Economic and Finance statistics

Block 4: Micro data for Statistics

Part 2 – Security-by-Security Databases

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Outline

Part 1: Introduction to financial micro statistics - Benefits, challenges and key aspects

Part 2: Security-by-Security databases

1. Main features of Security-by-Security databases
2. Examples of SBS databases
3. Standardisation, Identifiers and Linking
4. Using micro data for compiling macro statistics
5. Summary and conclusions

Part 3: Loan-by-loan data on credit and credit risk

Part 4: MMSR, €STR and Yield curve

Main features of Security-by-Security databases
Background

Security-by-security (SBS) data are becoming increasingly relevant for the production of securities statistics:

- "Provision of consistent and comparable securities statistics" identified as common priority area for the Data Gaps Initiative-2 (DGI-2) by the G20 Finance Ministers and Central Bank Governors (FMCBG) in September 2015

- Increasing recognition that standardised SBS data can play a key role towards achieving this goal:

  SBS databases can *"significantly improve the quality of monetary, financial, government finance, balance of payments and international investment position statistics, financial accounts, and financial balance sheets. Such data are also useful to estimate accrued interest and revaluations due to changes in interest rates and exchange rates"*
  (Bank for International Settlements, European Central Bank and International Monetary Fund (2015): Handbook on Securities Statistics, p. 2f - hereafter HSS)

➢ Growing number of G20 and FSB economies are developing or operating SBS databases

Main features of Security-by-Security databases
Background

Securities are negotiable financial instruments (2008 SNA, paragraph 11.33 and BPM6, paragraph 5.15):

- Negotiability: legal ownership of the instrument is readily capable of being transferred from one owner to another by delivery or endorsement
- While any financial instrument can potentially be traded, negotiable instruments are designed to be traded on an organized exchange or over-the-counter (OTC)
- Securities include …
  - **Debt securities**: Negotiable financial instruments serving as evidence of a debt (2008 SNA, paragraph 11.64)
  - **Equity securities** (shares): Securities acknowledging claims on the residual value of a corporation after the claims of all creditors have been met (2008 SNA, paragraph 11.83)
  - **Investments fund shares or units**: Collective undertakings issued by investment funds, through which investors pool funds for investment in financial or nonfinancial assets (2008 SNA, paragraph 11.94)

(see also HSS, page 9)

Main features of Security-by-Security databases
Basic design

An SBS database is a micro database that stores information at the level of individual securities

- Content: Data on individual securities + Data on issuer (and holding) side

Instrument information						*Issuer information*				*Holding information*			
ISIN	**Instrument Type**	**Maturity Date**	**Nominal Currency**	**Outstanding Amount**	**…**	**LEI**	**Country**	**Sector**	**…**	**Sector**	**Country**	**Holding amount**	**…**
ISIN 1	Debt security (short-term)	31072020	EUR	100000000	…	LEI 1	DE	Government	…	Financial corporation	DE	500000	…
ISIN 2	Debt security (long-term)	15062030	EUR	20000000		LEI 1	DE	Government		Financial corporation	UK	500000	
ISIN 3	Debt security (long-term)	15062020	USD	30000000	…	LEI 2	US	Financial corporation	…	Financial corporation	US	2000000	…
ISIN 3	Debt security (long-term)	15062020	USD	30000000	…	LEI 2	US	Financial corporation	…	Non-financial corporation	DE	5000000	…
…	…	…	…	…	…				…				…
ISIN X	Equity (listed share)	…	JPY	50000000000	…	LEI Y	JP	Non-financial corporation	…	Household	JP	1000000	…

Main features of Security-by-Security databases
Basic design

An SBS database is a micro database that stores information at the level of individual securities

- Content: Data on individual securities + Data on issuer (and holding) side
- Multipurpose:
  - Contains large number of attributes
  - Can be flexibly combined to meet different user needs
- Ideally based on multiple sources (to increase quality and coverage):
  - Commercial data providers, issuers, registers, central security depositories, central banks, government agencies, securities exchanges, financial institutions, holders, custodians (for holdings)

Main features of Security-by-Security databases

Attributes of statistics stored in SBS databases

Security features

- Identification (ISIN, CUSIP, etc.)
- Type of security / Instrument classification (SNA 2008, CFI, Instrument short name)
- Currency of denomination; Quotation basis
- Security status (e.g. alive / not alive)
- Redemption (type, frequency, currency)
- Coupon type and frequency
- Securitisation and Risk
- Dates (issue, maturity, coupon payments, etc.)
- Amounts issued/outstanding/held; coupon rate, accrued interest, yield to maturity
- No. of stocks, market capitalisation, dividends & income
- Prices (issue, current, redemption)

qualitative

quantitative

Entity features

- Name and identification (e.g. LEI)
- Sector (SNA 2008, NACE)
- Country of residency
- Entity Status (e.g. alive / not alive)

May be managed in separate DB

→ Needs proper identifiers

→ SBS DB must contain security-entity link

Market features

- Market identifier codes (MIC) (ISO 10383)
- Volumes traded outright (also possible volumes in repo / secured financing transactions)

Events

- Type (capital increases, liquidations, conversions stock splits)
- Date
- Amounts

Other:
Ratings (default risk of instruments, programs and issuers); Instrument relationships

Examples of SBS databases

ECB Centralised Securities Database (CSDB) - Overview

The CSDB is jointly operated by the Eurosystem of Central Banks (ESCB) – located in the ECB

- **Multisource**
  - Commercial data providers (CDPs)
  - Rating agencies
  - 27 EU National Central Banks (NCBs)
    → Data provision is voluntary
  - ECB internal sources
    - ✓ Collateral and Counterparties Database (C2D)
    - ✓ Register of Institutions and Affiliates Database (RIAD)
    - ✓ Statistical Data Warehouse (SDW)
  - LEI Golden Copy from GLEIF

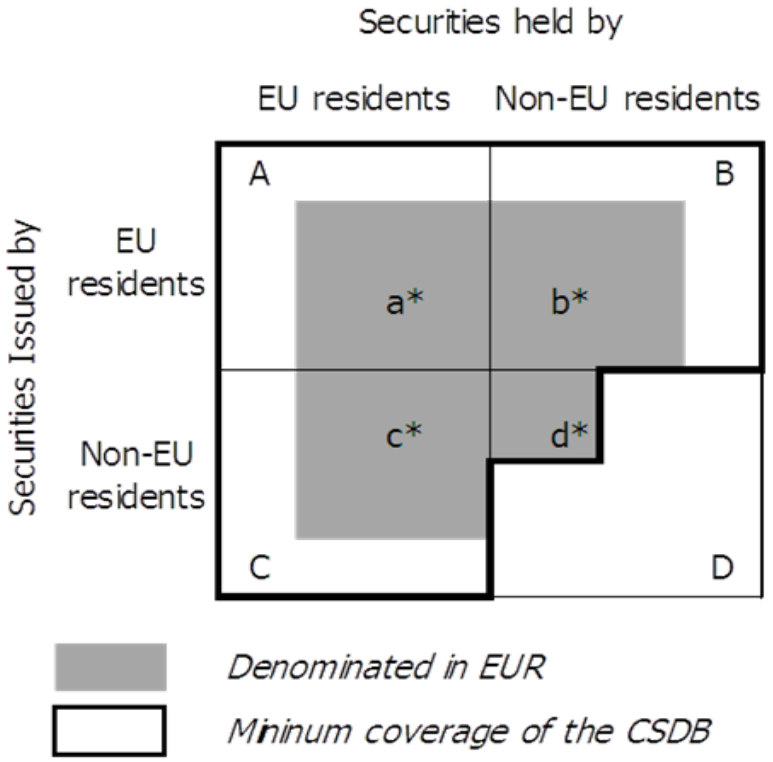
- **Multipurpose**
  - Current production of statistics
    - ✓ Balance of payments and international investment position;
    - ✓ Investment funds statistics; Financial vehicle corporations statistics;
    - ✓ Government finance statistics;
    - ✓ Securities holdings statistics
  - Future production of statistics:
    - ✓ CSDB-based Securities Issues Statistics (CSEC); G20 DGI-2 Recommendation II.7
  - Non statistical uses in the ESCB
    - ✓ e.g. Monetary policy; Fiscal policy; Market operations; Risk management; Financial stability; Banking supervision; Research
  - Non statistical uses outside the ESCB
    - ✓ e.g. European Insurance and Occupational Pensions Authority (EIOPA); European Systemic Risk Board (ESRB)

Examples of SBS databases

ECB Centralised Securities Database (CSDB) - Overview

Database content and coverage

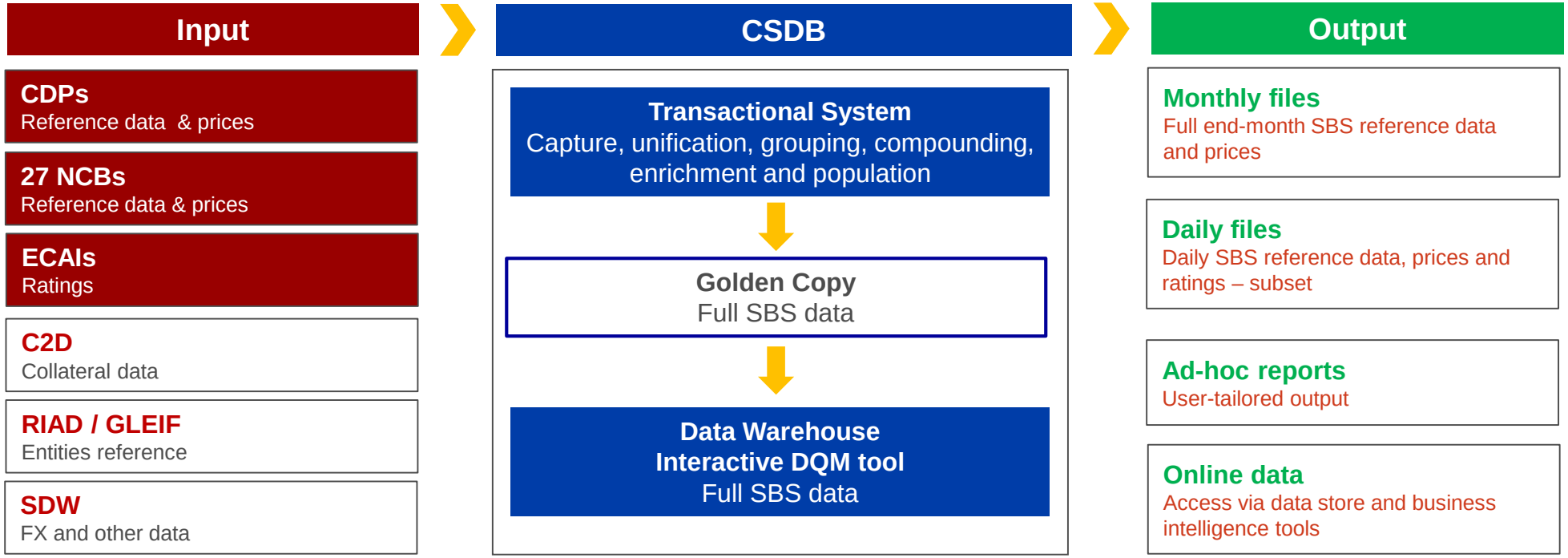
- International Securities Identification Number (ISIN) based
- Focus on debt securities, equity and mutual fund shares/units
  - Denominated in euro (worldwide)
  - Issued by EU residents (all currencies)
  - May be held by EU residents
- Around 7-8 million alive securities
  (> 60 million total securities)
- Contains Reference data on securities and issuers; Prices; Ratings data



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

Examples of SBS databases

ECB Centralised Securities Database (CSDB) - Operation



***CDPs**: Commercial Data Providers • **NCBs**: National Central Banks • **ECAIs**: External Credit Assessment Institutions (rating agencies) • **C2D**: Collateral and Counterparties database • **RIAD**: Register of Institutions and Affiliates Database • **GLEIF**: Global Legal Entity Identifier Foundation • **SDW**: Statistical Data Warehouse*

Examples of SBS databases

ECB Centralised Securities Database (CSDB) - Operation

Joint ESCB data quality management (DQM)

- NCBs monitor data quality of own resident issuers/issues
- ECB monitors data quality of relevant non-EU resident issuers/issues and structural mistakes in the data sources

DQM Framework supported by legal act (ECB/2012/21)

→ developed to be applied to output data relevant for statistics

➢ Current CSDB DQM Framework is based on expert rules that cover different dimensions of data quality

- Stability of data over time
- Plausibility of transactions
- Issuer identification
- Comparison with external benchmark
- Structural changes of issuer population

Interactive DQM tool

Platform for EBC and NCBs to check and modify CSDB data

Examples of SBS databases

ECB Centralised Securities Database (CSDB) - Usage

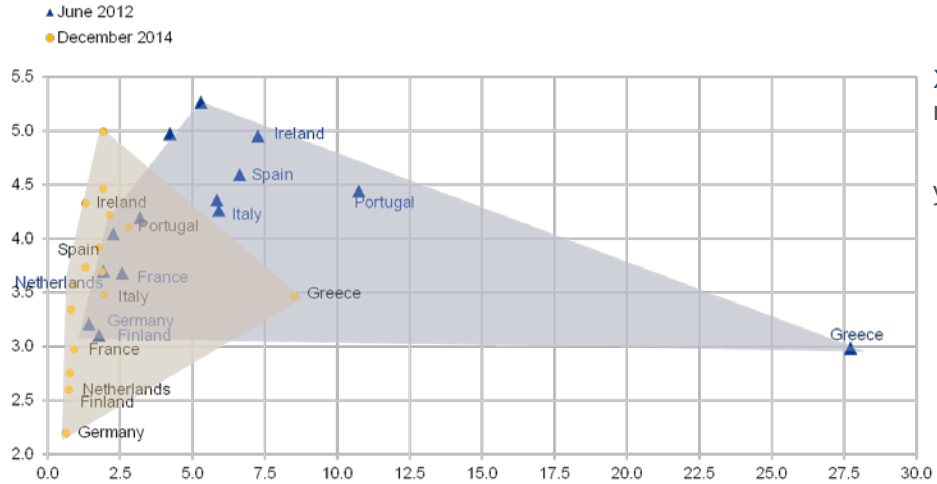
Examples of use of CSDB data

- **Debt securities issued by deposit-taking corporations (DTCs)**

	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%

Source: Cornejo, A. & J. Huerga (2016): The Centralised Securities Database (CSDB) - Standardised micro data for financial stability purposes. IFC Bulletin, n.41.

- **Average nominal yields and 10-year market yield to maturity for euro area government debt securities**



X-axis: Market yield to maturity (% per annum);

y-axis: Average nominal yield (% per annum)

Source: Cornejo, A. & J. Diz & D. Lojschova (2015): New and timely statistical indicators on government debt securities. ECB Statistical Paper Series, n.8.

Examples of SBS databases

ECB Securities Holdings Statistics Database (SHSDB) - Overview

SHSDB is jointly operated by the ESCB – located in the Deutsche Bundesbank and ECB

- **Multisource**
  - Decentralised reporting framework with NCBs
    - ✓ Direct reporting (mainly data on financial sectors): MFIs, IFs, FVCs, ICs, Banking groups
    - ✓ Custodians (data on non-financial sectors)
    - ✓ Internal information
  - CSDB
    - ✓ Reference information on securities and institutions
    - ✓ Prices
  - RIAD → Reference information on institutions
  - SDW → Other statistical data

- **Multipurpose**
  - Current production of statistics
    - ✓ Securities holdings statistics
  - Non statistical uses in the ESCB
    - ✓ e.g. Monetary policy; Fiscal policy; Market operations; Risk management; Financial stability; Banking supervision; Research
  - Non statistical uses outside the ESCB
    - ✓ European Systemic Risk Board (ESRB)

Examples of SBS databases

ECB Securities Holdings Statistics Database (SHSDB) - Overview

Data content compiled

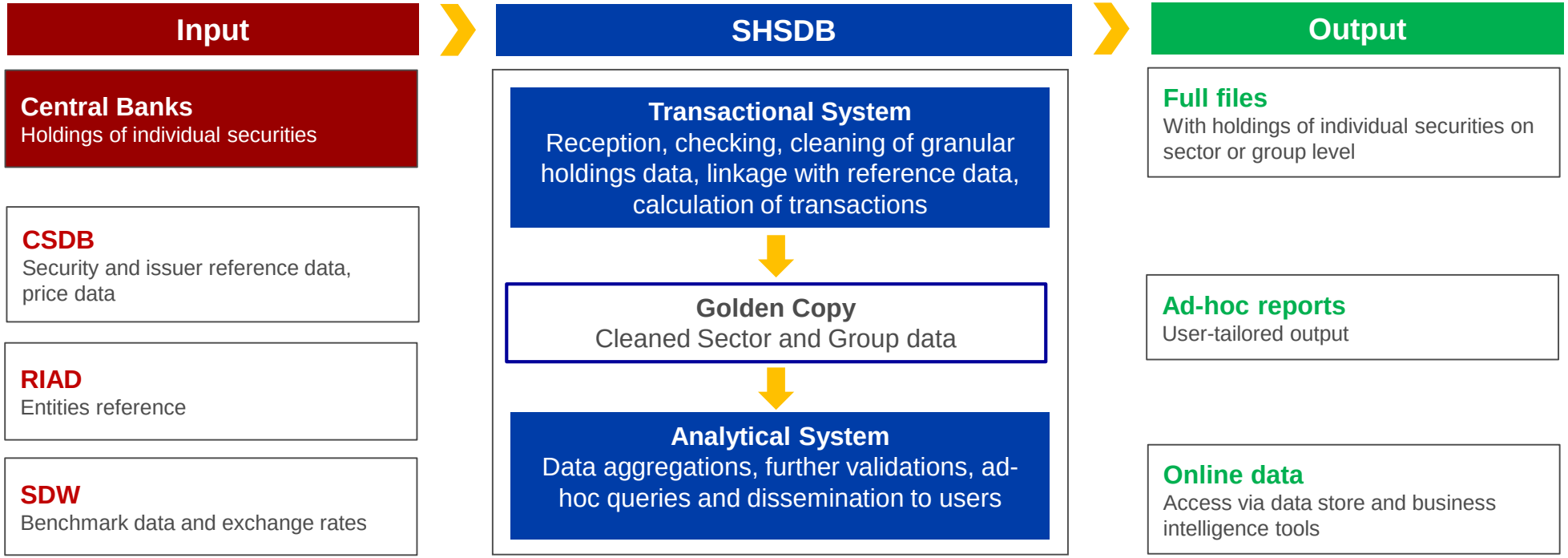
- Holdings on debt securities, quoted shares and investment funds shares/units
  - Positions
  - Transactions
  - Other changes in volume
- 25 EU countries participate
- Data at market value or nominal value/number of shares
- Reporting on a quarterly or monthly frequency

Data provision framework supported by legal acts

- Regulation ECB/2012/24 amended by Regulation ECB/2015/18
- Guideline ECB/2013/7 amended by Guideline ECB/2015/19

Examples of SBS databases

ECB Securities Holdings Statistics Database (SHSDB) - Operation



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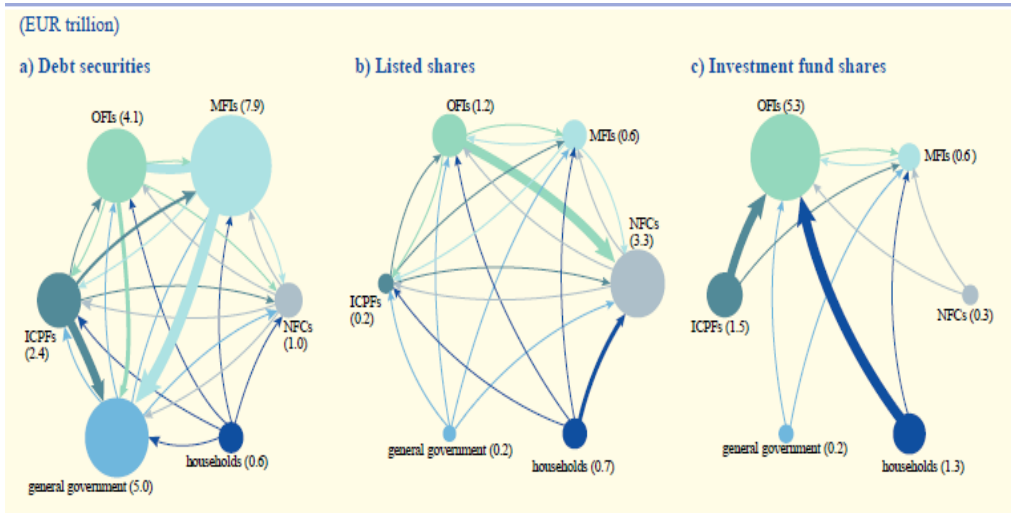
Examples of SBS databases

ECB Securities Holdings Statistics Database (SHSDB) - Usage

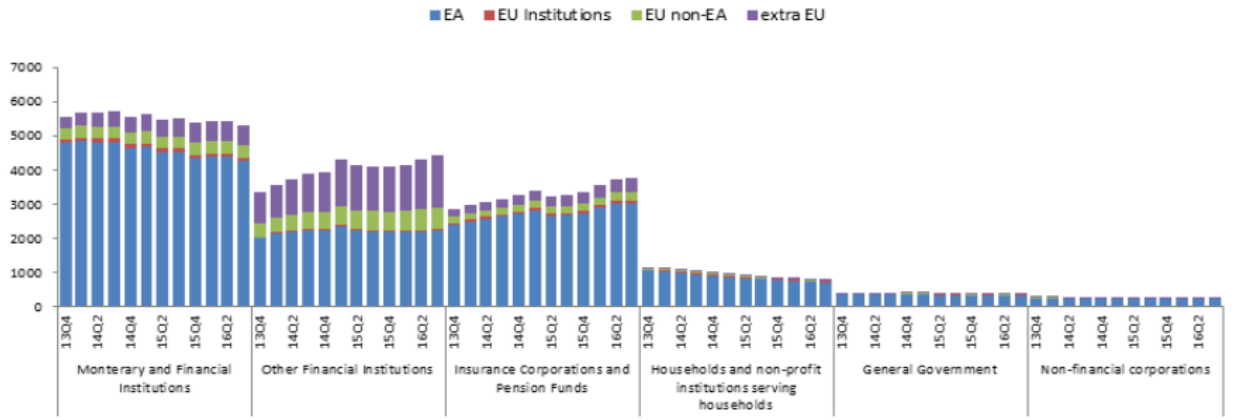
Examples of use of SHSDB data

- **Interconnectedness of euro area sectors**



Source: 'Who holds what? New information on securities holdings', ECB Economic bulleting, Issue 2, 2015

- **Euro area holdings of debt securities by holder sector and issuer area** *(EUR billion, positions at end of period)*



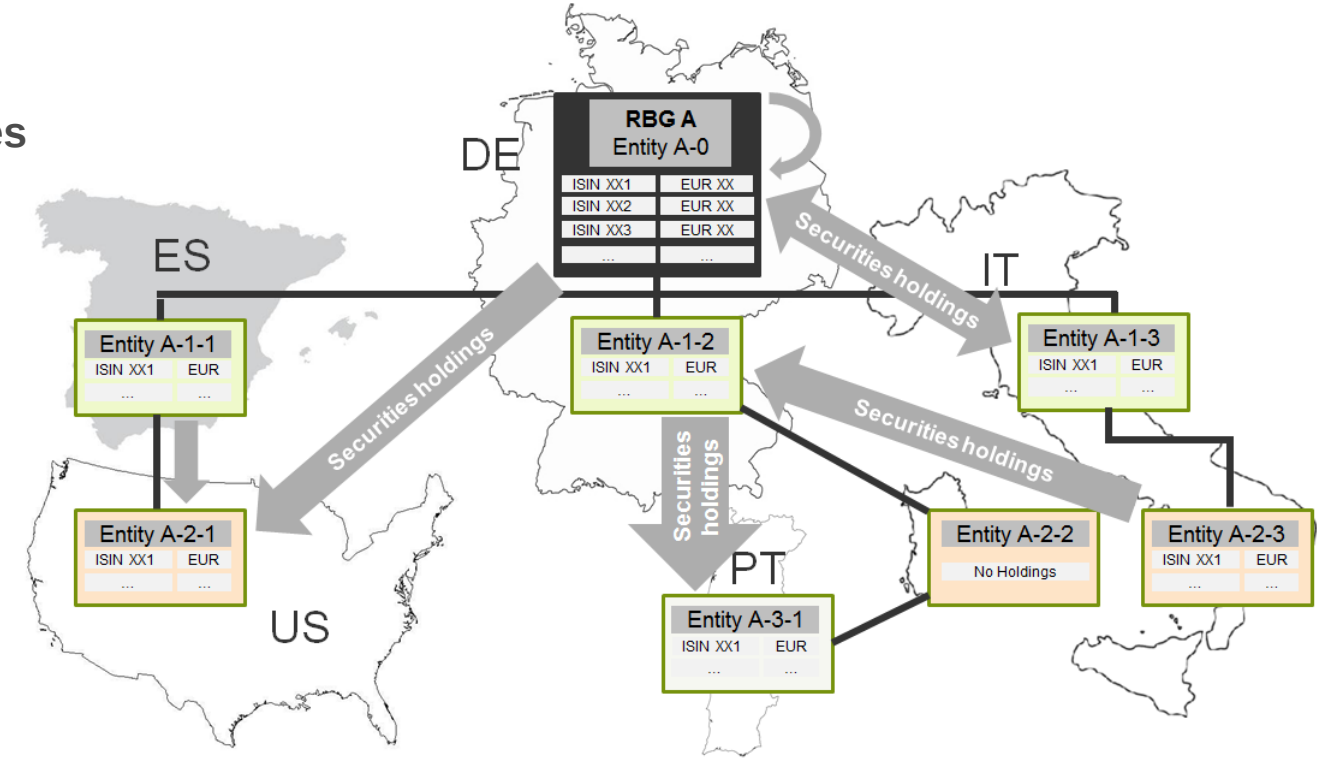
Source: ECB Press release – 'Extended publication of Securities Holdings Statistics', 2 February 2017

Examples of SBS databases

ECB Securities Holdings Statistics Database (SHSDB) - Usage

Examples of use of SHSDB data

- **Global perspective on banking group structures**
  - Availability of entity-by-entity information for all main reporting banking groups in the euro area
  - Allows for a detailed drill-down into group structures and intra-group holdings on a global level



Standardisation, Identifiers and Linking

Standardisation as key aspect for SBS databases

As shown, SBS databases can cover a large range of attributes
(securities reference data; securities holdings information; issuer and holder reference data; prices; ratings)

- International standardisation is of key importance when defining SBS data attributes
  - to achieve consistent and comparable securities statistics at the global level
  - to facilitate linking of SBS data with other micro data sets
- Factors supporting standardisation of SBS data
  - Use of financial industry standards (e.g. ISO codes) → mapping to statistical standards can support statistical compilation of SBS data
  - Trend towards digitalisation of securities issuances → Issuers will be increasingly required to include key information in securities prospectuses in machine-readable format using standardised ISO codes (e.g. EU Prospectus Regulation)

Standardisation, Identifiers and Linking

Standardisation as key aspect for SBS databases

Examples of international standards:

- For many SBS data attributes, international statistical standards (e.g. SNA) or financial industry standards (e.g. ISO standards) can be relied upon
  - ➢ These should be applied whenever possible in order to achieve consistent and comparable securities statistics at the global level

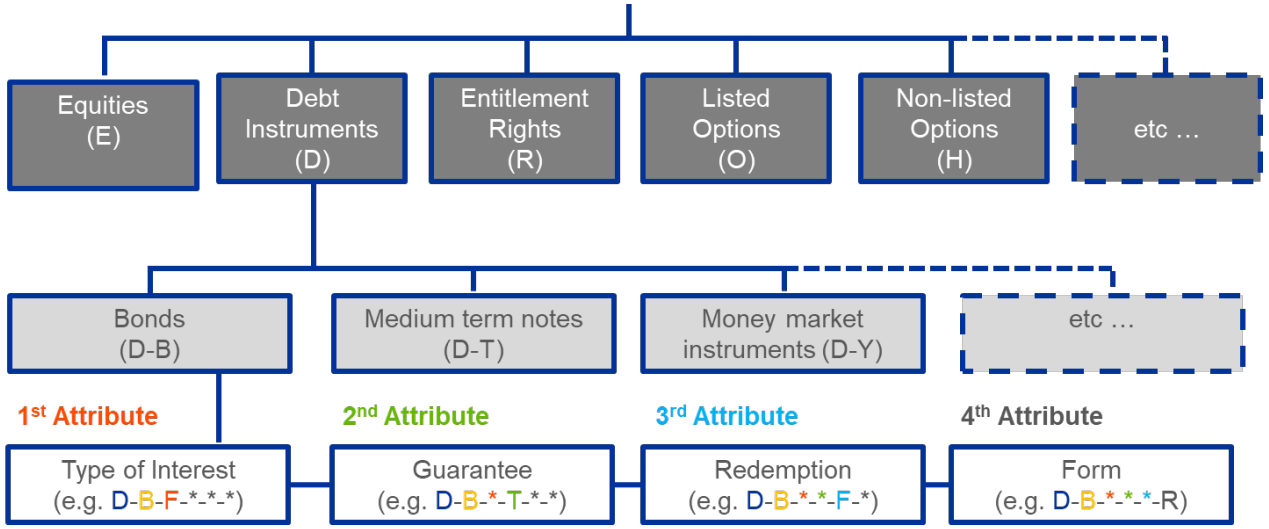
Attribute name	Code list / format	Example
Instrument attributes		
ISIN code	ISO 6166	DE0007100000
Financial instrument short name	ISO 18774	Daimler AG/4.625 MTN 20140902MTP u
SNA instrument classification	SNA code list	F511
CFI code	ISO 10962	ECETFB
Outstanding amount	ISO 80000-1	1,000,000
Currency of denomination	ISO 4217	USD
Issue date	ISO 8601	20170101
Maturity date	ISO 8601	20170131
Coupon type	*No standard code list*	FR, VR, VRA, VRB, VRC
Coupon rate	ISO 80000-1	4.50
Coupon dates	ISO 8601	20150630
Issue price	ISO 80000-1	100.00
Market price	ISO 80000-1	100.00
Market price source (MIC)	ISO 10383	FRAA
Issuer attributes		
Issuer name	ISO 18774	Daimler AG
Issuer LEI code	ISO 17442	ECTRVYYCEF89VWYS6K36
Issuer country	ISO 3166	SE
SNA issuer sector	SNA code list	S1311

Standardisation, Identifiers and Linking

Standardisation as key aspect for SBS databases

Examples of international standards: Classification of Financial Instruments (CFI) – ISO 10962

- ISO standard that provides codification for an internationally valid system to classify financial instruments with similar features
  - Single CFI code is to be assigned to each financial instrument
  - Applies not only to classical securities but covers also other financial contracts and innovative financial products
- CFI is hierarchically composed of six alphabetical characters



Source: ©London Market Systems Limited

Standardisation, Identifiers and Linking

The need for unique identifiers

SBS databases require the use of unique identifiers both for individual securities and for their issuers and holders

- For securities, a single unique identifier is needed in order to avoid duplications
- For issuers and holders, unique identification is needed to link individual securities to their issuer or holder and group them under the same issuing or holding entity

➢ Unique identifiers should ideally be global and licence-free to allow for standardised use across SBS databases of different economies

➢ Two ISO standards that fulfil these requirements are:

- **International Securities Identification Number** (ISIN)
- **Legal Entity Identifier** (LEI)

Standardisation, Identifiers and Linking

The need for unique identifiers

International Securities Identification Number (ISIN) – ISO 6166

- **Structure:** 12 digits, alphanumerical (assigned by National Numbering Agencies)

Example code: **DE0007100000** ← Check digit

9-digit alphanumerical National Securities Identifying Number (NSIN)

Issuing country code

Apart from country code, ISIN contains no embedded intelligence

Legal Entity Identifier (LEI) – ISO 17442

- **Structure:** 20 digits, alphanumerical (assigned by Local Operating Units)

Example code: **ECTRVYYCEF89VWYS6K36** ← Verification ID: 2 check digits

14-digit alphanumerical entity identifier assigned by LOUs

LOU identifier: Prefix to ensure uniqueness among LEI issuers

Surrogate identifier:
Code does not contain any information or classification

Standardisation, Identifiers and Linking

The need for unique identifiers

Advantages of ISIN and LEI

- Global ISO standard that is well established among market participants, data providers and rating agencies → compulsory in several jurisdictions (e.g. in Prospectus Regulation in the European Union)
- Unique identifiers
  - Securities only have one ISIN; Same ISIN cannot be used for different Securities
  - Entities only have one LEI; Same LEI cannot be used for different entities
- Global system to allocate ISIN and LEI → Ensures common rules and practices
- Linked to other ISO standards
  - CFI and FISN are also allocated by numbering agencies, along with ISIN
  - Global LEI foundation (GLEIF) cooperates with Association of National Numbering Agencies (ANNA)

Standardisation, Identifiers and Linking

The need for unique identifiers

ISIN and LEI coverage

- ISIN coverage for securities is already close to being complete in many G20 economies
- Implementation of the LEI is still in progress, but coverage is steadily improving due to increased regulatory use of the LEI
  - ➢ LEI coverage for issuers of securities in the Financial Stability Board economies at end-December 2020

	Non-financial sector (S.11)	Financial sector (S.12)	General government sector (S.13)
EU members	97.9%	98.3%	99.7%
World total	83.0%	85.1%	89.9%

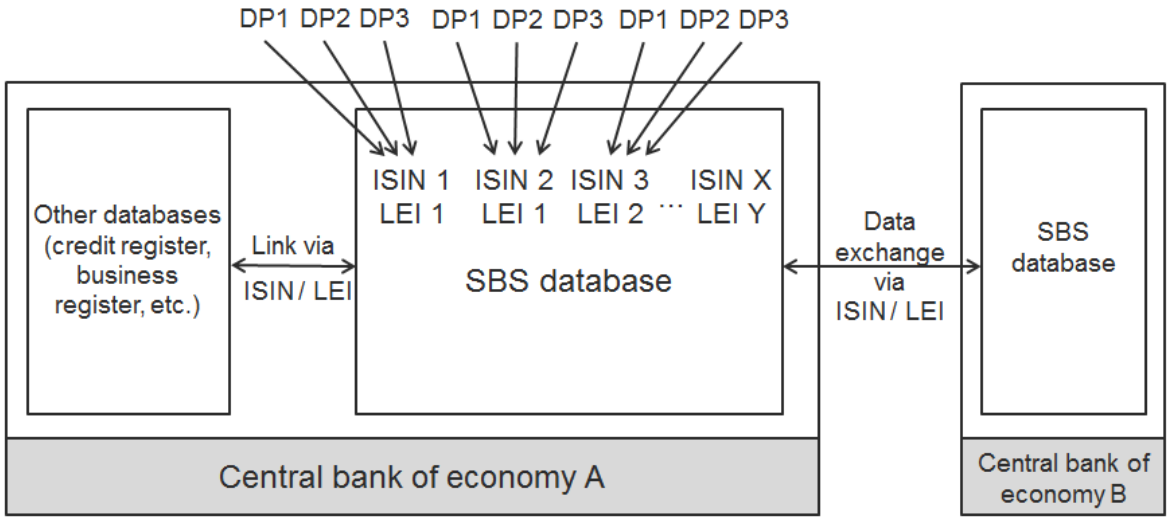
Note: LEI coverage data are weighted by outstanding amounts / market capitalization of securities issuers
Source: ECB Centralised Securities Database (CSDB)

Standardisation, Identifiers and Linking

Linking SBS data through unique identifiers

Standardised unique identifiers allow …

- combining data on the same security or the same issuer/holder from different data providers
- internal linking of databases
  (e.g. on entities, secured financing transactions, derivatives, loans, other)
- external data exchanges
  (e.g. with other central banks)



Using micro data for compiling macro statistics

Key strength of SBS databases lies in compilation of consistent and comparable securities statistics

- Securities issues statistics: SBS data allow producing flexible breakdowns and accessing the underlying micro data
- Securities holdings statistics: Holdings statistics can be produced by linking SBS reference data with holdings information
- SBS data can support compilation of various other products:
  - Government finance statistics
  - Institutional sector accounts
  - Balance of payments and international investment position statistics
  - Balance sheet statistics

➢ Multipurpose use of same micro data helps avoiding work duplication and supports consistency across statistical domains

Summary and Conclusions

Key takeways on SBS databases

SBS databases are becoming increasingly relevant for the production of securities statistics

- Store information at the level of individual securities for a variety of attributes
  - e.g. security reference information; prices; amounts; ratings; issuer/holder information; market data; events
- Ideally based on multiple sources (Multisource) and data can be used flexibly to meet various user needs (Multipurpose)
- Effective use of SBS data benefits from
  - Global and licence-free identifiers for the unique identification of securities and their issuers/holders
  - Standardisation of key attributes
    - ➢ New opportunities for standardisation of SBS data lie in use of industry standards & further digitalisation of securities issuances
- SBS databases with unique identifiers & standardised attributes can strongly support the compilation of consistent macro statistics

Thank you

Happy to receive any question or comments at the Q&A session on 13 July, 14 c.t.