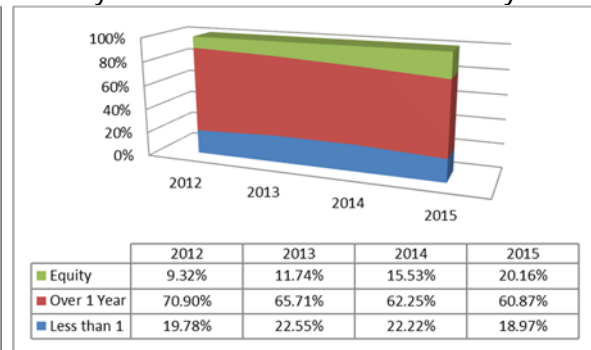
Chart 4

DTCs' securities funding structure based on the CSDB

Evolution of securities funding by year for Italy and Spain broken down by original and residual maturity, total outstanding amounts for liabilities (long/short term, less/over one year) and market capitalisation of equity, end-Sept 2015 (percentage, years)
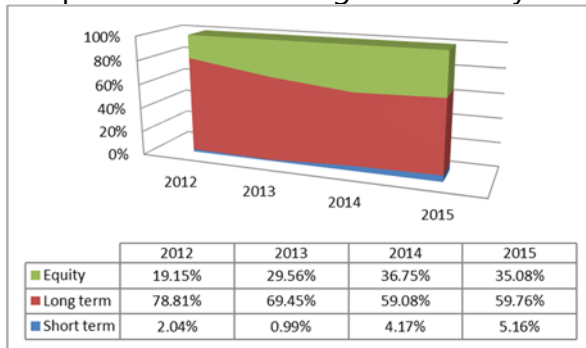
Italy – based on original maturity

	2012	2013	2014	2015
Equity	9.32%	11.74%	15.53%	20.16%
Long term	90.37%	87.47%	83.68%	79.44%
Short term	0.31%	0.79%	0.79%	0.40%

Italy – based on residual maturity

	2012	2013	2014	2015
Equity	9.32%	11.74%	15.53%	20.16%
Over 1 Year	70.90%	65.71%	62.25%	60.87%
Less than 1	19.78%	22.55%	22.22%	18.97%

Spain – based on original maturity

	2012	2013	2014	2015
Equity	19.15%	29.56%	36.75%	35.08%
Long term	78.81%	69.45%	59.08%	59.76%
Short term	2.04%	0.99%	4.17%	5.16%

Spain – based on residual maturity

	2012	2013	2014	2015
Equity	19.15%	29.56%	36.75%	35.08%
Over 1 Year	62.54%	55.87%	45.11%	46.72%
Less than 1	18.31%	14.57%	18.14%	18.20%
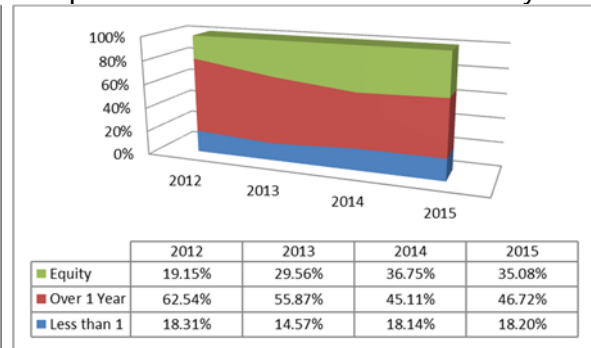
Source: Authors calculations, Centralised Securities Database (CSDB)

4.3.   Costs – Interest rate and yield to maturity

DTCs cost of financing through the issue of securities is a basic indicator for financial stability purposes and possibly an input for other measures. The *Handbook* does not directly prescribe the compilation of interest rates or other cost measures. However this topic is closely related to other relevant aspects of securities statistics as made explicit in the Annex 1 to the *Handbook* regarding the comparisons between market value and nominal value for debt securities.

As a first example of the type of indicators that can be compiled by using s-b-s information is the current interest rate applied on existing securities issued by CDTs. This information provides the current cost of financing in the markets for DTCs.

Chart 5 shows the inter-quartile levels and dispersion in interest rates, computing both explicit interest through coupons and implicit interest rate through the difference between issue and maturity prices, weighted by outstanding amounts for alive debt securities denominated in all currencies issued by DTCs in the euro area as a whole and in the largest euro area countries in terms of issues of securities by the DTC sector, by September 2015. The chart shows the interest rate of securities with remaining maturity between two and four years, excluding index-linked, floaters, securities with embedded option features and covered bonds. Furthermore, only securities with an explicit coupon and with available issue and redemption prices have been considered in order to maximise homogeneity and data quality, even if that has resulted in the reduction of the population of securities considered.

The results show that that the median for the euro area is near 2%, while the interquartile dispersion is more than 260 basis points, making explicit the different financing costs across securities. In terms of country comparisons, Germany shows less financing costs, with median close to 1.5%, France higher levels and dispersion, only partially overlapping with Germany. The Netherlands shows a median around 2% but lower dispersion than the total euro area. Italy has clear higher levels, with a median above 3.5%.

Chart 5

Intra-quartile interest rates

Intra-quartile interest rates of plain vanilla existing debt securities issued by DTCs with remaining maturity between 2 and 4 years, weighted by amount outstanding, end-Sept 2015 (percentage)
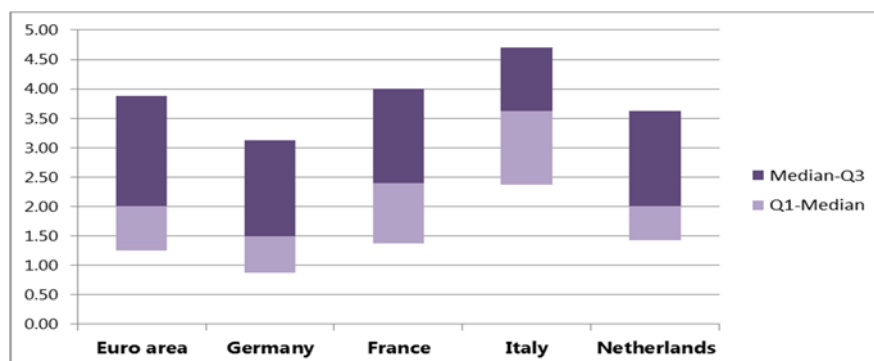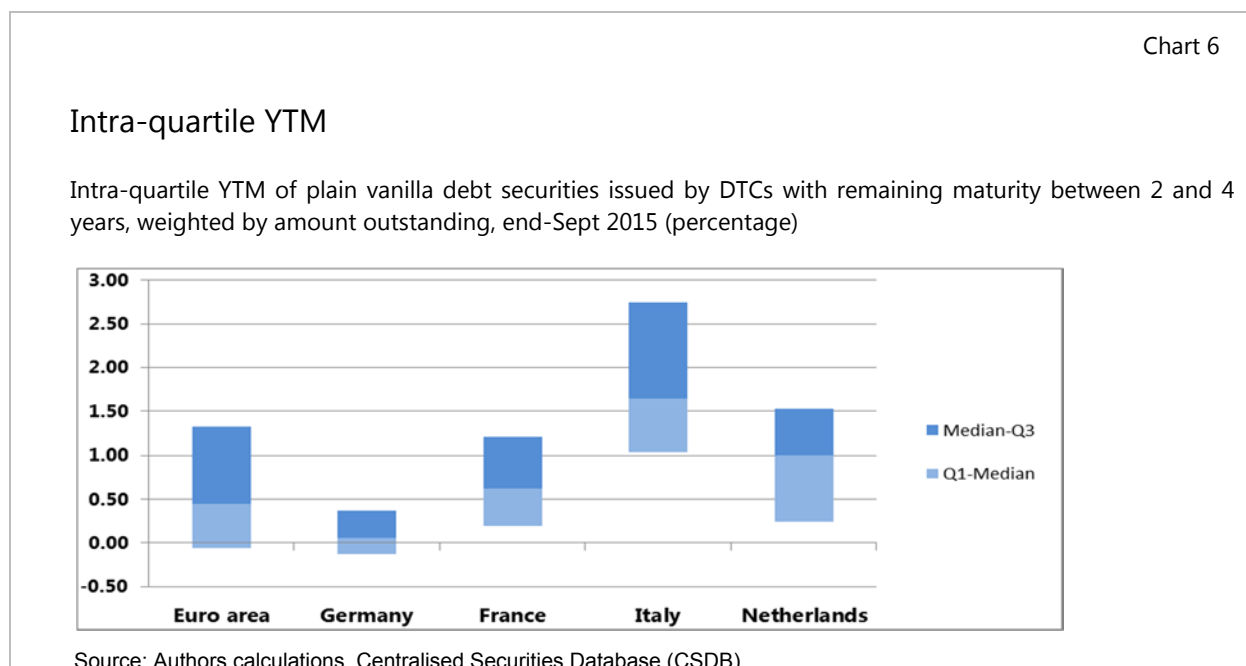

Source: Authors calculations, Centralised Securities Database (CSDB)

A complementary perspective of DTCs financing costs is provided by the yield to maturity. The yield to maturity (YTM) is defined as the total interest rate that could be earned by an investor who buys a debt security at market price, assuming that the bond will be held until maturity, and that all coupon and principal payments will be made on schedule. YTM can also be interpreted as the cost of financing of the issuer should need to issue a debt security for the period of the remaining maturity. The *Handbook* (para. 7.69) considers yield spreads as an indication of the relative creditworthiness of individual issues, which could be used to develop a statistical classification for debt securities by default risk.

This recommendation of the Handbook can be developed in many different ways. In the context of the euro area financial stability it seems particularly important to measure the YTM dispersion of securities issued by DTCs in the euro area as a whole and in each member state as well as the dispersion in each country.
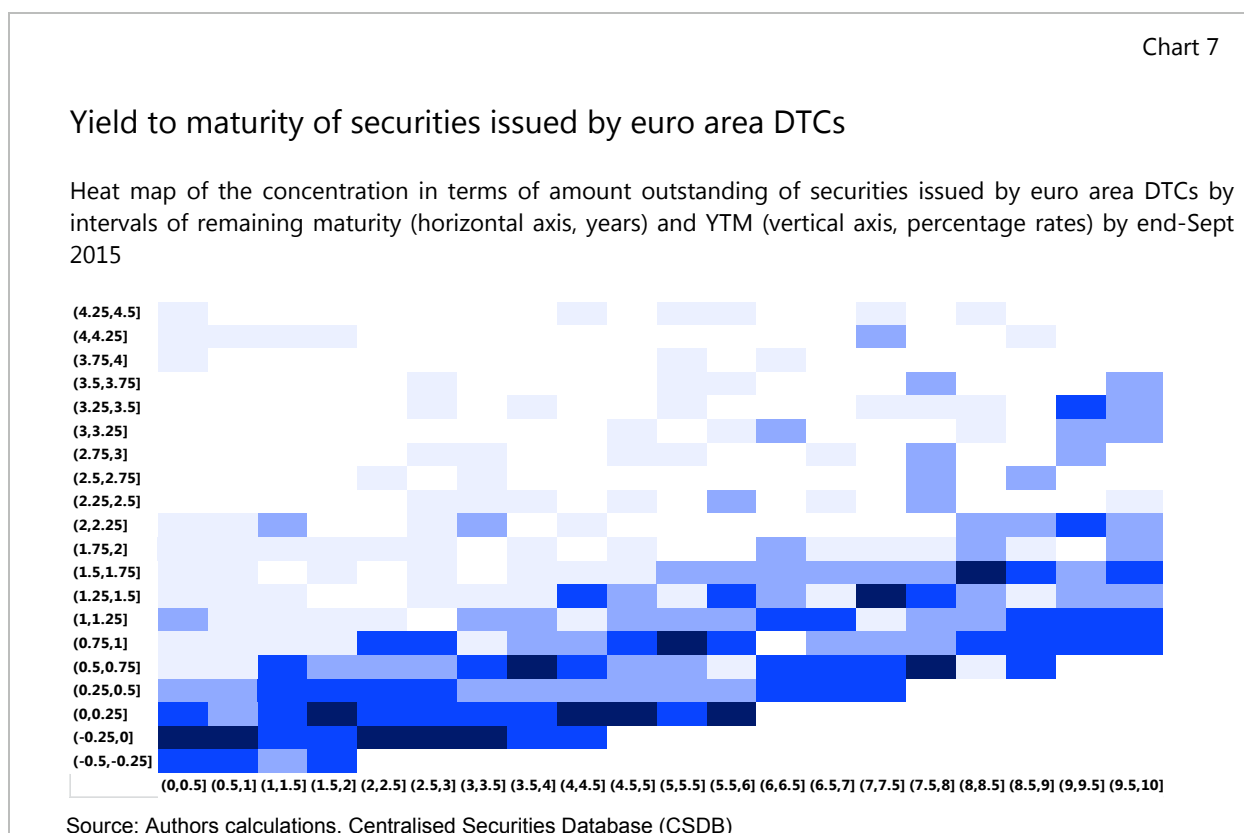
Chart 6 shows the inter-quartile levels and dispersion in YTM weighted by outstanding amounts for alive securities denominated in all currencies issued by DTCs in the euro area as a whole and in the largest euro area countries in terms of issues of securities by the DTC sector, by September 2015. The chart shows the YTM of securities with remaining maturity between two and four years, with the same population of instruments as described before

Intra-quartile YTM

Intra-quartile YTM of plain vanilla debt securities issued by DTCs with remaining maturity between 2 and 4 years, weighted by amount outstanding, end-Sept 2015 (percentage)

Source: Authors calculations, Centralised Securities Database (CSDB)

The median for the euro area is below 0.5% reflecting the current monetary policy stance, while the interquartile dispersion is more than 130 basis points. These levels already give an indication that DTCs could generally refinance their existing medium-term debt securities at a lower cost if they were issued today instead than in the past. However more relevant is possibly the different situations across countries. While Germany shows a very uniform picture with a median close to 0%, France has higher levels and dispersion, only partially overlapping with Germany. The Netherlands shows a median around 1% with a similar pattern as France. Italy shows even higher levels and dispersion.

A s-b-s database can also be used to build yield curves. It is noted that a yield curve implies the selection of a single rate for each point in time, through selection of the different possibilities. A first approximation towards the yield curve type of construction and analysis can be done through a heat map of the outstanding amounts related to each remaining maturity and YTM.

Chart 7 below shows a heat map of the outstanding amounts of debt securities denominated in euro by remaining maturity and YTM. The chart shows the relative relevance of the different levels of YTM per remaining maturity intervals. Those YTM levels with the highest concentration of securities in terms of amount outstanding are showed in darker colours. The chart is a first approximation to a YTM curve by linking the darkest areas. It is visible the current low slope of the curve as well as the increase in dispersion with highest remaining maturity.. .

Chart 7

Yield to maturity of securities issued by euro area DTCs

Heat map of the concentration in terms of amount outstanding of securities issued by euro area DTCs by intervals of remaining maturity (horizontal axis, years) and YTM (vertical axis, percentage rates) by end-Sept 2015

Source: Authors calculations, Centralised Securities Database (CSDB)

4.4. Risk profiles

There are different ways to measure and analyse risks. One of them is analysing the ratings information provided by the rating agencies, as mentioned in the Handbook (para. 7.64 ss). In addition to reference information, the CSDB contains ratings information on securities and entities coming from the main rating agencies. This information can be used to analyse the risk profiles of specific countries, sectors as well as specific entities or instruments.

Chart 8 shows an example of country risk profiles based on the assessment made for all instruments rated in the respective country. In general, the country risk refers to the risk of investing or lending in a country. This risk could come from possible changes in the business environment that might affect operating profits or the value

of assets in the country. The assessment of the risk is being made by the rating agencies and the information can be used in different ways. In the example, all instruments with an ISIN code rated in the country are considered and then the highest scale rating is selected by comparing the ratings of all agencies.

The results shows countries like Denmark, Germany or Switzerland with a less risky profile, i.e. more than 60% of the instruments rated in that country have a high grade when comparing all rating agencies. At the same time, other countries like Greece, Croatia or Cyprus have riskier profile with almost all instruments under speculative grade. Portugal, Russia or Brazil are also considered risky with just some 40% of instruments in a medium to low investment grade. When looking to the whole euro area, around 45% of the instruments are rated with high grade, 42% with medium to low investment grade and 13% with speculative grade.

Chart 8

Risk profile by country

Risk profile based on all instruments rated by Standard & Poors, Moody's and Fitch for the respective country and euro area, end-Sept 2015
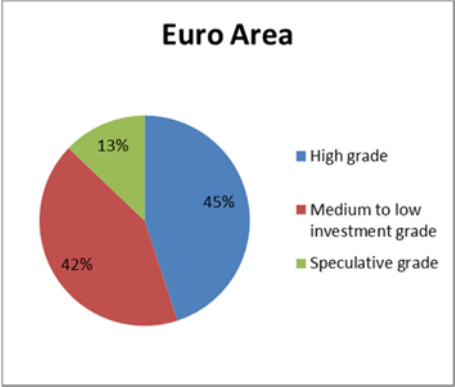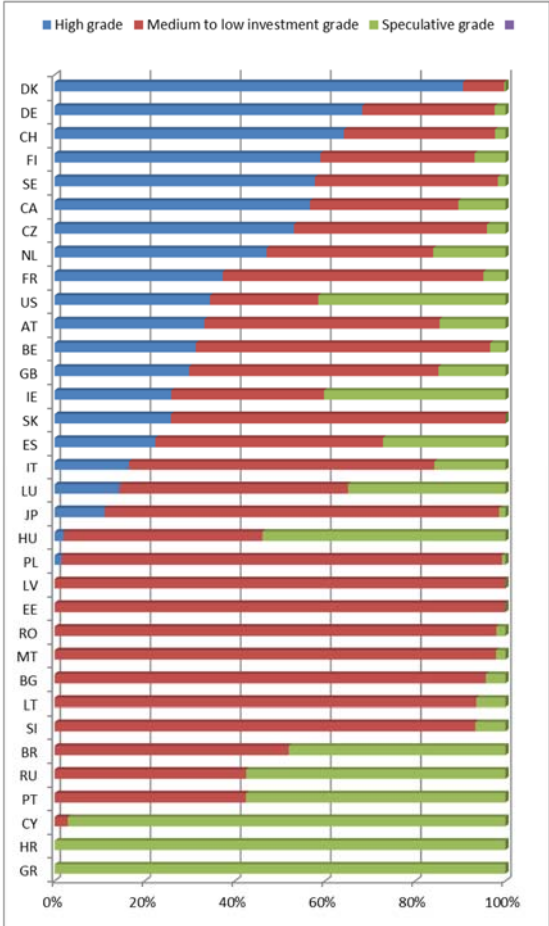
Source: Authors calculations, Centralised Securities Database (CSDB)

4.5.   Standardisation - LEI

As previously explained the use of international standards in financial markets is necessary in order to ensure transparency. The CSDB started to receive LEI information in 2014. Therefore the CSDB can be used to monitor the implementation of LEI among securities issuers, i.e. going beyond the total global figures of LEI allocated, around 400,000 by end-September 2015. While data should be taken with some care, as they may be biased by the different degree of reporting among CDPs, it may still provide a view of the minimum level of implementation of the LEI on securities issuers across global geographical areas.

Table 3 shows the coverage of the LEI in the CSDB in terms of number of instruments, capitalisation (aggregating amounts outstanding on debt securities and market capitalisation on shares), and number of issuers of securities. The data show that coverage in terms of number of securities is relatively high in the euro area and in the EU, 85.7% and 72.6% of the instruments in euro area and non-euro area countries respectively, somehow lower in terms of market capitalisation and much lower, 18.7% and 10.4% in terms of total number of issuers. It must be taken into account that most of the large issuers of securities, at least in the EU, already have an assigned LEI while possibly many small issuers have not yet applied for it. Nevertheless an important exception is the EU governments, which have generally not yet requested a LEI. Regarding the rest of the world, Table 3 shows a much lower coverage of the LEI, which may be due to an effective delayed implementation or to limited information reported by CDPs. In any case it can be affirmed that at least half of the global capitalisation recorded in the CSDB is issued by an institution with an LEI.

LEI coverage on issuers of securities   Table 3

Overview of LEI coverage on issuers of securities, end-Sept 2015 (Eur Bn)

	Count of Instruments			Amount outstanding and market capitalisation			Count of Issuers		
	Total in CSDB	of which with LEI	% over the Total in CSDB	Total in CSDB	of which with LEI	% over the Total in CSDB	Total in CSDB	of which with LEI	% over the Total in CSDB
EU - Euro Area	2,074,963	1,797,170	86.6%	33,650	23,706	70.4%	197,538	39,561	20.0%
EU - Non Euro Area	417,456	299,326	71.7%	12,957	7,403	57.1%	78,729	8,504	10.8%
United States	2,434,890	485,059	19.9%	60,673	36,684	60.5%	177,524	11,031	6.2%
Japan	36,482	11,450	31.4%	13,188	1,371	10.4%	11,074	211	1.9%
Rest of the World	1,402,823	738,248	52.6%	65,999	17,977	27.2%	301,936	9,031	3.0%
Total	6,366,614	3,331,253	52.3%	186,468	87,141	46.7%	766,801	68,338	8.9%

Source: Authors calculation, Centralised Securities
Database (CSDB)

Giving the rapidly growing global number of LEIs and the current coverage in the CSDB it can be expected a relatively high coverage in terms of total securities in a few years. A quick improvement in the coverage would result if all EU governments had an LEI, which would increase coverage in terms of outstanding amounts and market capitalisation up to 82% for the whole EU. Nevertheless a full coverage can possibly

only be achieved, as in the case of ISIN, through compulsory rules applicable to the securities issuers and initiatives by public authorities..

4.6.   Other examples

Many other uses of CSDB in the context of financial stability could be possible. In the first place it is noted that any of the data above can be drilled-down in the CSDB to the individual issuer and/or the individual security. Due to the current commercial licenses and statistical confidentiality rules individual information cannot be presented in this paper but is fully available to ESCB internal users.

Other possible indicators built on s-b-s data could be based on combination of the different analysis by crossing the different data and/or by using other classification criteria recommended in the Handbook such as type of interest rate or currency of denomination. Additional breakdowns by original and/or remaining maturity could also be implemented. Aggregates by all economic sectors and subsectors of especial interest (e.g. FVC) are also feasible.

Further details by type of security, e.g. separately identifying covered bonds, asset backed securities (ABS), securities linked to inflation, interest rate or asset price, convertible bonds, etc. It would also be possible to identify the international debt securities according to the three criteria specified in the Handbook (para. 7.62), namely listing in a market located in a foreign country, ISIN with a foreign or international code, or issued in a foreign currency, in similar ways as applied in BIS debt securities statistics

Furthermore, additional possibilities may include concentration measures by sector and country, analysis of dependencies of costs on market size and risk, the calculation of yield curves per sector or subsector, and further extension of the data along time, i.e. in the form of time series, just to mention a few.

Additionally, it is thinkable not only to obtain totals and averages on any of the above mentioned concepts but also dispersion measures like range, quartiles, standard deviation, asymmetry measures and any other feature related to the whole distribution of a certain variable.

Going beyond the calculation of aggregate figures for publication, a s-b-s also offers the opportunity to use micro-data as such. In ultimate terms the full potential of s-b-s database is only exploited if it empowers the users to drill-down on any aggregate, provides full flexibility for the (possibly internal) user to build its own aggregates as required for the particular use of the data and also directly use micro-data at the level of individual institutions and securities.

5. Conclusion

The need for correct, complete and timely data on securities has been recognised as one of the data gaps in relation to financial stability since the beginning of the crisis. These data needs can be better addressed through s-b-s databases. The CSDB is a prominent example of a micro-data on securities containing reference information, prices and ratings on securities, as well as ratings data on institutions and programmes. However, the current use of CSDB for financial stability purposes is still limited. This limited use is possibly due to a combination of lack of visibility and absence of a user-friendly tool to access the data.

This paper addresses the first of the obstacles mentioned above by presenting the main features of the CSDB and explaining why the CSDB is a useful source of data for financial stability purposes. In particular the main features of the CSDB have been described and several concrete potential uses of the CSDB in the context of financial stability have been presented. These have covered the funding of financial institutions through securities, their funding costs, risks of financial institutions in comparison with other sectors, refinancing needs of financial institutions and degree of extension of the LEI among the issuers of securities. The potential uses presented are very much line with the content of the new Handbook on Securities Statistics.

Many other uses of the CSDB related for financial stability purposes are conceivable, either in isolation or together with other databases, e.g. on securities holdings. By the presentation of just a few examples of the possible uses of the CSDB in this field this paper just intends increase awareness on these possibilities and prepare the ground for an overall strategy on the use of s-b-s micro-data that aims to reach the full potential use of these new data sets.

6. References

Bank for International Settlements, European Central Bank and International Monetary Fund (2015): Handbook on Securities Statistics.

Cornejo Pérez, A, Diz Dias, J and Hartwig Lojschova, D (2015): New and timely statistical indicators on government debt securities, Statistics Paper Series, European Central Bank, June.

European Central Bank (2010): The "Centralised Securities Database" in brief, Frankfurt am Main, February.

International Monetary Fund: Global stability report (2013), October.

Financial Stability Board and International Monetary Fund (2009): The Financial Crisis and Information Gaps: Report to the G-20 Finance Ministers and Central Bank Governors, October.

Financial Stability Board and International Monetary Fund (2015): The Financial Crisis and Information Gaps: Sixth Progress Report on the Implementation of the G-20 Data Gaps Initiative, September.

Gruic, B and Wooldridge, P (2012): "Enhancements to the BIS debt securities statistics", BIS Quarterly Review, December.