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Setting-up the transmission of individual MFI statistics on balance sheet items and interest rates across the Eurosystem¹

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¹ This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS or the central banks and other institutions represented at the meeting.

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Abstract

From its start in mid-1998, the European Central Bank (ECB) has defined the analysis of monetary aggregates and their counterparts as one of the two pillars in its conduct of monetary policy. Hence, the growth of broad money aggregate M3 has steadily been a key policy indicator. As this indicator is produced by the Eurosystem (i.e. the ECB and the national central banks of euro area countries), its high quality, in particular timeliness, integrity, reliability and accuracy, is of utmost importance. Whereas analyses were run for more than a decade based on aggregated data at euro area and national levels, the financial crisis and subsequent policy measures taken by the ECB in response to it, led to the urgent need to drill down to individual banks' data. While national aggregates remain a key component for the compilation of euro area indicators, granular balance sheets and interest rates data have become an important complementary source of information about developments in the money issuing sector. To meet this demand for granular data, statisticians have faced legal and technical issues in various aspects of data compilation and, in response to these challenges, had to establish a new framework amongst the data compilers to allow for the exchange and use of these confidential data. The collection of individual balance sheet items and interest rate statistics gives an example of a "new statistical framework", i.e. a legal and technical structure tailored to address issues such as: data confidentiality protection, increased reporting burden, new approach to managing databases evolving across time to follow the evolution of, e.g., the reporting samples, data quality assessment with expanded databases or data access to final users. This paper intends to describe and explain the issues behind the integration of granular data in macro statistics environments and to explore the set of solutions that have been investigated in the ECB to monitor in parallel both granular and macro-data flows in the particular case of the banks' balance sheet items and interest rates statistics.

Keywords: Monetary policy – MFI – individual data – monetary aggregates – central banking – interest rates

JEL classification: C81, G21

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Introduction

Micro-data are defined in a formalised way as observation data collected on an individual object - statistical unit. Historically, the European Central Bank (ECB) has always relied in this respect on the concept of Monetary Financial Institution (MFI)³ to conduct its monetary policy analysis and undertake decisions aiming at fulfilling its mandate to maintain price stability in the Eurozone. However, acting as centralising institution and euro-area-level policy maker within the European System of Central Banks (ESCB) has placed for many years the scope of the statistics collected and compiled at the ECB exclusively on information aggregated at the country level. Until 2012, only aggregate data for euro area countries were transmitted on a regular basis by the national central banks (NCBs) to the ECB. To guarantee cross-country comparison and relevant euro area aggregates, ECB regulations⁴ concerning the collection of data on MFI balance sheet items (BSI) and interest rates (MIR) have been issued (together with methodological manuals).

In particular the financial crisis, which started in 2007 and the subsequent deployment of non-standard measures by the ECB, have progressively changed the perspective on data needs to assess the effectiveness of euro area monetary policies, further to the level of inflation in the Eurozone, also for financial stability purposes. In particular, it became clear that evaluating the impairment of the interbank market and analysing the heterogeneity amongst euro area banks regarding their reaction to liquidity shortage and financial ability to face distortions in the money transmission mechanism could only be addressed by looking at the MFI micro picture.

In the first half of 2012, a few months after the announcement by the ECB of additional measures to support bank lending and money market activity, including two longer-term refinancing operations (LTROs with a maturity of 36 months and the option of early repayment after one year⁵), work was jointly initiated by members of the monetary policy and statistics committees of the ECB together with the Eurosystem NCBs to set up an exchange across the Eurosystem of BSI and MIR statistics on an individual basis. In line with the collection of aggregate (macro) BSI and MIR statistics, it was agreed that these data would be collected monthly, thus allowing the timely assessment of ECB non-standard measures' effect.

The individual BSI (IBSI) and MIR (IMIR) datasets were released the first time to the ECB internal users in June 2012 thanks to a strong cooperation within the Eurosystem in order to set up the micro data flow. This paper aims to provide descriptions of the challenges which the ECB statisticians had to face to implement these granular datasets while presenting some of the stakes behind the collection of individual information on the deposit taking and credit granting activity of the euro area MFIs.

³ "Monetary financial institutions" (MFIs) are central banks, resident credit institutions as defined in Community law, and other resident financial institutions whose business is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account (at least in economic terms), to grant credits and/or make investments in securities.

⁴ In particular, four regulations have been issued over time regarding BSI statistics, respectively in 1998, 2001, 2008 and 2013, and two regarding MIR statistics, respectively in 2001 and 2013. See references.

⁵ These two long-term refinancing operations were announced on the ECB website:

https://www.ecb.europa.eu/press/pr/date/2011/html/pr111208_1.en.html

The short story of individual MFI statistics

1. Timeline of proposals and decisions

In 2012, the ECB started to receive on a regular basis from the euro area NCBs individual BSI data. The exchange, which was set up for monetary policy and financial stability purposes, was also supplemented with the one-off transmission of individual BSI and MIR data for historical periods to better support Eurosystem users. These data were intended and still are treated as strictly confidential so that their access is restricted to a limited number of named Eurosystem users. In 2014 the data transmission became permanent and started to also include the regular exchange of individual MIR data.

Another review of the IBSI and IMIR datasets was undertaken mid-2015 in order to address new Eurosystem users' request to expand the sample of MFIs covered in the data exchange and enhance the reporting scheme with higher granularity. The review also included data requirements formulated by the ECB Banking Supervision.

It is worth noting that the short timeline for the implementation of the individual MFI data transmission owes to the fact that the ECB legal framework for collecting national statistics was already in place. It comprises ECB regulations ([ECB/2013/33](#) and [ECB/2013/34](#) at present for BSI and MIR statistics) as well as the ECB Guideline on monetary and financial statistics (referred to as [ECB/2014/15](#) in its last recast). Together, ECB regulations and guideline define qualitatively the scope of the collection of BSI and MIR aggregate data. Statistical regulations are legally binding for all euro area reporting agents; the ECB Guideline imposes obligation on the NCBs to report aggregate data to the ECB. Consequently, none of the data requirements formulated by the ECB stake-holders in setting up the MFI micro-database have ever gone beyond what was already available in the NCBs' databases. While discussing the micro-data transmission it was actually strongly emphasised that reporting agents should not be impacted by the new ECB requirements. Instead, a key issue with the implementation of the individual data transmission was the need to ensure that the regular data flow between NCBs and the ECB remained in line with the strict confidentiality rules applying to individual MFI information. To reach this, the ECB relied on Article 8 of the Council Regulation (EC) No 2533/98 of 23 November 1998 concerning the collection of statistical information by the ECB. Point 2 of Article 8 states that the "transmission from the NCBs to the ECB of confidential statistical information shall take place to the extent and at the level of detail necessary for the exercise of the tasks to be carried out through the ESCB, as described in Article 105 of the Treaty".

2. Purpose of the data collection

The first transmission of individual statistical information was initiated to strengthen monetary analysis, jointly with the country-wide aggregated MFI balance sheet data that NCBs were already transmitting to the ECB, in the context of the 3-years maturity LTROs launched in December 2011.

From a monetary policy perspective, data have been required to monitor the effectiveness of the transmission of ECB policy to the real economy. They also allow for a more comprehensive assessment of developments in euro area fragmentation such as heterogeneity in bank funding costs that can only be analysed with

information on individual bank interest rates on deposits outstanding. For a given reference period, product category and reference area, IMIR data actually show for instance disparity in the interest rates applied by credit institution reporters. The range between the highest and the lowest rates can be significant. This is illustrated on Figure 1 below.

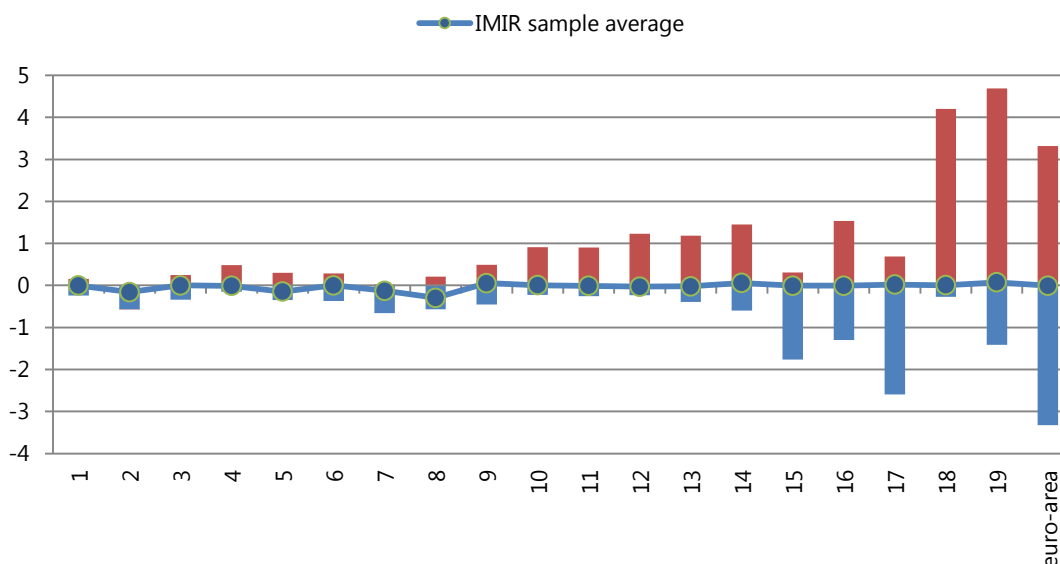
Two desirable features of the individual MFI data collected by the ECB are their timeliness and their content matching the one of the BSI and MIR aggregates. Data are received with a one month time lag with respect to the date they refer to and only a couple of days after reception of the corresponding aggregates. Content-wise, the last enhancement of the IBSI and IMIR reporting templates constituted a significant improvement with higher granularity in the reported data. IBSI and IMIR reporting templates remain however both subsets of the macro BSI and MIR templates as the scope of the datasets in terms of balance sheet items coverage is bounded by the BSI and MIR regulations seen as the common denominator for the data availability across the Eurosystem at the level of individual reporters. This sheds light on one of the main uses of these micro-data which consists in making possible drilling down from aggregated to individual developments and thus identifying key players in national trends for the set of balance sheet and interest rate indicators used for monetary policy or financial stability purposes. It also allows putting nuances in the national pictures provided by the aggregate data: one can look at the distribution of certain indicators at country level or clustering MFIs according to specific criteria. For instance, economists look at the distribution of lending rates for non-financial corporations (NFCs) splitting euro area countries between vulnerable and less vulnerable economies. More generally speaking micro-data give Eurosystem users more flexibility to apply statistical tools in order to analyse transmission mechanism of monetary policy instruments: micro-data give users a macro-scope for analysing statistical information.

Taking the example of IMIR, the need for more granular information on banks' net interest margins has also arisen in the particular context of prolonged low interest rates, of which the negative rate on the deposit facility. Besides, as the purchase of securities via the expanded Asset Purchase Programme decided by the ECB in January 2015 is expected to influence the financing conditions of euro area households and firms, additional monitoring of banks' risk-taking behaviour has become necessary to assess possible risks for the financial stability of the Eurozone. The current economic circumstances justify the last enhancement of the data collection. From a forward-looking perspective, reviewing and possibly increasing regularly the sample of credit institutions included in MFI micro-data should allow for better calibrating future policy responses taking into account a broader range of business models, in particular and again regarding loans vis-à-vis the non-financial private sector.

Dispersion¹⁾ of interest rates applied to loans for house purchase denominated in euro, by euro area countries (1-19)

Data with reference September 2015^{2) 3)}

Figure 1



Source: ECB.

- 1) Dispersion is calculated based on the September 2015 observation reported for the corresponding MIR aggregate series.
- 2) Euro area countries have been anonymised and sorted in ascending order according to the difference between the highest and the lowest interest rate applied across all MFIs included in the IMIR sample.
- 3) The IMIR sample average corresponds to the interest rate average weighted by new business volumes when only IMIR reporters are taken into account. The actual MIR sample (used for aggregate statistics) may be different in some euro area countries leading to a spread between the so-called "IMIR sample average" and the corresponding reported MIR statistics (e.g. country No. 8 on the chart).

3. Content of the individual BSI and MIR datasets

The IBSI statistics encompass information on the balance sheet of MFIs, both on the assets and liabilities side. The asset side indicators include cash, loans to households, NFCs and governments, debt securities, money market fund (MMF) shares/units, equity and non-MMF investment fund shares/units, non-financial assets (including fixed assets) and remaining assets. On the liabilities side, time series are collected for deposits included and not included in the broad money aggregate M3, debt securities issued, capital and reserves and remaining liabilities. The granularity of series allows the analysis by loan purposes for households' loans, e.g. loans for house purchase, and by maturity. Regarding banks deposits, information is collected broken down by type (overnight, with agreed maturity, redeemable at notice, repos), maturity and reference area of depositors (domestic versus other Monetary Union Members) with a focus on deposits placed by NFCs and households – granularity is higher for these two sectors.

NCBs report to the ECB outstanding amounts and, for some of them, the corresponding adjustment series, so called ancillary series, covering on best effort basis information on revaluations for changes in prices and exchanges rates,

reclassifications or loan write-offs/write-downs. For loans, additional data on loan transfers, linked for instance to securitisation, are also covered. These loan transfers and adjustment series are collected to derive meaningful transaction measures that reflect actual banking business. As for the aggregate BSI, the information received also allows the compilation of indexes of notional stock from which growth rates are derived.⁶

The individual MFI interest rate data collection, similarly to aggregate MFI interest rates statistics, covers interest rates on euro-denominated deposits as well as loans to households and NFCs. Regulation ECB/2013/34 defines statistical standards for the selected reporting agents and requires from them to report 117 interest rate indicators with the corresponding volumes, of which 91 refer to new business and 26 to outstanding amounts.

Summary of indicators collected for individual MFI Balance Sheet and Interest Rate data

Evolution of the number of indicators since June 2012

Table 1

Number of indicators	June 2012	June 2014	October 2015	
Assets	Outstanding amounts	13	15	65
	Adjustment series	12	12	22
	Rates on new loans	24	24	27
	Rates on outstanding loans	-	-	9
	New business volumes of loans	24	22	25
Liabilities	Outstanding amounts	11	15	61
	Adjustment series	11	11	10
	Rates on new deposits	11	11	11
	Rates on outstanding deposits	-	-	4
	New business volumes of deposits	7	7	7

The MFI sample

The main ingredient of individual MFI statistics compared to their corresponding macro-data (aggregate BSI and MIR) is the sample of banks to be selected for the BSI and MIR panels in order to ensure that indicators developed based on the data collected reach a statistically significant coverage of the total population of reporting banks. This section explains the selection criteria that have been used in order to make this selection.

1. Selection of the banks panel

The panel was initially constructed in 2012 so as to cover primarily the largest MFIs in each euro area country plus their significant non-resident branches and

⁶ See also "Technical notes" of the ECB Statistics Bulletin: <https://sdw.ecb.europa.eu/servlet/desis?node=10000022>

subsidiaries across the euro area. Since 2012 the MFI sample has undergone several reviews while being always confined by the ECB regulations applying to the collection of balance sheet items and interest rates. Data on balance sheet items based on solo accounts as a rule were collected on monthly basis until December 2014 in frames of Regulation ECB/2013/33. However, under Article 8, the Regulation allowed NCBs to grant the smaller MFIs - institutions in the tail - derogations in statistical data reporting requirements. Hence individual data for tail reporters cannot be available. Furthermore, some credit institutions might have even participated individually in the monetary operations - one of the sample selection's criteria - but statistical data were reported in aggregated way in line with Section 2 of Annex III in Part 2 of Regulation ECB/2013/33. Furthermore Regulation ECB/2013/34 foresees the collection of MFI interest rates data to be performed either as census or as stratified sampling.

Taking into account these legal limitations, an expert group conducted analysis and discussions regarding the MFI panel which first led to the conclusion that the sample of MFIs to be reported individually should fulfil the following three criteria:

- **Bank size:** the MFI should belong to the 150 “largest banks” stipulated in the Governing Council request. Due to the specific aim of the individual data collection, the first constraint on the “appropriate bank’s size” triggered discussions on the way MFIs size could be understood. One criterion was that the requested selection of banks should ensure high coverage ratios for both total assets and lending to private non-financial sector. Amongst various alternatives discussed and taken into consideration such characteristics as total assets, total main assets or volume of lending to non-financial sector were taken into consideration.
- **Active participation in monetary policy operations:** the idea was to ensure the coverage of main participants in different policy measures: 3-years LTRO, deposit facility users as well as users of ECB refinancing.
- **Representativeness:** a national selection of MFIs should ensure the representativeness of the selected panel for monetary policy transmission as well as lending to non-financial private sector. In addition, the membership in the EBA sample could allow evaluating the regulatory impact on the monetary transmission. Furthermore, it was ensured that 131 banks participating in the ECB’s Bank Lending Survey are included in the sample as representative main lending institutions for each euro area country.

In a second stage initiated in May 2012, an Expert Group made of NCB experts together with experts from the ECB’s Directorate Monetary Policy, Directorate General Statistics and Directorate General Research checked the presence in the proposed sample of special institutions having no deposit taking or loans granting activity and for which little analytical value would arise from monthly monitoring. In this respect, the coverage of savings or cooperative banks was examined, as specialised central institutions often channel the liquidity injected by the Eurosystem to small institutions. There was a strong need to identify the use of monetary policy instruments, in particular for the creation of loans to the private non-financial sector. In the relevant countries, special institutions were complemented with a set of associated deposit taking or loans granting credit institutions. Finally, in line with the Governing Council request to report the 150 largest banks, the Expert Group agreed on the selection of 248 credit institutions belonging to around 115 headquarters. The selected reporting agents were

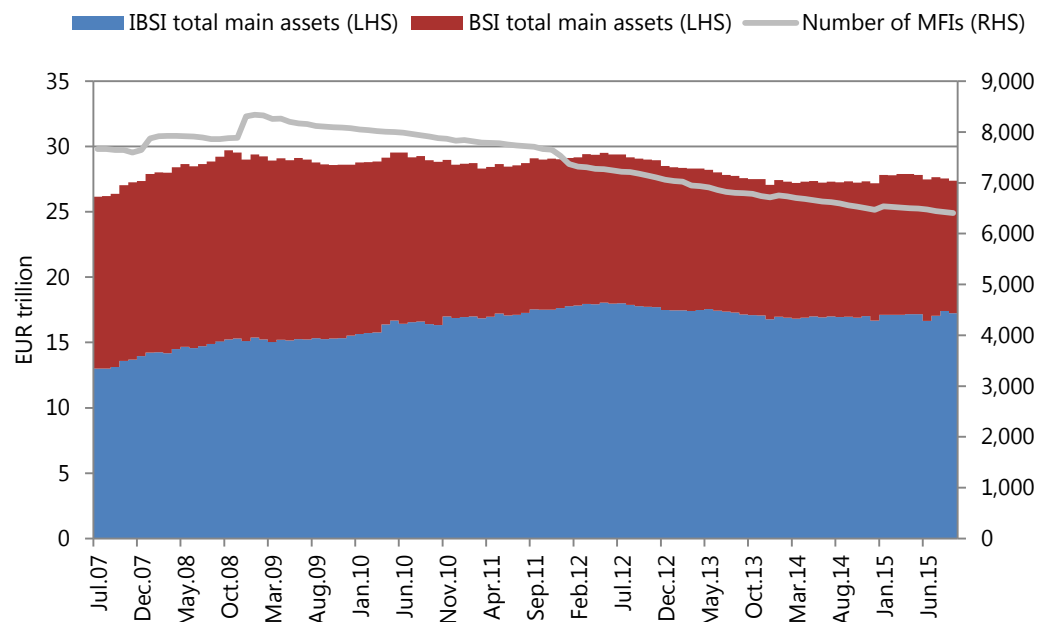
informed individually, as mentioned above, via a notice sent by their National Central Bank.

Figure 2 below displays indicatively the number of MFIs resident in the euro area as well as their total assets reported under both aggregate and individual BSI statistics. It shows that a relevant sample of banks for monetary policy analysis requires well-thought selection criteria as both the euro area MFI population and volume of total assets evolve over time. The new extension of the IBSI and IMIR datasets should lead to another approximately 50 credit institutions covered at individual level while the total assets' coverage, based on the aggregate BSI figure, should increase by 10%.

Total main assets¹⁾ coverage across euro area MFIs

Data with reference July 2007 to September 2015

Figure 2



Source: ECB.

1) Total main assets equals total assets minus remaining assets as defined in Regulation ECB/2013/33.

2. The concept of micro-data group

The scope of the IBSI and IMIR data collections comprises the reporting of accounting positions on a solo basis. However, in some cases, aggregated data have been also reported for group of banks defined at country level. Such aggregates may either result from derogations permitted by the Regulation, and be therefore reported as such to the NCB, or be compiled by the NCB itself based on country-specific criteria. In particular, starting with the 2015 extension, some NCBs opted for the aggregate reporting of savings banks and/or cooperative banks under a single MFI identifier as this is of economic relevance in the case of small institutions following a common and well-defined business model. In light of these fictitious entities – these aggregated groups have *a priori* no legal status - the need arose to

establish a new concept for aggregated reporting in the particular case of individual MFI statistics, which is referred to as Micro-Data Groups (MDGs) in the ECB technical documentation. Under the IBSI and IMIR frameworks, a micro-data group is defined as a set of banks for which data are reported on aggregated basis but which do not necessarily constitute any legal form. Consequently, the aggregation perimeter does not necessarily match with the one applying to supervisory reporting for instance and it might not be captured by the ESCB Register of Institutions and Affiliates Database (RIAD) which contains the full list of MFIs in the European Union based on information provided regularly by all members of the ESCB.

The idea of *micro-data groups* is to leave space for the NCBs to report aggregated information along different national practises. So far, the following cases were for instance identified:

- Individual data of small MFIs are collected by one MFI which plays the role of the central institution for the group. Aggregated data are directly transmitted to the NCB covering both the central institution and the group members. In such case neither the responsible NCB nor the ECB has access to the underlying individual information on small banks.
- The central reporting institution's data are not combined with the other MFIs' figures on which behalf this central institution is reporting. In this case, the central reporting institution transmits two full sets of data: one for its own business, based on solo accounts and encoded with its own standard MFI ID, a second one covering the activity of all other institutions. The individual data might be available at the NCB but they are transmitted aggregated to the ECB. In this case, the NCB performs the aggregation by grouping similar institutions within a MDG.
- Data of a small bank is reported both under a MDG on aggregated basis and on solo basis accounts under its original MFI ID. This case is a very similar to the second one when; apart from the aggregated data, the central reporting institution also reports its own individual data. The only difference is that any single MDG member can be reported in addition to the aggregated dataset. Identifying these cases is crucial when it comes to the aggregation of the micro-dataso as to avoid double counting.

As not all full BSI statistics reporters are included in the MIR statistics sample, MDG compositions may sometimes differ for IBSI and IMIR datasets. A bank which is included in the IBSI MDG and is a full BSI reporter does not necessarily provide its MIR data as it might not be a member of the MIR national sample. Besides, banks mergers, acquisition consolidations and restructuring can lead to changes in the micro-data reporting population quite regularly. This implies being able to timely monitor the evolution of the MFI sample. For example, the IBSI/IMIR SDMX data exchange model requires the dimension representing the reporting institution's MFI ID to be listed in the structural definition codes. So here is a need to react on any sample addition or deletion before the actual data exchange takes place. In this context, it was decided to enhance the RIAD system so as to make possible the comprehensive management of MFI lists for micro-data collection purposes. In its data model, RIAD already had a statistical reporting requirements domain (REPT) allowing flagging individual MFI as *BSI full reporter* (EA_BSI_F), *BSI reporter subject to derogation under Article 9 of the regulation* (EA_BSI_NF) or *MIR statistics reporter* (EA_MIR). The list of flags was further developed to also include information on the MFI's IBSI/IMIR samples membership:

- EA_IBSI_EUROSYSYSTEM: MFI belongs to the IBSI sample.
- EA_IMIR_EUROSYSYSTEM: MFI belongs to the IMIR sample.
- EA_IBSI_EUROSYSYSTEM_MDG: MFI is reported within a MDG for the IBSI dataset.
- EA_IMIR_EUROSYSYSTEM_MDG: MFI is reported within a MDG for the IMIR dataset.

At current stage, 14 MGDs are covered in the data transmission, covering about 2000 small MFIs whereas approximately 300 entities directly report individual data.

3. Coding of MFIs in the data set

From the very beginning, the data structure⁷ adopted for the transmission of individual MFI data has used the official RIAD MFI ID for each institution included in the sample. The RIAD list of MFIs is maintained and updated regularly by the ECB in accordance with Regulation ECB/2013/33 and Guideline ECB/2014/15. Each NCB allocates a unique MFI ID to each resident MFI in its geographical area. An MFI code consists of the two digits ISO code corresponding to the resident country followed by any alphanumeric combination of characters, whose number is restricted. In general, MFI identifiers are assigned once only and do not change over time. However, in case of major internal data management reorganisation, central banks are entitled to change these codes. This is seen as a challenge for the maintenance of the individual data reporting system which aims at guaranteeing the univocal identification of reporting agents for users.

In 2014 the reorganisation of internal data management in two NCBs led to important changes in the recording of MFI identifiers: on 3 July 2014 in Belgium and on 17 July 2014 in Italy⁸. This experience resulted in the development of a commonly agreed best practice for managing the transmission and dissemination system environments at the ECB: before new data were received, the ECB team would recode in its databases all data sent with the outdated MFI IDs and remove the series referring to these outdated MFI IDs from the corresponding reception lists in order to prevent the new data from coming with the outdated series keys. At the same time, the involved NCBs are informed that only newly encoded data can be transmitted, even in the case of revisions. The newly encoded series are then disseminated to data users with an explanatory note on the MFI IDs change.

In case of mergers and acquisitions, the recoding of data does not take place. If two in-sample institutions *A* and *B* merge into a newly created institution *C*, the MFI ID of institution *C* is used for the corresponding time series, while historical data are still sorted under the MFI IDs of institutions *A* and *B*.

⁷ SDMX Technical Standards allow the exchange of data (and of metadata closely associated to these data) among statistical institutions based on known data structure definitions. More information about the structure SDMX statistical domains be found in: https://sdmx.org/?page_id=4345

⁸ Further details are available under the FAQ section: <https://www.ecb.europa.eu/stats/money/mfi/html/index.en.html>

Micro-data processing

1. Data transmission

The use of the SDMX data transmission standard was identified as the most appropriate solution to transmit data from the NCBs to the ECB. On the other hand, the restricted Statistical Data Warehouse⁹ was chosen for the 'back-flows'. The following three criteria were taken into consideration when opting for the SDMX format:

- confidentiality of individual data transmission
- flexibility in handling the MFI codes
- technical infrastructure on the NCBs that allows generating the GESMES/TS files, and respecting deadlines for data transmission.

During the testing phase, in order to reduce the burden for the preparation of the transmission system, CSV/Excel files were accepted, upon bilateral agreements between each NCB and the ECB. The ECB team was converting the received files into GESMES format with the highest confidentiality flag ("C") to the data.

2. Data quality assessment

The ECB performs data quality checks on each time series received from the NCBs. These checks may be divided into two categories.

- **Formal checks** are based on the data model requirements. They consist in making sure that all required data have been reported for all MFIs, that stocks (IBSI) or new business volumes (IMIR)¹⁰ are reported with positive values, that, wherever in the IMIR template rates are reported, the corresponding business volumes are sent with strictly positive values. Formal checks also include the assessment of relevant changes compared to the previously transmitted data. For instance, IMIR rates or business volumes observations which did not change compared to the previous reference period should be either revised or explained by reporting agents. New missing values are also looked. For IBSI, any new missing value for a given time series must be explained owing to the nature of balance sheet items. By definition, all formal checks must hold. For IMIR, any missing value reported for a time series for which the previous seven observations were not missing must be either revised or explained. The reason behind it is that individual MFIs do not always necessarily grant new loans or take deposits for all breakdowns at each reference date¹¹.

⁹ ECB interface to release and present data. Part of the data released are accessible to the general public, the rest is only accessible to a restricted set of users managed internally,

¹⁰ For further details on the definition of new business volumes, see ECB Regulation EU/2013/34.

¹¹ The value 0.0000 (rate) indicates an interest rate equal (or very close to) to zero, and the value 0.000 means a very small value of new business (less than 500 €). In IBSI, the value 0 can mean either a small or non-existent volume. NC is used only when the reporting bank does not offer the particular product at all.

- **Linear checks** are internal consistency checks. They look at accounting relations between reported breakdowns and reported totals (for instance, the amount of debt securities pertaining to all maturities must equal the sum of debt securities reported for short-term and long-term maturities). By definition, all these checks must hold with a certain tolerance threshold estimated at country level.
- **Plausibility checks** examine probable relations between reported breakdowns. They are based respectively for IBSI and IMIR on the well-established BSI and MIR aggregate statistics. Via these checks, observations reported for the individual MFIs are basically benchmarked with the corresponding country aggregates. For instance, “individual” new business volumes and outstanding amounts from the credit institution’s balance sheet reported respectively under IMIR and IBSI must not exceed the aggregated country of residence’s business volumes and outstanding amounts reported under MIR and BSI. The same rule applies to the aggregates compiled exclusively from the IBSI and IMIR samples (sum of all underlying individual reporters). IMIR plausibility checks also look at the difference between the interest rate for a country constructed from the IMIR sample and the rate reported in MIR statistics: such difference is expected to be minimal. When a plausibility check fails, it is very likely that the underlying series have been wrongly reported. However, due to the sampling method applied for compiling MIR statistics and to stratification issues¹², plausibility checks set for interest rates do actually not always hold; in some cases, the direction of change between two consecutive observations might even be different.
- **Graphical checks** only apply to IMIR statistics. Individual series graphs are produced to display the development of rates and new business volumes over time, for each individual data reporter and for each reported indicator. They allow to identify outliers or unusual developments in the series. Country level graphs showing the evolution of each aggregated national series focus on distribution measures such as median, quartiles while marking banks with rates exceeding the country average +/- 3 standard deviations. Moreover, for each breakdown, a Lorenz curve of the new business volumes at the latest data point available is calculated in order to assess business concentration for each breakdown.
- **Top-down analysis** consists in looking at individual MFI preliminary aggregates to identify special developments at a lower level of granularity than the one corresponding to the directly transmitted data. For instance, let us assume that institution A reports short-term loans to both domestic and other euro area resident households and for both house purchase and other than house purchase purposes. At first stage, and given a reference date, only the total aggregate “short-term loans to households” is checked, based on a threshold determining as of which level a subcomponent of the aggregate is to be deemed out of the usual range. In this example, the outcome of the top-down analysis could be that only the decrease in loans granted to domestic households for house purchases explains the downward trend observed on total loans to euro area households. Providing that the threshold value is properly set for the given credit institution, such conclusion can be then drawn from looking at a single time series instead of the four series actually transmitted by the

¹² The Guideline ECB/2014/15 in Annex II specifies how the sampling and stratification of the national MFIs should be performed.

reporting agent (two reference areas by two household loans types). This allows optimising the data quality assessment by reducing the amount of observations to be checked while making more straightforward the identification of key players in the trend followed by indicators more broadly used in macro-economic studies (example of the aggregate “total loans to the private sector”).

Challenges and way forward

One of the biggest challenges raised by the collection of more granular data by a central institution such as the ECB is the greater exposure to national practices and market specificities than in the case of aggregated statistics. Whereas international organisations may apply global standards for macro statistics granting direct compilers a reasonable amount of flexibility for their implementation at national level, the demand for micro-data make institutions face much more prominently the issue of national practices for compiling regulated statistics. This dramatically changes the perspective on how to collect data: rather than giving priority to users’ needs by providing the best indicators summarising the state of play of the economy in a given geographical area –example of the euro area broad money aggregate M3 - the focus of micro-databases implementation must be set on the reconciliation of granular national statistics within a single and consistent data model. In other words, whereas users are given more wiggle room to decide ad hoc on what to do with granular data, compilers must face up to the difficult task of harmonising country-specific data inputs.

As a matter of fact, statistical requirements laid down in the BSI and MIR regulations issued by the ECB are mandatory for reporting agents in euro area countries, not subject to the derogations stated in Article 9 for BSI statistics, and selected by NCBs drawn from the reference reporting population for MIR statistics. While ensuring that data for individual reporting agents are made available in accordance with the BSI and MIR reporting tables, NCBs can however incorporate these requirements in their national reporting forms in order to avoid duplications and to minimise the reporting burden for their reporting agents. This may result in the use of several data sources to compile aggregates; for instance, positions vis-à-vis the NCB may be sourced directly from the NCB’s financial statements. NCBs may also provide their reporting agents with a reporting scheme for BSI and MIR statistics showing a higher granularity than the one required by the ECB regulations. Such practises may become problematic if there were initially specifically set up for the compilation of aggregates but not for the production or transmission of the underlying individual data.

Until now, in order to physically transmit the individual BSI and MIR statistics, many NCBs have relied on already existing tools in their statistics department set up for the aggregate data and in some cases this might be suboptimal. Standard SDMX messages which ensure the full confidentiality of statistical data transmission have not necessarily been used at first stage. Database patches also had to be done in some cases in order to combine the different data sources used to compile aggregate data. This may affect the data quality and surely makes the quality assessment on ECB’s side more difficult as the NCBs response is likely to take longer when reverting to countries on their specific data issues (failing checks, outliers, special development, etc.). The next challenge is to concentrate efforts on the

integrated management of micro-databases. Some work has for instance already been done in Banco de Portugal where statisticians worked on a Business Intelligence Architecture model to be used as reference in IS/IT developments in the statistical area. Their idea is to be able to connect efficiently different data sources via a centralised reference database while providing final users with harmonised outputs independent from the initial data sources.

Cooperation with the NCBs is also a key component when implementing new statistical reporting frameworks. In the specific case of micro-data transmissions, not only NCBs provide the required data to the ECB but they also act as a necessary intermediary between the European institution and the credit institutions in their respective country. Beyond the communication challenge it might represent, the ECB is anyway not empowered to deal with MFIs directly so that only NCBs may revert to credit institutions in the case of questions arising from the data quality assessment. This partly illustrates the philosophy behind the Eurosystem which consists in sharing tasks between the ECB and the NCBs. To this aim and especially in order to achieve a level playing field in processing the data between national compilers and ECB statisticians, efforts have been made to set up appropriate and well defined timelines for each production round despite the data non being published outside the ESCB. NCBs know when to transmit the data, when to expect a feedback from their ECB counterparts and when data are made available to internal final users. The ECB and the NCBs also share folders on a server containing live documents so that any relevant information is channelled as fast as possible between stake-holders.

One enhancing aspect of the statistical reporting framework set up for the collection of individual MFI statistics is the forward-looking approach that was undertaken since the beginning by the project's main contributors. This started with the pilot exercise conceived as a "warm-up transmission" for both compilers and users. Compilers had to design ad hoc quality assessment tools but at the same time they benefitted from relative flexibility to do so. In particular, they were not constrained time-wise by any official publication or press release and from a methodological perspective, they were also not bound by the monetary policy framework applying in the context of "standard measures". The approach was really to investigate the potential of individual MFI statistics to retrieve additional information with respect to the aggregate data in the case of non-standard monetary policy measures. As the pilot exercise finally became a regular production, one may say that the way forward has already started and may be seen as the ongoing way. The last step of the implementation was launched in October 2015 and demonstrates a clear willingness on the ECB side to carry on and further develop the compilation of micro-statistics with the NCBs' support.

In the future, the ECB could ideally receive both the aggregate and individual datasets simultaneously, i.e. on the exact same day, in order to carry out the data quality assessment of both data flows in parallel. This would partly streamline the checking of aggregates by allowing ECB compilers to directly look at underlying series at MFI level when identifying outliers or special developments in the aggregate time series rather than always reverting back to countries.

Progress can also still be made in clustering banks within the MFI reporting sample. Although credit institutions are clearly defined at European level, there remain many differences at country level across banks regarding their size and business models. Being able to better classify credit institutions should allow for a

better understanding of the information provided by banking macro data. This becomes particularly relevant in the light of the increasing regulatory requirements for banks. The Supervisory Board Chair Danièle Nouy said in a conference held in October 2015 that the ECB Banking Supervision aims to make banks more comparable and trustworthy and will therefore focus on banks' business models as of 2016. How can statisticians help in this if not by breaking down the broad concept of credit institutions? In this direction, two steps were already achieved with the inclusion, on one hand, of the information on the level of significance of the MFIs amongst the metadata for the IBSI and IMIR samples, and, on the other hand, with the concept of micro-data groups introduced for countries where group of banks may be relatively clearly identified by their business model. However a significant amount of work is still to be done since there is so far no qualitative classification of credit institutions, beyond their ownership and relationship to the parent institution when it exists, available and agreed at European level. Such a classification should be nonetheless established carefully since it should not rely, at least not fully, on "objective figures" such as the banks' total assets for instance or any capital adequacy ratio. In particular, there is always a risk in categorizing qualitatively undertakings. First, in the case of credit institutions, national competent authorities already apply their own scope of consolidation for the financial reporting of entities operating in their country. What if not all of them belong to the same category according to cross-country classifications? Secondly, not all banks may recognise themselves in the categories they would be possibly put into, which they may perceive as a reputational cost. Retroactively this may impact the way they carry out business and lead to a biased interpretation of the MFI level data. Here is the micro-data challenge.

Improving the categorisation of banks within the MFI sample would also imply a further increase of the number of reporters to allow for a reasonable representativeness of each possible category. This is work on-going.

Conclusion

In 2012, at the time when the decision to collect individual MFI statistics was still discussed, NCBs raised the question of the usefulness of such micro-data being made available at the ECB. The project was fairly perceived as a dramatic change in the statistical practices that had been in place for more than a decade for sharing information between the ECB and the other ESCB members. One big concern was that more granular data would create more confusion amongst ECB internal users and blur the euro area picture shown from macro data while increasing the data management burden for compilers.

A few months ago, in 2015 the IBSI and IMIR datasets entered the third phase of their implementation to converge closer to their respective aggregate parent BSI and MIR statistics. This should be first seen as a concrete success in cooperating with the numerous stake-holders involved in this project. It also stresses the relevance of opting for a step-wise approach when integrating micro-data requirements into an already well-established macro-data environment. This allows testing procedures, interacting with users on a more ad-hoc basis and drawing preliminary conclusions on the use of granular information to better monitor the economic situation and assess the impact of monetary policy measures on the financial system before the data flow fully becomes operational and runs in parallel of the transmission of macro information.

The large amount of micro-data received each month by the ECB opens new ways for information to be cross-checked, validated and later on analysed for economic purposes. It places compilers' work in a constant development state reflecting the evolution of the MFI population and banking business in the euro area. This triggers of course challenges; one of them being to try to find synergies between already existing data sources and models. The implementation of the management of BSI and MIR micro-data samples in RIAD system to produce dynamic MFI lists in the IBSI and IMIR data environments offers a good example of progress along these lines.

In his introductory speech to the IFC workshop on Integrated Management of micro-databases held in June 2013, the governor of Banco de Portugal expressed the need "to know how to get the most of available data". The ECB is taking strong initiatives in this direction. The data analysis of macro aggregate balance sheet and interest rate statistics is more and more carried out on the basis of the information provided by the individual data; users are provided with the macro and corresponding micro set of series with a very short time lag. Work is done on the harmonisation of data validation tools used for both data collections. There is a clear focus on integrating the amount of statistical information channelled down from reporting agents up to the ECB in order to better serve its key functions.

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Warsaw, Poland, 14-15 December 2015

Setting-up the transmission of individual MFI statistics on balance sheet items and interest rates across the Eurosystem¹

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¹ This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS or the central banks and other institutions represented at the meeting.



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Working Paper

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Overview

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2 The MFI sample

3 Data quality assessment

4 Challenges

5 IBSI-IMIR: way forward

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5 IBSI-IMIR: way forward

A little bit of history...

- **2012:** the ECB started to receive on a regular basis from the euro area NCBs individual Balance Sheet Items data - complemented by a one-off transmission (Individual **BSI** and **MIR** data).

Data of around **250** MFIs belonging to **115** headquarters

- **2014:** the regular transmission of individual MFI data started to also include information on MFI interest rates.
- **2015:** the scope of both IBSI and IMIR transmissions was reviewed to
 1. better serve user requirements for monetary policy and financial stability analysis;
 2. reflect new BSI and MIR ECB regulations which entered into force at end-2014.

In addition, the sample of euro area MFIs covered by the IBSI and IMIR datasets was extended to reach approximately **300** credit institutions.

... and a reminder of the legal framework...

1. To share data

- Historically, the ECB has collected aggregate data to fulfill its mandate of maintaining price stability across the Eurozone.
- However, **Council Regulation (EC) No 2533/98** empowers the ECB to **collect statistical information** that is necessary to carry out the tasks of the European System of Central Banks (ESCB) [Article 2].
- On 8 March 2015, amended version of Council Regulation came into force, allowing use of statistical information collected by ECB in field of prudential supervision. In particular, the following paragraph added under Article 8:

*“4a The ESCB may transmit **confidential statistical** information to authorities or bodies of the Member States and the Union responsible for the supervision of financial institutions, markets and infra structures [...] to the extent and at the level of detail necessary for the performance of their respective tasks [...].”*

... to answer...

Why “individual data”?

- **December 2011:** the ECB launched its 3-years maturity LTROs → raise the need for assessing the effectiveness of such outstanding measures.
 - picturing heterogeneity in bank funding costs
 - closer look at the banks’ risk-taking behaviour
 - identify links between policy transmission and bank business models

What are “individual data”?

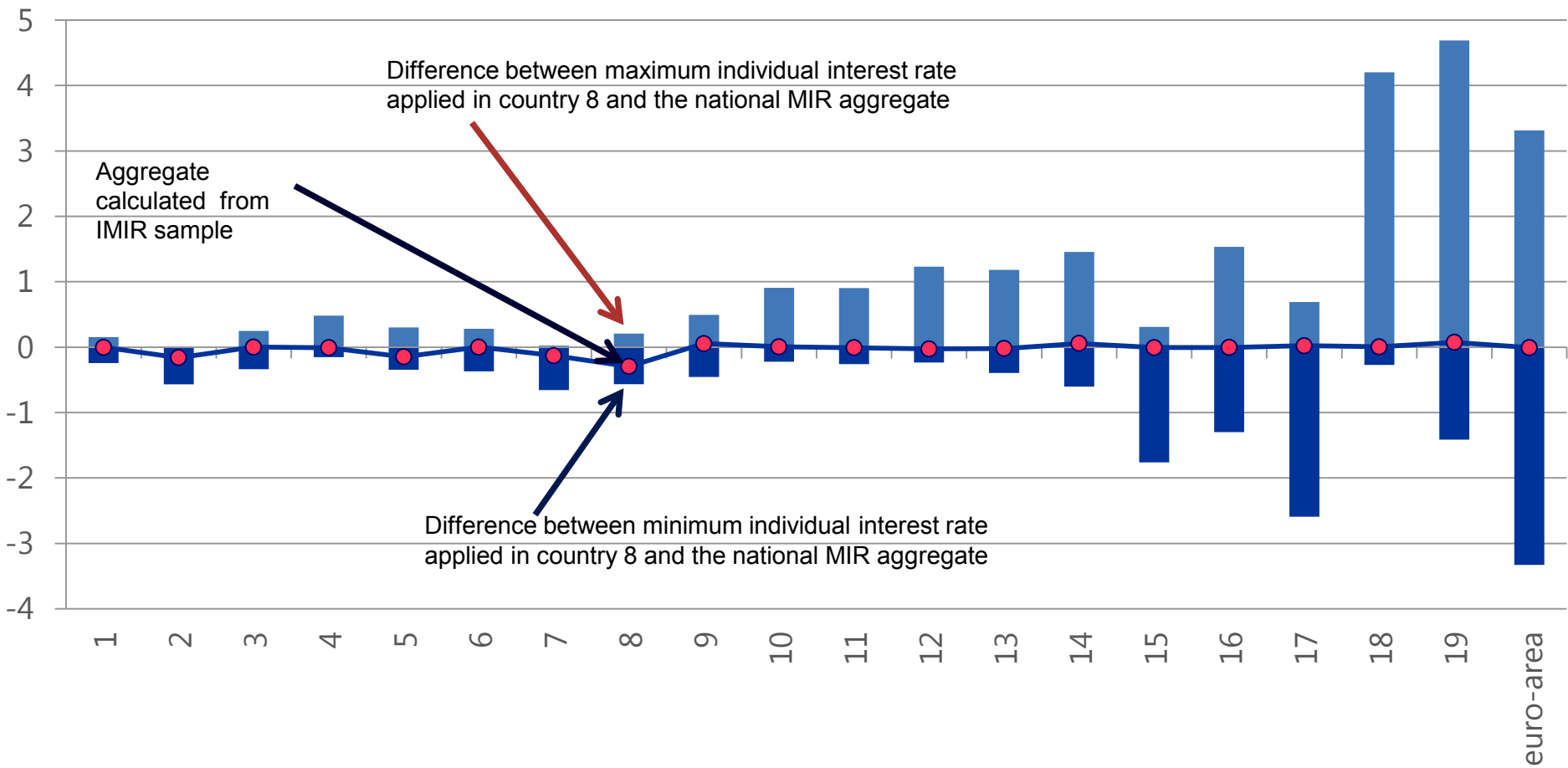
- **IMIR dataset:** interest rates on deposits and loans to private sector
- **IBSI dataset:** information on the balance sheet of banks

Assets	Liabilities
<ul style="list-style-type: none">• cash• loans• debt securities• MMF shares/units• equity• non-financial assets• remaining assets	<ul style="list-style-type: none">• deposits with high granularity• debt securities issued• capital and reserves• remaining liabilities

Dispersion of interest rates

loans for house purchase denominated in euro
data with reference September 2015

●— IMIR sample average



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5 IBSI-IMIR: way forward

Micro-data: observation data collected on an individual object - statistical unit

For IBSI and IMIR datasets,

Statistical unit = MFI^{*)}

- **Selection criteria:**

- Bank size
 - Active participation in monetary policy operations
 - Representativeness
- Role of non deposit-taking or credit-granting specialised credit institutions in the sector of savings and cooperative banks as a channel of liquidity injection
 - Selected agents are notified by their NCBs
 - Initial selection of approximately **300 MFIs** belonging to **115** headquarters

^{*)} central banks, resident credit institutions as defined in Community law, and other resident financial institutions whose business is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account (at least in economic terms), to grant credits and/or make investments in securities.

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5 IBSI-IMIR: way forward

- **Formal checks**
 - Data model requirements
 - All checks must hold by definition of the reporting template
- **Linear checks**
 - Internal consistency checks
 - Accounting relations
 - All must hold within a given tolerance defined at country level
- **Plausibility checks**
 - Probable relations between reported breakdowns
 - Individual data benchmarked against aggregated MIR/BSI data
 - Do not always hold
- **Graphical checks**
 - Development of rates and new business volumes over time
 - Outlier identification and unusual series development
- **Top-down analysis**
 - Identification of key components of changes

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4 **Challenges**

5 IBSI-IMIR: way forward

- Higher granularity = Greater exposure to **national practices** and **market specificities**
- Statistical information collected in cooperation with National Central Banks (NCBs)
 - From national authorities
 - Directly from economic agents
- Cooperation with NCBs
 - Task sharing between the ECB and NCBs
 - NCBs revert to MFIs in case of questions related to data quality
- Integrated management of micro-databases
 - Reconciliation of **granular national statistics** in one data base
 - Different data sources connected via centralized reference database
 - Harmonized output for final users
- Definition of production **timelines**
 - Data transmission
 - Data quality checking and feedback rounds
 - Release of data to the final users

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5 **IBSI-IMIR: way forward**

- **Transmission of individual and aggregate data at the same time**
 - Access to underlying subcomponents triggering changes
 - Outlier detection by comparison to a peer group
- **Developing new ways of cross-checking the information**
 - Exploiting synergies between various data sources and data models
 - Focus on integrating the information retrieved from different data sources
 - Optimising production processes with the increasing amount of collected data
- **Banks' clustering**
 - Detection of MFIs with similar business models
 - Qualitative classification could result in different categories than the legal groups
 - Enhancement of linkages between [RIAD](#) and IBSI/IMIR

Thank for your attention

Question?

- **Regulations** concerning the **consolidated balance sheet** of the monetary financial institutions
 - Regulation (EC) No 2819/98 of the ECB of 1 December 1998,
 - Regulation (EC) No 2423/2001 of the ECB of 22 November 2001
 - Regulation (EC) No 25/2009 of the ECB of 19 December 2008
 - Regulation (EU) No 1071/2013 of the ECB of 24 September 2013
- **Regulations** concerning statistics on **interest rates** applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations
 - Regulation (EC) No 63/2002 of the ECB of 20 December 2001
 - Regulation (EU) no 1072/2013 of the ECB of 24 September 2013
- **Guidelines** on monetary and financial statistics
 - Guideline ECB/2014/15 of the ECB of 4 April 2014
 - Guideline ECB/2007/9 of the ECB of 1 August 2007
 - Guideline ECB/2003/2 of the ECB of 6 February 2003

Reference reporting population

1. For the fulfilment of the ECB's statistical reporting requirements, the ECB, assisted by the national central banks in accordance with Article 5.2 of the Statute, shall have the right to collect statistical information within the limits of the reference reporting population and of what is necessary to carry out the tasks of the ESCB.

2. The reference reporting population shall comprise the following reporting agents:

(a) legal and natural persons falling within the sub-sectors 'central bank', 'other monetary financial institutions' and 'other financial intermediaries, except insurance corporations and pension funds' as described in Annex B and residing in a Member State, to the extent necessary to fulfil the ECB's statistical reporting requirements in the field of money and banking statistics and payment systems statistics;

(b) post office giro institutions, to the extent necessary to fulfil the ECB's statistical reporting requirements in the field of money and banking statistics and payment systems statistics;

(c) legal and natural persons residing in a Member State, to the extent that they hold cross-border positions or carry out cross-border transactions and that statistical information relating to such positions or transactions is necessary to fulfil the ECB's statistical reporting requirements in the field of balance of payments statistics or the International Investment Position;

(d) legal and natural persons residing in a Member State, to the extent that statistical information relating to the securities or the electronic money issued by them is necessary to fulfil the ECB's statistical reporting requirements.

3. An entity that would otherwise be covered by the definition in paragraph 2, but which according to the national law of its country of residence is neither a legal person nor a collection of natural persons, while it can be the subject of rights and obligations, shall be a reporting agent. The reporting obligation of such an entity shall be fulfilled by the persons legally representing it.

Where a legal person, collection of natural persons or an entity as referred to in the first subparagraph has a branch resident in another country, the branch shall be a reporting agent in its own right irrespective of where the head office is located insofar as the branch satisfies the conditions defined in paragraph 2, with the exception of the need to possess separate legal personality. Any number of branches set up in the same Member State shall be regarded as a single branch when they belong to the same sub-sector of the economy. The reporting obligation of a branch shall be fulfilled by the persons legally representing it.