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Aggregate macroprudential statistics from micro supervisory data – conceptual and operational issues¹

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Aggregate Macro-Prudential Statistics from Micro Supervisory Data. Conceptual and Operational Issues

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Abstract

In this paper we describe the conceptual and operational issues associated with building comprehensive and high-quality aggregate data set as an aggregation of micro supervisory returns based on the example of Consolidated Banking Data (CBD), a key component of the ECB statistical toolbox for financial stability analysis.

These data contain aggregated information on the EU banking system, with detailed information on the profitability, balance sheets, assets quality, solvency ratios and liquidity position of banks in the EU28 countries. In other words, the CBD describe all the relevant features of national banking systems, displayed also for several sub-components of the whole banking population, with the connected (systemic) risk profiles. CBD are at the cross-road between micro and aggregate (macro) statistics as they are based, conceptually and operationally, on the EBA Implementing Technical Standards on supervisory reporting (ITS) and in line with the new CRD IV/CRR regulation. With the entry into force in 2014 of the new set of ITS the whole CBD statistical framework had to be conceptually reshaped and implemented. In August 2015 the first data were released for the revised CBD.

Transposing firm-level supervisory returns into comprehensive aggregate statistics is a complicated exercise, as even if the majority of supervisory reporting has been harmonized for most of the credit institutions, there still exist several national reporting regimes and accounting standards applied across EU jurisdictions (the application of ITS varies across reporting areas in terms of coverage). A sound methodology is required and operational challenges arise. In this paper we describe how these issues were dealt with.

Keywords: Macro-Prudential Analysis, Consolidated Banking Data, Banking Indicators

JEL classification: C82, G21

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Introduction and background

As a response to the financial crisis, the strengthening of the framework for macro-prudential analyses and policies globally and within Europe has been a key priority. Within this framework, the banking sector has always been in the focus of the systemic risk analysis of the E(S)CB such that detailed, frequent and timely information on the EU banking system is necessary. The Consolidated Banking Data (CBD) is the key data set for the macro-prudential analysis conducted at the ECB/ESCB and it is a prominent input into the statistical support to the European Systemic Risk Board (ESRB). The CBD collection started in 2002 and the data model in force until last year was implemented in 2009 by all EU countries. The main data sources for those CBD were the supervisory information collected according to Financial Reporting (FINREP) and Common Reporting (COREP) guidelines, as originally developed by the Committee of European Banking Supervisors (CEBS).

CBD include detailed information on bank profitability, balance sheets, asset quality and solvency broken down by size classes of banks and covers almost 100% of the EU banking system. Already from the start data were fully consolidated on a cross-border and cross-sector basis²; cross-border means that data on branches and subsidiaries located outside the domestic market are included in the data reported by the parent institution and cross-sector means that branches and subsidiaries of banks that can be classified as financial institutions other than banks are also included (insurance corporations are not included). CBD included also data for foreign controlled branches and subsidiaries reported separately, as a distinct analysis of these firms is often needed given their large share of the domestic banking sector in some EU countries. CBD were reported at national level for three size classes (small, medium-sized and large banks), which are determined as a percentage of the total assets of the whole EU banking system. This breakdown by size allows the analysis of different national banking systems, as concentration in these markets varies substantially among countries. CBD were first collected on annual basis and from 2010 on a semi-annual basis.

CBD are intensively used for banking and systemic risk analyses, for internal briefings and for external publications. The ECB report on Banking Structures³ provides an example of the use of these data for banking analysis. CBD are also one of the key inputs to the statistical support provided by the ECB to the ESRB. These CBD were described in Borgioli, Gouveia, and Labanca (2013).

With the entry into force of the European Banking Authority's (EBA) Implementing Technical Standards on Supervisory Reporting (ITS)⁴, the availability and extent of harmonisation of supervisory data across EU substantially increased. Following the implementation of the ITS, the ESCB Statistics Committee/Working Group on Monetary and Financial Statistics (WG MFS), the Financial Stability Committee/Macro-prudential Analysis Group (MPAG) and the EBA Standing Committee on Oversight and Practices (SCOP) mandated a Joint Task Force on Consolidated Banking Data ("the TF CBD") to design and implement a revised

² Data are fully consolidated in terms of prudential scope, as it is only financial institutions covered except insurances companies. The consolidation in this case is therefore "full" from the supervisory perspective.

³ <http://www.ecb.europa.eu/pub/pdf/other/bankingstructuresreport201410.en.pdf?9a8e28568a0a90cfaa8d8e7c951c4dea>

⁴ Implementing Technical Standards Amending Commission Implementing Regulation (EU) No 680/2014 on Supervisory Reporting of institutions

reporting scheme for the CBD. The main focus of the mandate was to enhance the data quality as well as the data availability of the CBD and, at the same time, to ensure continuity with the previous framework to the extent possible.

The revised CBD reporting scheme is now organised in twelve main parts, each of them including several templates. Main parts are profitability and efficiency, balance sheet, liquidity and funding, asset quality and capital adequacy. The previous CBD already provided a comprehensive set of data covering the financial statements (balance sheet, income statement), asset quality and capital adequacy. These items were mapped against the ITS and a few series which cannot be mapped against the ITS were discontinued after assessing their analytical value. For the provision of data on asset quality, the existing section of the CBD was largely replaced by new reporting based on a harmonised definition of non-performing loans as well as a few key items on forbearance. In order to cover new requirements, data on concentration risk (sectorial, geographic, NACE activity and funding concentration), and Liquidity and Funding risk including asset encumbrance have been added to the templates. Also the frequency was increased from semi-annual to quarterly reporting.

The new CBD were implemented in the course of summer 2015 and marks a relevant improvement in terms of quantity and quality of data availability.

This paper describes some of the main issues of the conceptually and operationally challenging endeavour of deriving meaningful aggregates starting from firm-level supervisory returns that are based on different accounting systems. The paper also deals with how to preserve (some) continuity in time series constructed by the connection of data points reported according to successive and different data models.

In the next paragraph, we provide a description of the conceptual guidelines underlying the establishment of the new reporting framework for CBD. The following paragraph provides an overview of the main issues faced in the implementation of this new framework. Some examples are then put forward and the last paragraph concludes.

1. Creating the new CBD reporting framework - Guiding principles

As mentioned, The TF CBD was mandated by the parent Committees to design and implement a revised reporting scheme for the Consolidated Banking Data (CBD) based on the EBA ITS. The ITS, based on the new Capital requirements regulation and directive (CRR/CRD IV⁵), aim at implementing uniform reporting requirements for credit institutions and investment firms. The ITS cover the reporting of financial information (by introducing the new FINREP templates for both the IFRS and n-GAAP reporting institutions) as well as the reporting of own funds and capital requirements (by introducing the new COREP templates for all institutions). The ITS

⁵ Directive 2013/36/EU on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms (CRD IV) and Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms (CRR)

are complemented by other specific reporting templates introduced by the CRR (asset encumbrance, forbearance, liquidity, leverage ratio, large exposures and non-performing exposures) that are also used for the compilation of CBD.

An important objective of the CBD revision was continuing to provide a complete dataset for the entire EU banking system, including sufficient coverage of national banking system. However, it has to be kept in mind that while the ITS are extended to the entire banking system, it is not to all banks in respect of all templates – especially not for the financial statements (FINREP). Having this in mind some guiding principles in the work on the enhancement of the CBD were laid down:

- As a general rule the previous CBD framework and data points were retained to ensure some continuity in terms of time series, at least for key series. This is particularly important for published indicators. Exceptions were made where the ITS introduced clear benefits e.g. in terms of harmonization and data availability.
- The revised CBD framework was based on the reporting of ITS data points and templates covering (IFRS and n-GAAP) FINREP and COREP; reporting cells for relevant data from non-FINREP banks (and Full sample) were inserted in the reporting scheme, as it was already the case in the previous reporting scheme. It was however recognized that in respect of non-FINREP reporters, estimates or proxies may be needed even from other sources than supervisory returns.
- The reporting framework was based on those ITS templates that ensure coverage of the entire (or the greatest part of) the EU banking system. Hence, COREP templates were, in general and when relevant, prioritized over FINREP as the former has full coverage of banks. Mixing unnecessarily the compilation of CBD series from both COREP and FINREP in a given block of series was also avoided, as the perimeters and definitions can be quite different.
- A balanced approach was kept between additional user needs ascertained by the TF CBD and for the need to minimize the costs of data compilation.
- Undue overlapping and redundancies with already existing data collection were avoided. For instance, while drafting the section of geographical concentration of exposures, attention was paid to avoid possible overlapping with the BIS data on international banking activity.

1.1 Bridging (to the extent possible) the previous CBD information

The CBD framework in place since 2009 already provided a comprehensive set of data with rather long time series. In order not to scatter this information, consistency of at least the key items had to be ensured. Accordingly, the first step in the construction of the new CBD scheme was to produce a detailed mapping of the previous CBD data points against the ITS. As a consequence of this exercise some series from the previous CBD were removed, due to quality and availability issues, low users' value or because they were impossible to be mapped to the ITS.

The **financial statements** section of the previous CBD was rather straightforward to map to the ITS and for all the main series time series continuity was ensured. Only a few granular breakdowns were dropped and some redefinition was needed.

Referring to the **Capital Adequacy** section, the new CBD framework is hinged on the capital requirements introduced by the CRR/CRD IV. The CRR caused major revisions

in the definition of own funds, capital ratios and capital requirements and consequently many items in the Capital Adequacy section of the new CBD (own funds in particular) underwent breaks in series or had to be discontinued. Basically only series for Tier 1, Tier 2 and Total Own Funds could be bridged. The old CBD included a detailed section on capital requirements, while the ITS require the reporting of risk exposure amounts. The TF CBD agreed that risk exposure amounts should be included in the reporting scheme with current time series converted into risk exposure amounts. Some further details on exposure classes (e.g. SMEs) were also included, as well as the new requirements on Credit Value Adjustments and Large Exposures in the trading book

The **asset quality** section of the template was very arduous to map. In the previous CBD framework this section suffered from limitations due to reliance on (not harmonised) national definitions, lack of comparability and uneven coverage. On the other hand asset quality is a key part for macro-prudential analysis and the assessment of systemic risk and it is at the core of users' needs. A clear trade-off was there between moving towards new harmonised definitions and keeping the continuity of existing time series. Moreover, the drawback of limited data availability in jurisdictions where a relevant part of the banking system is not (yet) covered by FINREP had to be taken into account as well.

In the end, weighing pros and cons it was decided to move towards new harmonised definitions. A new asset quality section, based on the new harmonised EBA definition of non-performing loans, was introduced in the template to replace the existing one. This allowed comparability across EU countries, even at the price of breaking with historical time series. However, few items of the previous reporting scheme were retained, even if changes in definitions lead anyway to breaks in series.

Finally, few basic items on **Forbearance** were included in the new CBD based on the relevant FINREP template (F 19.00). In this case it was deemed that the analytical value added provided by this information (missing in the old CBD) outweighs the issue that data are not available for most non-FINREP banks.

1.2 New user requirements and making choice between COREP and FINREP

The mapping of the old CBD into the ITS gave the initial core set of data points for the new template. This set was then supplemented with further data points that were made available by the entry into force of the ITS and were deemed useful to meet relevant users' needs, after having weighted them against the cost to compilers. The previous CBD scheme lacks in fact information in areas key for the assessment of systemic risk, like concentration risk, liquidity and funding or asset encumbrance.

In assessing possible new user statistical needs, COREP templates were given priority over FINREP ones whenever possible. In fact, while COREP templates have to be applied by **all** the EU banks and banking groups uniformly, FINREP templates are differentiated between IFRS banks and banks applying national accounting standards (GAAP-FINREP) and do not have to be reported by all of the institutions (e.g. non-consolidating credit institutions are not reporting based on FINREP).

This is particularly relevant for the profit and loss, balance sheet and asset quality templates (financial information templates). These templates are treated below. However also other part of the CBD framework provide interesting cases.

For instance, the template drawn for the data points used then to build **liquidity indicators** is another example of the preference of COREP template vis-à-vis FINREP ones. Six liquidity indicators were in the end selected by the TF CBD to be inserted in the new CBD (liquidity analysis was a weak area of the 'old' CBD). Two of them came directly from the mapping exercise and they are built starting from FINREP templates and were kept also in the new CBD to ensure continuity. Another four liquidity indicators were then added following a survey conducted to explore users' needs; all of them are calculated starting from COREP templates in order to have them harmonised and available for the whole reporting population.

Conversely the CBD template for data on **concentration risk** is a case in which, notwithstanding the preference given to COREP templates, data filtered from FINREP had to be used in order to cover some areas, with the following need to make micro data from different accounting systems coexist in the aggregate. FINREP data were necessary for instance to gauge domestic and non-domestic activities with the geographical breakdown of assets, liabilities and profit or loss by location of the activity.

The new **geographical concentration** template shows also a good example of aggregation problems passing from the micro to the macro level. The final template is not broken down by exposures classes, given the difficulties in mapping Standardised approach (SA) and IRB exposure classes and hence only total exposures are reported. In fact the definitions are not exactly the same in SA and IRB but at the same time exposures classes provide valuable information even at the highest level of aggregation. Another key issue was the coverage of the foreign exposure information provided by the COREP templates; in fact only banks with more than 10% foreign exposures of total exposures report geographical breakdown according to the ITS. Evaluating competing options to bridge this gap, it was in the end decided to report all "domestic banks" for which the breakdown is not available in the reporting country (as towards domestic counterparties).

The information for **sector counterparty** concentration is also based on the FINREP breakdown of loans and advances by six sectors of counterparty (F 05.00), with a small breakdown by NACE codes of loans and advances to non-financial corporations (F 06.00); breakdown on debt securities by five sectors of counterparty (F 04.01 – F 04.09); and breakdown on equity instruments by three sectors of counterparty (F 04.01 – F 04.03 and F04.06 – F 04.08). A template for **funding concentration** had to be derived as well from FINREP (F 08.01). In case of the sector counterparty concentration, data collected based on FINREP are adjusted by a smaller amount of information collected from non-FINREP banks and also from the full sample of banks containing only simplified information about the breakdown on loans and advances (loans and advances to general governments, central banks and credit institutions are collected separately, to other financial corporations, non-financial corporations and households are grouped under category "other"). The template for funding concentration is amended by a small amount of information on retail funding and wholesale funding derived from COREP templates (C 68.00).

1.3 Integrating NON-FINREP reporters in the framework

A distinctive and key value added of CBD has always been the coverage of entire EU banking system with coverage of the EU national banking systems. In fact also the previous CBD framework, which was built starting from the CEBS FINREP and COREP, was supplemented with information coming on a best effort basis from other supervisory or statistical reports (or from annual accounts), in order to accommodate the whole banking system.

In the conceptual design of the new CBD, the same problem of reconciling, at macro level, different (in terms of accounting) micro supervisory returns had to be tackled.

While the ITS foresee that all banks within the EU must report the full COREP templates, there are still gaps in the coverage of FINREP data, as some banks do not have to report FINREP (e.g. banks not consolidating) and there is also a differentiation between banks applying IFRS (IFRS-FINREP) and banks applying national accounting standards (GAAP-FINREP). In fact FINREP must only be reported by banks compiling consolidated accounts according to IFRS or which are required to do so by NCAs. Also remittance frequency for n-GAAP reporting banks is not the same in all cases as in FINREP and tends to be lower.

Looking ahead, even in the steady-state⁶, n-GAAP reporting banks and/or non-consolidating banks will represent a non-trifling part of few national banking systems. The extent to which this is the case varies across EU countries; FINREP reporting is extended to the entire banking sector in a majority of jurisdictions, but in a few jurisdictions the share of total assets of non-consolidating banks and/or reported according to n-GAAP is (and will be) not negligible.

Keeping this in mind, the new CBD framework was drawn in a way to use COREP templates to the maximum extent possible (see above). However this was of course not possible for some sections of the reporting scheme.

In order to have full coverage of the EU banking system and of national ones, non-FINREP reporting intermediaries had to be integrated within the CBD overall reporting framework. This integration must be accomplished in a transparent way and must be such that overall aggregates can be compiled and key financial information items can be reconciled across different class of reporters.

The enhanced CBD framework was then constructed starting from the ITS requirements and complementing them with specific data items for non-FINREP reporters to be compiled from national reporting or annual accounts or other data sources. This integrated set of requirements allows full aggregation of the main items (like interest income, total deposits, etc.) of the sub-components of the different banking systems. Aggregation would include "of which" items to provide transparency and decomposition between ITS (FINREP) and non-ITS (non-FINREP) data.

This reconciliation issue is further complicated by the different reporting regimes granted to different class of firms under FINRPEP rules [full FINREP,

⁶ SSM banks will be required to compile data according to FINREP at least using a simplified format by 2017. Non-SSM NCAs that still have banks reporting according to n-GAAP currently do not have firm plans to extend FINREP (full or partial) to other institutions.

reduced FINREP ...]. All things considered, in the enhanced CBD reporting scheme three separate templates were drawn for different categories of reporters:

FINREP reporting banks (IFRS reporters)

n-GAAP consolidated banking Groups that are asked to compile a simplified FINREP (GAAP-FINREP reporters)

Solo banks, for which FINRPEP reporting is not envisaged (non-FINREP reporters)

The table below summarise all the possible CBD treatment of different class of firms.

Table 1 Treatment of different classes of financial intermediaries in the CBD

CBD reporting schemes	CBD Reporting sources	
	Transitional period	Steady state
Consolidated or Sub-consolidated IFRS banking groups	Harmonised FINREP Harmonised COREP	
Consolidated or Sub-consolidated n-GAAP banking groups	National GAAP FINREP and/or national GAAP templates (proxy series) Harmonised COREP	<u>SSM countries:</u> Full FINREP or Simplified FINREP or simplified FINREP or Data Points FINREP ⁽¹⁾
		<u>Other countries :</u> National GAAP FINREP and/or national GAAP templates (proxy series)
		<u>All countries:</u> Harmonised COREP
Solo banks	National templates (proxy series) ⁽²⁾ Harmonised COREP	<u>SSM countries:</u> Full FINREP or simplified FINREP or over simplified FINREP or Data Points FINREP ⁽³⁾
		<u>Other countries:</u> National IFRS/GAAP and/or Non-FINREP templates (proxy series)
		<u>All countries:</u> Harmonised COREP

Notes:

(1) and (3): For more details, refer to the draft Regulation of the ECB on reporting of supervisory financial information, October 2014, first table, page 10:

<https://www.bankingsupervision.europa.eu/legalframework/publiccons/pdf/reporting/draft-ssm-reporting-regulation201410.en.pdf>;

(2): Some countries might have implemented FINREP-like reporting for solo institutions

The definition of the templates for the first two categories of reporters (IFRS-FINREP and GAAP-FINREP reporters) was rather straightforward, being based on FINREP templates that were harmonised across countries. It was basically enough to select the FINREP templates that were needed to meet user needs, ensure to the possible extent the continuity with the previous CBD, trying at the same time to limit the impact on compilers.

More challenging was the **derivation of a template for non-FINREP reporters** that could accommodate data availability and frequency, uneven across relevant jurisdictions, and at the same time detailed enough to contain information relevant for banking and stability analysis (also because the items contained in the scheme for non-FINREP reporters would be the only ones for which the compilation of “global aggregates” would be available).

In the end a **step by step approach** was used to assemble the template for non-FINREP reporters (and foreign controlled branches; see paragraph below). As a first step a survey on data availability was carried out among jurisdictions where the activity of non-FINREP reporters is not irrelevant. The main outcome of the survey was that these countries shared very close data availability for the main items of the profit and loss, balance sheet and asset quality templates. These ‘common’ items were used as the basis and then complemented by a) the non-FINREP items that were mandatory in the previous CBD template (need to ensure a certain continuity of the series) and b) further items that emerged as particularly relevant to meet important users’ needs (for instance for the statistical support that the ECB has to provide to the ESRB, but not only) to be reported on a best effort basis. At the end of this step-by-step process, the template for the mandatory items to be reported for non-FINREP reporters was ready and it is the one that has been implemented.

The final template so emerged from crossing the results of the survey on data availability with what was prescribed for the old CBD reporting and the consideration of users’ needs. The template for non-FINREP reporters allows in turn calculating, at least for the most relevant items, aggregates and indicators for the whole banking system(s). This streamlined template is used also to report data for foreign-controlled branches.

The 12 sections that make up the final template are presented in Appendix 3.

1.4 Reporting scheme for foreign-controlled branches

In the previous CBD framework, foreign-controlled branches had to report exactly the same items as domestic firms and foreign-controlled subsidiaries. However, data availability is rather reduced for foreign-controlled branches. This was evident already from the analysis of data points reported for these intermediaries for the previous CBD and was further confirmed by an ad-hoc survey conducted by the TF CBD among all EU countries, as both exercises pointed towards limited data availability. Some data points were reported by just a few countries, possibly generating misleading information for the EA and EU aggregates. Furthermore, even under the new reporting framework there is no harmonised supervisory reporting for branches, as all the FINREP and COREP reporting is related only to credit institutions and their subsidiaries.

It was hence decided to draft streamlined reporting scheme in order to get better coverage and higher quality data (by reducing the effort to try to get proxies for data not reported uniformly by branches). Moreover it emerged from the outcome of the ad-hoc survey and from the data reported in the old CBD that the data points available for foreign-controlled branches highly overlaps with those available for non-FINREP reporters. For this reason it was decided to have for foreign-controlled branches the same reporting scheme that was drafted for non-FINRPEP reporters (see paragraph above).

2. Implementation

The implementation of the new CBD framework as well as the preparation of all the necessary documentation needed for the communication with the users and compilers from NCBs and national authorities started immediately after the TF CBD rolled out the revised reporting scheme. The main steps of the implementation included the creation of the new structure for the CBD, the implementation of the quality checks, the definition of the indicators and aggregates calculated based on the reported elementary data points and the link between the new data and the old data.

To design the new dataset, the first fundamental step was the introduction of a new Data Structure Definition (DSD) for the CBD. The DSD is a set of dimensions that provides a unique description of each data item in the dataset.

Considered the large amount of additional information available under the revised CBD framework, the DSD already in place for the previous CBD dataset did not allow a sufficiently detailed description of the newly defined data items. New dimensions needed to be coded and while the old CBD series key consist of 11 dimensions; the new series keys have 16 dimensions (Appendix 1). A detailed description of the series keys and the single dimensions according to the new CBD framework is given in Appendix 2.

2.1 Implementation of validation rules and data quality checks

In order to ensure a good quality of the data collected and published, several validation rules and checks are applied to the raw data received from the NCBs to assess their quality.

Within a data collection, data are revised several times until a sufficient quality is guaranteed. This is done through an iterative approach which requires an intense discussion between the ECB and NCBs. Not just raw data are checked, but also aggregated figures and indicators calculated by the ECB are subject to the revision process, in order to ensure an accurate description of the respective banking sectors.

Data quality assessment is carried out along different dimensions:

Completeness. It is verified that all the expected data have been reported to the ECB.

Consistency / Stability. Reported data should be consistent with historical values. Large changes and discrepancies are analysed and NCBs are asked to provide valuable explanations in these cases. As an example, countries are asked to

confirm any changes in the reporting population. Also, the dynamics of the total assets for each reporting sector (domestic large, medium sized and small banks, foreign EU and non-EU controlled branches and subsidiaries, etc.) is assessed. NCBs are asked to double-check the reported values in case the variation between the last two periods exceeds 15%.

Correctness. According to the EBA ITS, several items are expected to be reported with negative sign (e.g. interest expenses) or positive sign (e.g. interest income), and some other have to be reported as percentage values. During the data quality assessment, it is checked whether data have been transmitted according to the EBA ITS guidelines or corrections are needed. The CBD framework differs from the EBA ITS regarding the reporting of data related to accumulated impairment or allowances. According to the CBD framework, all these items should be reported as positive (in case they decrease the gross value of the exposure) while they are reported differently in several FINREP templates (e.g. in F04.03 accumulated impairment is reported as a negative value).

Accuracy / Horizontal and vertical comparability. According to the CBD templates, data are reported within the same table or in different tables both on an aggregate level and with different breakdowns. For instance, data can be broken down by reporting sector, meaning that Full sample data and IFRS-FINREP, GAAP-FINREP as well as Non-FINREP data are reported; other examples include counterparty breakdowns, as in the case of total loans. In these cases it is checked whether the sum of the breakdown is equal to the aggregate figures. However, in several cases the equality does not hold due to methodological differences between different FINREP or COREP templates (e.g., loans and advance reported in F01.01, that are used in the CBD Balance sheet templates, do not include cash and cash balances at central banks while loans and advances reported in F05.00, that are used in the CBD Balance sheet – break templates include these items as well).

2.2 Definition of the aggregates and indicators

The CBD dataset has been considerably enhanced and a whole new set of information has become available. To make the use of the CBD more efficient and straightforward, several aggregates and indicators are derived from the raw data received from NCBs. These aggregates and indicators are defined to meet the users' needs and are among the basic items used in different kinds of financial analysis.

Aggregates

Three types of aggregates are calculated: aggregates across reporting frameworks, aggregates within reporting frameworks and aggregates across countries. The aim of the aggregation of reporting frameworks is to make available the data as much as possible for the most important frameworks (from the analytical point of view). In several cases data are reported by IFRS-FINREP, GAAP-FINREP (or, alternatively, directly by FINREP) and Non-FINREP banks, but the information is missing for the Full sample. In this case, the aggregate figure for the Full sample is calculated from the reported data as sum of FINREP (IFRS + GAAP if the FINREP figure is not directly available) and Non-FINREP contributions (e.g. Interest income). Also, some items are available for IFRS-FINREP and GAAP-FINREP reporters but are not directly reported for the FINREP aggregate (e.g. Dividend income), which is then calculated. The

aggregation of different reporting sectors poses a problem of harmonisation of the data. In fact, the Full Sample aggregate includes data from FINREP reporters and Non-FINREP reporters, and thus methodological discrepancies have to be taken into account. However, this represents a real issue only in a very few countries and as data are made available for all reporting framework, it can be easily overcome.

Data aggregation within reporting frameworks covers the calculation of aggregate figures from the available breakdowns. According to the CBD template, in some cases only breakdowns are reported, while the total figures are not part of the reporting templates. An example is the item Net interest income. This information is available for Non-FINREP reporters and for the Full Sample, but is not reported directly for IFRS-FINREP, GAAP-FINREP and FINREP reporters. Therefore, item Net interest income is calculated from the items interest income and interest expense reported directly for IFRS- and GAAP-FINREP and calculated for FINREP reporters.

Finally, a cross country aggregation is performed. As data are available for all EU countries, it is possible to calculate EU and EA aggregates. In both cases, the aggregate figure takes into account the changing composition. This information was available also under the previous CBD framework; however, in case the whole banking sector was taken into account, the overlap caused by the double counting of subsidiaries and branches was neglected. The problem is the following: if a banking group has its headquarter in country X (EA country) and has a subsidiary in country Y (also EA country), then the data relating to the subsidiary are reported by country X (under the consolidated data of the banking group) and also by country Y (the data of the subsidiary). Thus a simple sum of values for country X and Y includes the figures for the subsidiary twice. To overcome this issue, two new aggregates are calculated, the "clean EU" and "clean EA" aggregates. Clean EU represents "All domestic banking groups and stand-alone banks, foreign (non-EU) controlled subsidiaries and foreign (non-EU) controlled branches" and clean EA represents "All domestic banking groups and stand-alone banks, foreign (non-EA) controlled subsidiaries and foreign (non-EA) controlled branches". It was estimated that the overestimation due to the use of aggregate 67 (that is, the simple EA or EU aggregates) is around 10% both for the EU and EA figures.

Indicators

There are four areas of indicators calculated: profitability and efficiency indicators (e.g. Return on Equity, Return on Assets), Asset quality indicators (e.g. NPL ratio), Balance sheet and liquidity indicators (e.g. Leverage ratio) and Capital adequacy indicators (e.g. Solvency ratio). By the introduction of the new regulatory framework and the new EBA ITS, it was possible to derive new indicators or to enhance the definition of indicators already in use. In some cases, the definition of the indicator had to be changed due to the change in the definition of the underlying items.

New indicators were calculated mainly in the area of asset quality, liquidity and capital adequacy. New asset quality indicators include for example indicator Net Non-performing debt instruments per Gross Non-performing exposures. This indicator is calculated for FINREP reporters and it is also available for the breakdown for non-financial corporates and households – within the new framework it is not just total provisions available but also provisions on non-performing exposures, therefore the coverage ratio can be calculated. The list of Balance sheet and liquidity

indicators have been enhanced thanks to the more precise data on the amount of liquid assets and short term liabilities available under the revised CBD framework, and now includes for example indicators such as Liquid assets to Short-term Liabilities. The available indicators on capital adequacy have been revised as well. Due to the new regulation, the definition of capital changed and this affected the definition of solvency ratio. Moreover, new and important measures of solvency need to be reported, such as the CET1 ratio (Common Equity Tier 1 ratio), and are now included in the list of CBD indicators.

2.3 Joining the old and new CBD in order to make time series available under the new framework

In this section we discuss the technical issues related to the creation of time series that also include historical CBD data reported under the old framework. As previously described, a mapping between the old and the new CBD items was made whenever possible, in order to ensure the continuity of the series. However, this mapping was not always straightforward, due to methodological changes in the framework. The main changes concerned the reporting framework and the regulatory framework. Under the old framework, all data points were reported for the full sample of the banks⁷, while selected data points were reported for non-IFRS and non-portfolio reporting IFRS banks. In the new framework there are 5 categories of different aggregate reporters (IFRS-FINREP, GAAP-FINREP, Non-FINREP, FINREP, Full Sample). Where possible, the “old framework” full sample data were mapped into the “new framework” full sample data (e.g. total assets, **Figure 1**). In case of items available only for FINREP reporters under the “old framework” that are reported under the “new framework” by both IFRS-FINREP and GAAP-FINREP banks (or directly by the aggregate of FINREP banks), the history is attached to the FINREP aggregate (e.g. net interest income, **Figure 2**). Selected items are mapped between the “old framework” non-IFRS and non-portfolio reporting IFRS banks and the “new framework” non-FINREP banks (e.g. net interest income. In this case, the sum of net interest income for FINREP banks and non-FINREP banks is then attached to the full sample). In some cases the history is attached only to IFRS-FINREP banks, as some of the items are reported only by these banks (e.g., the available for sale portfolio is defined only for IFRS banks and is required to be reported only by IFRS-FINREP banks, **Figure 3**).

Regarding the changes in the regulatory framework, there are some items available in both the old and the new framework, but for which the definition may have changed significantly⁸. This is the case e.g., of the definition of non-performing exposures. When a change of definition occurred, the old series are considered as discontinued at the level of raw data, but, where possible, a mapping was preserved at the indicators level. As an example, the calculated indicator “Gross non-performing debt instruments [% of total gross debt instruments]” exists both under the old and the new framework (although the name is slightly different), and historical values are available under the new indicator. However, historical observations of the underlying series, i.e. provisions (accumulated impairment) and

⁷ However, not all the data were necessarily reported by the full sample of banks, e.g. AFS portfolio is defined only for IFRS banks.

⁸ This change is in most of the cases related to the implementation of the new Basel III framework

non-performing exposures, were not made available under the new series, because of potentially large differences in the definition of these items.

Figure 1 Mapping the history – “Full sample” data attached to “Full sample”

In thousands EUR	Total assets - Austria, All domestic banks, Full sample	
	"Old CBD" data	"New CBD" data
2008	830,294,460	830,294,460
2009	867,842,605	867,842,605
2010	856,667,295	856,667,295
2011	873,509,134	873,509,134
2012	847,589,865	847,589,865
2013	788,427,096	788,427,096
2014		750,818,312

The history is attached, where it is possible, also in case of the calculated indicators. There are two basic ways how to attach the history in case of these indicators. The first is to calculate the indicator for the full period available using the latest version of the underlying items, as the history should be already matched for those items. The second is to calculate the indicator based on the new framework only for the period when the data are available based on this framework and to attach the history of the indicator calculated based on the old framework. At the beginning it was the first option used, but several errors or shortcomings of this option came out. In the new framework, the indicators are calculated for several reporting frameworks, but when it is calculated for a particular framework (e.g. Full sample), only items reported under this framework are used. However, in some cases the history of the data is not attached for all the underlying series under that particular framework (e.g., all Full sample items have history except one, when it is the FINREP the history is attached to), or, when there are just a few series entering the calculation, it can happen that the whole numerator or denominator is lacking the history. In such cases, the calculated history is not matching the “real” historical data, or even can’t be calculated for that particular framework. As mixing up of items using different reporting framework should be avoided, finally it was the second option used. As an example, indicator “Staff expenses [% of total assets]” is calculated for the Full sample. The indicator is calculated as Staff expenses over total assets. However, while for the item total assets the history is attached also to the Full sample, for item Staff expenses the history is attached only to the FINREP reporters. It means that using the first option, the calculation would fail.

Figure 2 Mapping the history – 2 items under the old framework attached to one FINREP item under the new framework, all domestic banks

In thousands EUR	"Old CBD" data - Germany, all domestic banks		"New CBD" data - germany, all domestic banks, FINREP reporters	
	Interest income		Interest expenses	Net interest income
2008	281,361,359	+	-238,521,996	42,839,363
2009	184,710,315		-144,185,831	40,524,484
2010	156,129,662		-118,862,714	37,266,948
2011	170,248,763		-132,933,671	37,315,092
2012	143,976,389		-110,414,744	33,561,645
2013	108,689,279		-76,369,304	32,319,975
2014				32,808,176

Figure 3 Mapping the history – "Full sample" data attached to "IFRS-FINREP"

In thousands EUR	Available for sale financial assets, Belgium, All banks	
	"Old CBD" data, Ful sample	"New CBD" data, IFRS-FINREP
2007	216,613,334	216,613,334
2008	221,996,776	221,996,776
2009	176,644,447	176,644,447
2010	159,658,775	159,658,775
2011	150,167,313	150,167,313
2012	120,134,863	120,134,863
2013	113,560,245	113,560,245
2014		132,198,167

3. Examples and applications

The significantly enlarged dataset described so far, together with the considerable amount of new CBD based indicators, offers potential starting points for new and more in-depth analysis of the EU28 banking system.

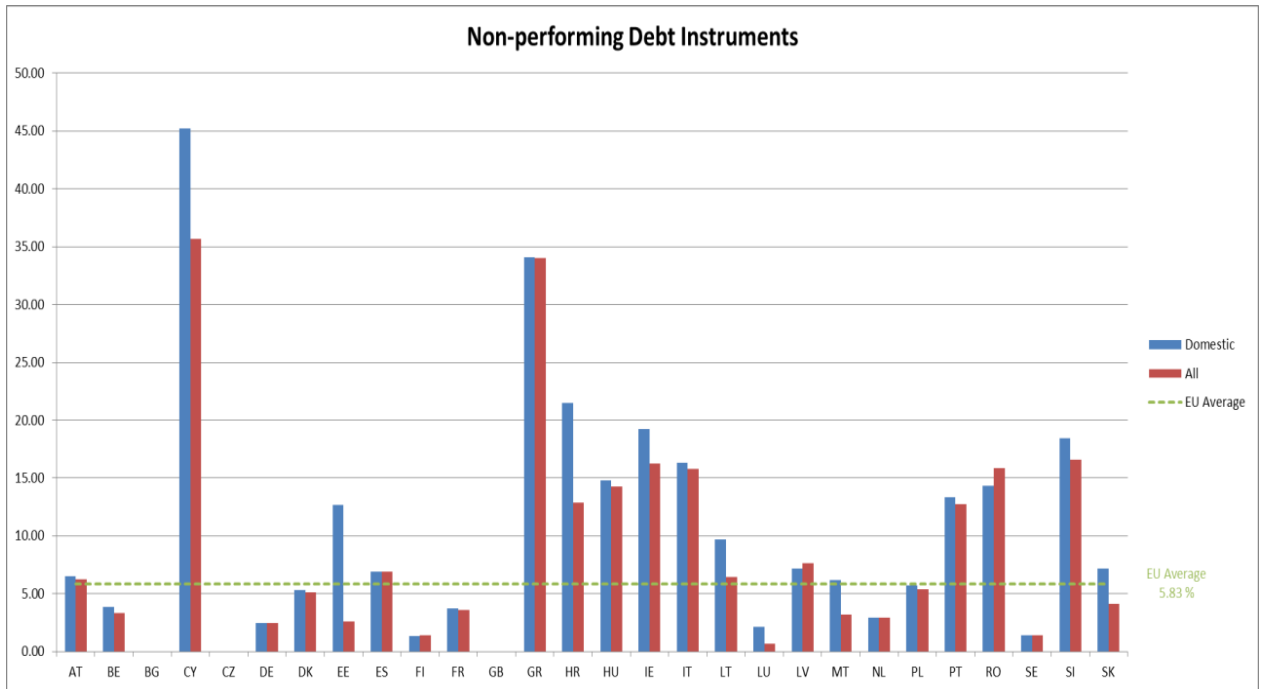
In this section we present an analysis of a sub-group of indicators selected from the whole set of indicators that are built and published on the basis of the CBD elementary data points collected. The aim of this selection is to provide a thorough overview of the EU banking sector and to demonstrate the value added of the CBD series for macro-prudential analysis.

As already described, while one of the main focus of the review of the framework was to ensure the continuity of the analytically relevant time series as much as possible, in some cases the new harmonised definitions represent such a value added that the items under the previous framework were discontinued. In other cases, the templates were enlarged by a large set of new items available. The first case is related mostly to asset quality items (such as non-performing exposures) or the definition of capital, the other case is related to, e.g., asset encumbrance items, forborne exposures or liquidity items (e.g. items requiring stable funding or liquid assets).

The following examples include charts on indicators affected by the above mentioned changes, i.e. based on newly collected data (such as forborne exposures, asset encumbrance and data on liquidity) or on items subject to a new definition according to the new CRR/CRD IV regulation (Non-performing debt instruments ratio, Tier 1 ratio, CET 1 ratio, etc.).

As from end-2014 the reporting framework changed to a large extent for the banks, while the dataset is enlarged, it is still subject to certain data quality constraints as well as some confidentiality issues. Therefore, as it is clear also from the below examples, in some cases the indicators can't be published for all countries. However, while confidentiality issues are expected to affect data availability also in the future, data quality issues should gradually diminish.

Figure 4 Non-performing Debt Instruments per Total Debt Instruments by country (Q4 2014)

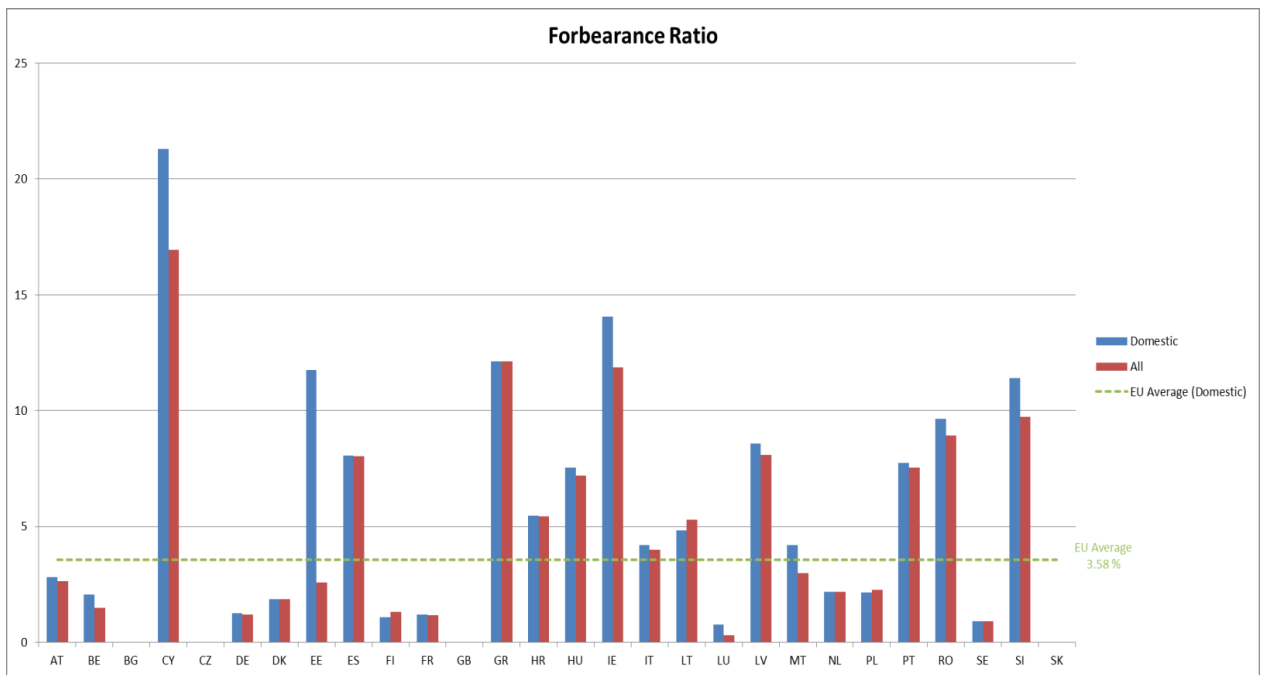


Source: ECB.

Data are displayed in percentages.

Debt instruments are the sum of Loans and advances and Debt securities.

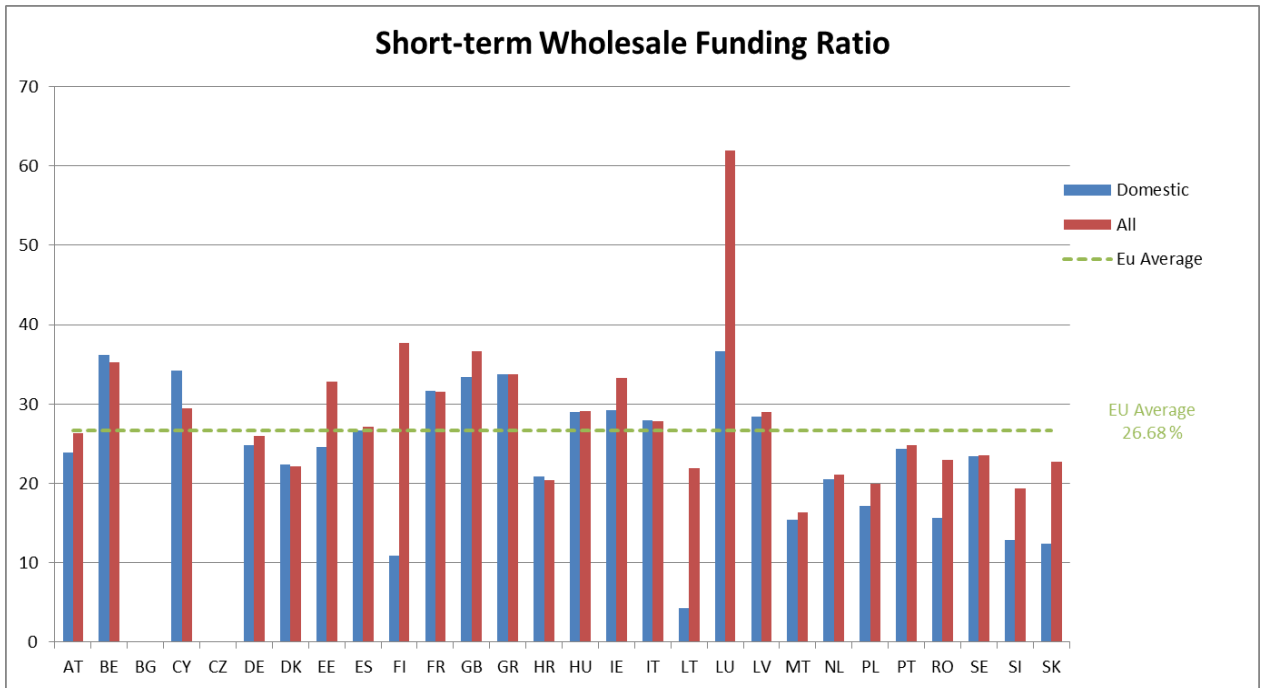
Figure 5 Forbearance ratio for Total Debt Instruments by country (Q4 2014)



Source: ECB.

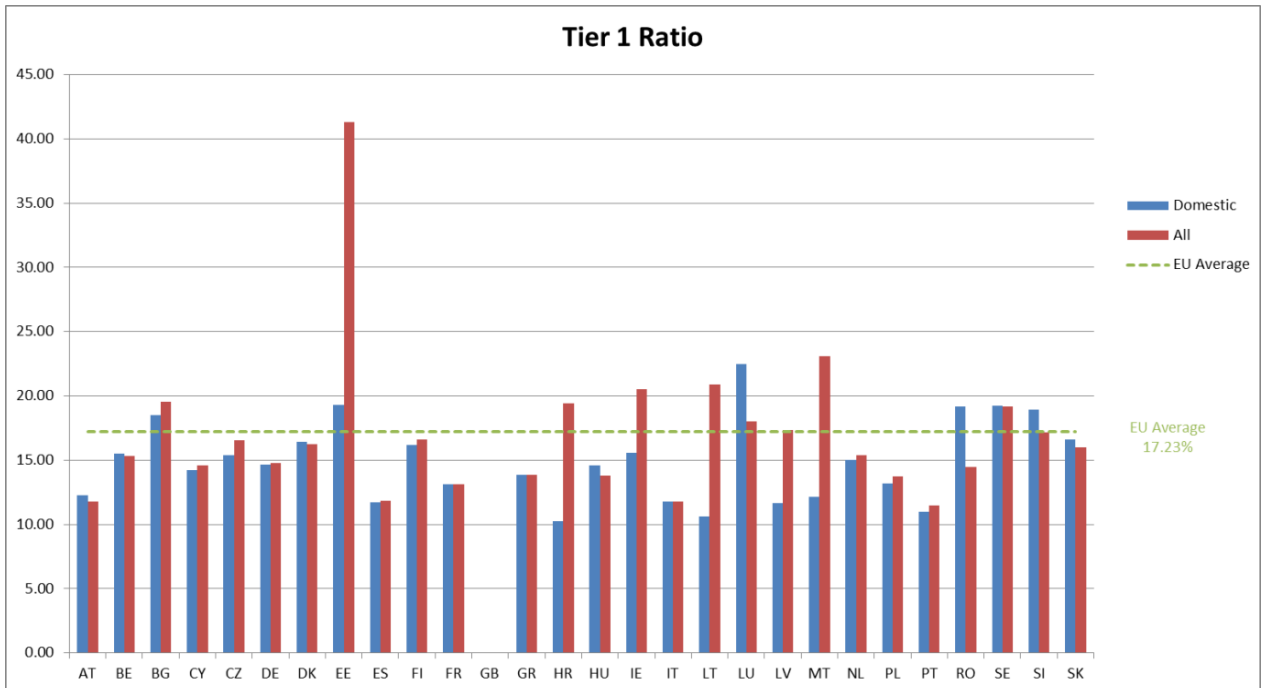
Data are displayed in percentages.

Figure 6 Short-term wholesale funding ratio by country (Q4 2014)



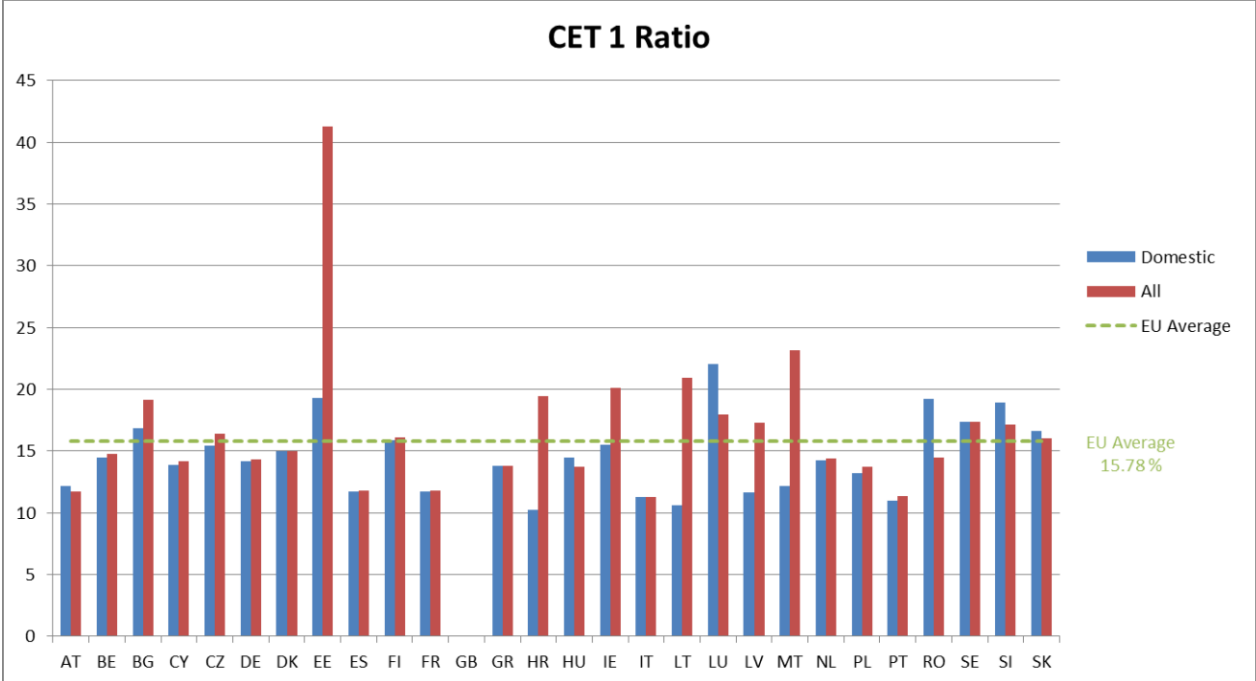
Source ECB.
Data are displayed in percentages.

Figure 7 Tier 1 ratio by country (Q4 2014)



Source ECB.
Data are displayed in percentages.

Figure 8 Common Equity Tier 1 ratio by country (Q4 2014)



Source ECB.
Data are displayed in percentages.

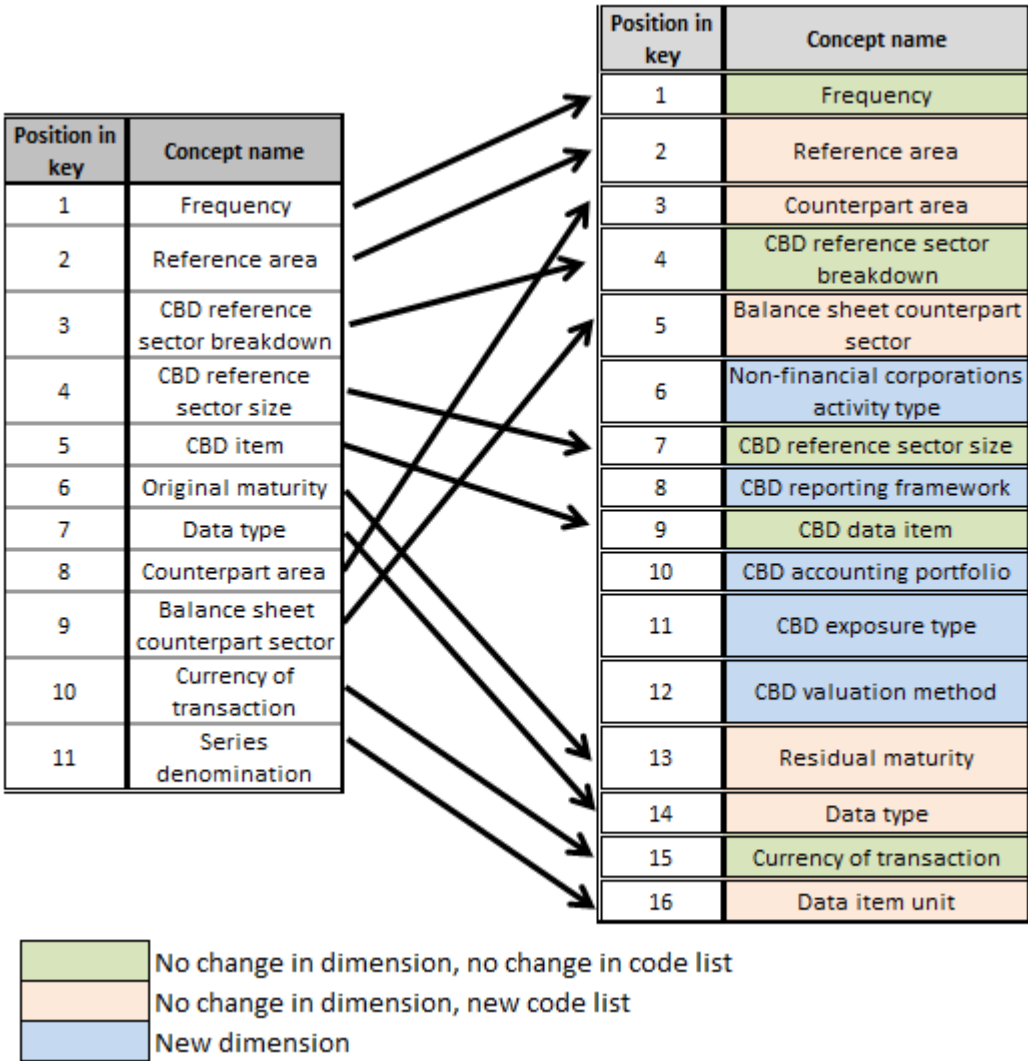
4. Conclusion

Deriving aggregate statistics from micro- (supervisory) data, not designed primarily for statistical needs and sometimes built on different non-harmonised accounting and conceptual basis, presents challenges both at conceptual and operational level.

In this paper, we described on the example of CBD how can be such micro-level data used to build a comprehensive and high enough quality macro-level database. We described a set of steps and issues that should be performed/solved during such a process, like the issue of disharmonised data, the possible aggregation of data collected in order to minimise the reporting burden or the question of time series in case there is a change in the framework.

After the outbreak of the financial crisis there is an increasing need for more granular and detailed data not just on a micro-level for supervisory purposes, but also on a macro-level in order to support macro-prudential decisions or decisions related to financial stability. As such macro-level data can be built-up using already available micro-level data; a positive outcome of this paper is that it is possible to support policymakers with granular data without significantly increasing the reporting burden on financial intermediaries.

Appendix 1: Changes in the dimensions used in the DSD for the "old" and "new" CBD



Appendix 2: Description of the dimension used in the CBD DSD

Dimension No. 1, Frequency: This dimension indicates the frequency of the reported time series and can take a value "A" for annual or "Q" for quarterly.

Dimension No. 2, Reference area: This dimension represents the country of residence of the reporting institution.

Dimension No. 3, Counterparty area: This dimension represents the area of residence of the counterparty of the data item. For the purpose of the CBD2 key family the dimension value "_Z" (Not applicable) is used in the "Reporters" part and value "W0" (World -all entities, including reference area, including international organisations) is used where the data item to be reported is not allocated to a specific area.

Dimension No. 4, Consolidated Banking Data reference sector breakdown: This dimension indicates the reporting sector (domestic institutions, foreign EU subsidiaries, etc.).

Dimension No. 5, Balance sheet counterpart sector: This dimension indicates the sector of the counterpart, e.g. S11 financial corporations, S1M households, etc. For items within the CBD2 key family where the sector is not specified the dimension value "_Z" is used, referring to the "Not applicable".

Dimension No. 6, Non-financial corporations' activity type: This dimension represents the activity type of the non-financial corporations (Manufacturing, Construction, etc.). For items within the CBD2 key family where the activity type is not specified or where the Balance sheet counterpart sector (dimension No. 5) is not "S11" (non-financial corporations), the dimension value "_Z" is used, referring to the "Not applicable".

Dimension No. 7, Consolidated Banking Data reference sector size: This dimension refers to the size group of the corresponding reporting sector. The following 6 values apply to the CBD: "L" - large institution, "M" - medium-size institution, "S" - small institution, "A" - all institutions, where no size group is specified, "F" – SSM significant banks and "N" – SSM less significant banks.

Dimension No. 8, Consolidated Banking Data reporting framework: This dimension refers to the reporting framework of the corresponding reporting sector. The following 5 values apply to the CBD: "A" – full sample – All banks/groups irrespective of the reporting framework, "F" – FINREP reporting institutions (IFRS + GAAP), "I" – IFRS-FINREP reporting institutions, "G" – GAAP-FINREP reporting institutions and "N" – non-FINREP reporting institutions.

Dimension No. 9, Consolidated Banking Data item: This dimension represents the item of the CBD reporting scheme. The first character of the item codes is always a letter specifying the main domain of the data item following this list: "A" – assets, "D" – distributions, "E" – exposures, "I" - indicators, "L" – liabilities, "LE" – Equity, "LF"

– off-balance sheet items, “O” – own funds, “P” – profit and loss items, “Q”- liquidity, “R” – reporters.

Dimension No. 10, Consolidated Banking Data accounting portfolio: This dimension represents accounting portfolios of the CBD reporting items (Available for Sale, Held to Maturity, etc.). For items within the CBD2 key family which refer to number of institutions where portfolio is not applicable, the dimension value “_Z” is used, referring to the “Not applicable”. For other items where the portfolio is not specified, the dimension value “_X” is used, referring to “Not specified”.

Dimension No. 11, Consolidated Banking Data exposure type: This dimension represents the exposure type of the CBD reporting items (performing exposures, non-performing exposures, encumbered assets, etc.). For items within the CBD2 key family which refer to the number of, the dimension value “_Z” is used, referring to the “Not applicable”. For other items where the exposure type is not specified, the dimension value “_X” is used, referring to “All exposures”.

Dimension No. 12, Consolidated Banking Data valuation method: This dimension represents the valuation method for the CBD reporting items (carrying amount, original exposure value, etc.). For items within the CBD2 key family which refer to the number of institutions, the dimension value “_Z” is used, referring to the “Not applicable”.

Dimension No. 13, Residual maturity: This dimension represents the residual maturity of the CBD reporting items. For all items, where the residual maturity is not specified, or where it is not applicable, the dimension value “_Z” corresponding to “Not applicable” is used.

Dimension No. 14, Data type: This dimension indicates the type of data to be reported. In the data flow under consideration the three following values are relevant: “LE” - Closing balance sheet/Positions/Stocks, “T” - Transactions, and “_Z”- Not applicable.

Dimension No. 15, Currency of transaction: This dimension describes the currency in which reported items are denominated. For the CBD data flow, two code values are relevant: “_T” - All currencies of denomination and “_Z” - Not applicable.

Dimension No. 16, Data item unit: This dimension specifies in which measure the reported series is expressed. In case of data expressed in the common currency (euro), the code value assigned must be “EUR” - Euro. Countries that do not use the common currency (euro) should convert the data into euro using the foreign exchange rate as of end of the corresponding reporting period. All items reported as percentage should be characterised within this dimension by “PC” - Percent. For other items that are reported as plain numbers, e.g. the number of credit institutions, the code value “PN” – Pure number is used.

Appendix 3: Description of CBD templates

1st part	Reporting population	Information on the number of credit institutions
2nd part	Profitability and efficiency	Income statement and distribution data
3rd part	Profitability and efficiency (Ratios)	Information on the distribution of the ROE
4th part	Consolidated balance sheet	Information on assets, liabilities, equity and off-balance sheet items
5th part	Balance sheet breakdowns	Breakdown of main financial assets and liabilities by counterparty economic sector
6th part	Measures of asset quality	Information on non-performing loans and impaired assets
7th part	Concentration	Geographical, sectorial concentration of assets and funding concentration by sector and instruments
8th part	Liquidity and funding	Information on liquid assets and asset encumbrance
9th part	Capital adequacy – own funds	Information on the own funds
10th part	Capital adequacy – exposures	Information on the type of exposures
11th part	Capital adequacy – other	Information on capital buffers
12th part	Capital adequacy – ratios	Information on distribution of institutions by risk approach, solvency ratio and Tier 1 ratio

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IFC workshop on *"Combining micro and macro statistical data for financial stability analysis. Experiences, opportunities and challenges"*

Warsaw, Poland, 14-15 December 2015

Aggregate macroprudential statistics from micro supervisory data – conceptual and operational issues ¹

Gaia Barbic, Stefano Borgioli and Jan Klacso,
European Central Bank

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.



EUROPEAN CENTRAL BANK

EUROSYSTEM

**Gaia Barbic,
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ECB
Monetary and Financial
Statistics

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Outline

- 1 The Challenge
- 2 What are the Consolidated Banking Data
- 3 Changes in CBD framework
- 4 Guiding Principles
- 5 What about non-FINREP reporters?
- 6 What about foreign-controlled branches?
- 7 Implementation – Main steps
- 8 Examples and applications

The Challenge

- Transposing firm-level supervisory returns into comprehensive and internally consistent aggregate statistics is a **complicated exercise** ...
- ... a **sound methodology** is required and
- ... **operational** challenges arise.

What are the Consolidated Banking Data

- The Consolidated Banking Data (CBD) is a **key data set for the macro-prudential analysis** conducted at the ECB/ESCB and for the statistical support to the European Systemic Risk Board (ESRB).
- CBD include **detailed information on bank profitability, balance sheets, asset quality and solvency** broken down by size classes of banks and covers almost 100% of the EU banking system. Data are fully consolidated on a cross-border and cross-sector basis.
- The CBD **collection started in 2002**. Data model changed over time.
- Up to last revision, **main data sources for CBD were** the supervisory information collected according to Financial Reporting (**FINREP**) and Common Reporting (**COREP**) guidelines, **as originally developed by** the Committee of European Banking Supervisors (CEBS).
- With the entry into force of the European Banking Authority's (**EBA**) Implementing Technical Standards on Supervisory Reporting (**ITS**), **the whole CBD framework had to be revised**.
- The “new” CBD were first implemented in the course of summer 2015

Changes in CBD the framework

- CBD framework revised and improved by the “**Joint ECB/EBA Task Force on Consolidated Banking Data**” in the course of 2014
- Data from 2014 onwards in line with the new CRR/CRD IV regulation
- Changes due to the revised framework in
 - The **list of items** collected
 - The **definition of items** collected
 - The **list of aggregates** calculated and published
 - The subsets of the **reporting population**
- “New” CBD to be reported with a quarterly frequency
 - end-of-year FULL template ; Q1, Q2, Q3 LEAN template

Guiding Principles

- **Transition to the “new” CBD:**
 - **Continuity of time series:** previous CBD retained, at least for key series.
 - **Revised CBD based on ITS data** points and templates covering (IFRS and n-GAAP) FINREP and COREP. Reporting cells for relevant data from non-FINREP banks were inserted in the data model
 - **Maximum coverage possible:** COREP templates were, in general and when relevant, prioritized over FINREP.
 - **Clear methodology:** unnecessarily mixing the compilation of CBD series from both COREP and FINREP in a given block of series was avoided.
 - A **balanced approach** was kept between additional user needs ascertained by the TF CBD and the need to minimize the costs of data compilation.
 - **No overlap:** undue overlapping and redundancies with already existing data collection were avoided

What about non-FINREP reporters?

- A key value added of CBD is the coverage of **entire EU banking system** with coverage of the EU national banking systems. Hence ...
- ... the need to bring together in the same statistical framework **different** (in terms of accounting) **micro supervisory returns** (also in the steady state).
- Reporting population split into:
 - IFRS-FINREP: reporters applying IFRS and the EBA ITS
 - GAAP-FINREP: reporters applying national accounting standards and the EBA ITS
 - Non-FINREP: reporters not applying the EBA ITS at all
 - FINREP = IFRS-FINREP + GAAP-FINREP
 - Full Sample = FINREP + Non-FINREP
- This **split is only for FINREP tables**, COREP is reported by all CIs
- This integrated framework allows full aggregation of the sub-components of the different banking systems at least for the main items (like interest income, total deposits, etc.). Aggregation includes “of which” items to provide transparency and decomposition between ITS (FINREP) and non-ITS (non-FINREP) data.

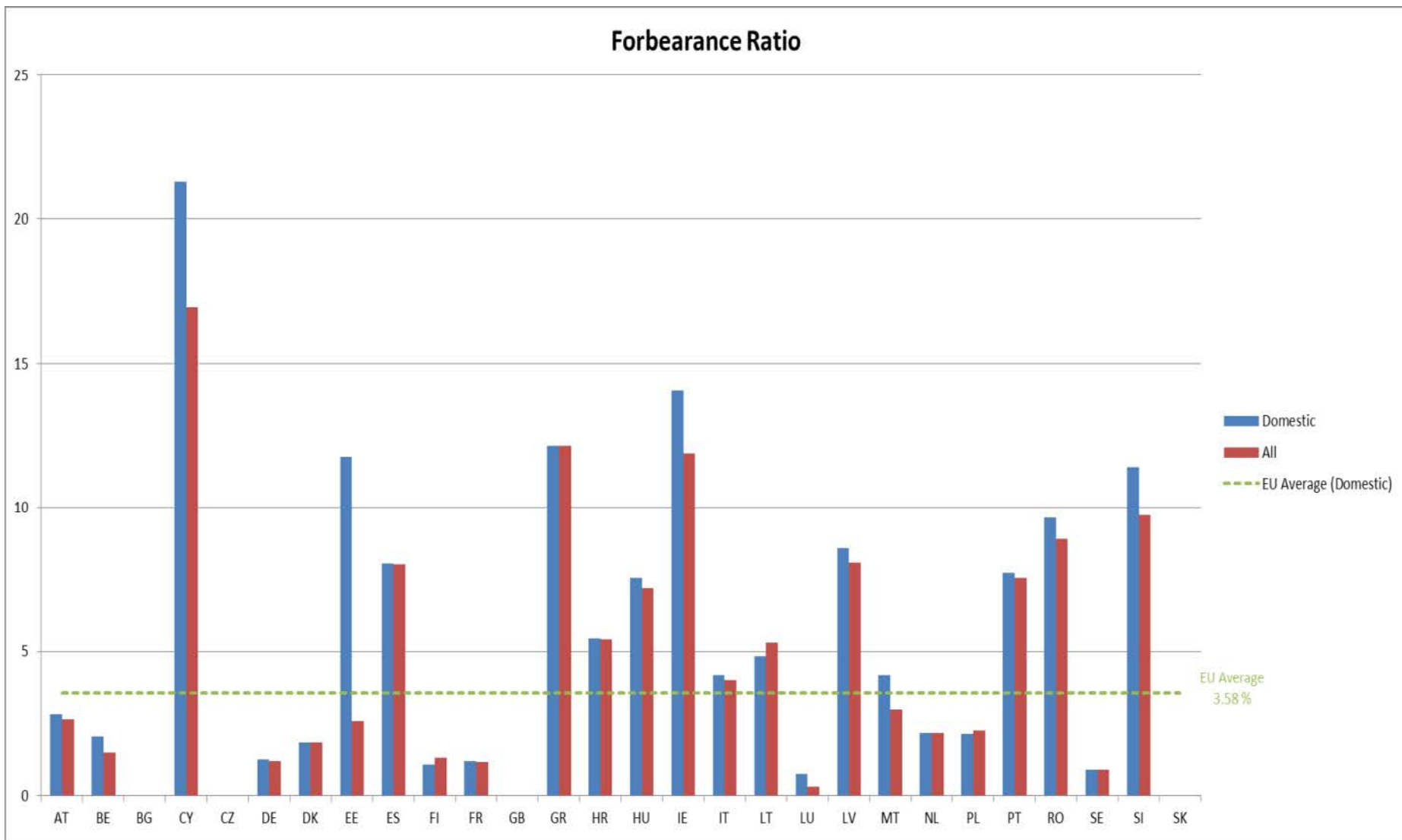
What about foreign-controlled branches?

- **Reduced data availability** for foreign-controlled branches.
- **No harmonised supervisory reporting** for branches: all the FINREP and COREP reporting is related only to credit institutions and their subsidiaries.
- **High overlap** between data points available for branches and non-FINREP reporters emerged from an ad-hoc survey and from the data reported in the “old” CBD.
- It was then decided to have for foreign-controlled branches the **same reporting scheme** that was drafted for non-FINRPEP.

Implementation – Main steps

- Creation of the new structure for the CBD
- Implementation of the **quality checks**
 - Completeness
 - Consistency/Stability
 - Correctness
 - Accuracy/Horizontal and vertical comparability
- Definition of the indicators and aggregates calculated based on the reported elementary data points
 - A set of new indicators important for macro-prudential analysis identified/defined based on new data available
- **Mapping** and the link between the “new” CBD and the “old” CBD.
- CBD **catalogue** at <http://www.ecb.europa.eu/stats/money/consolidated/html/index.en.html>

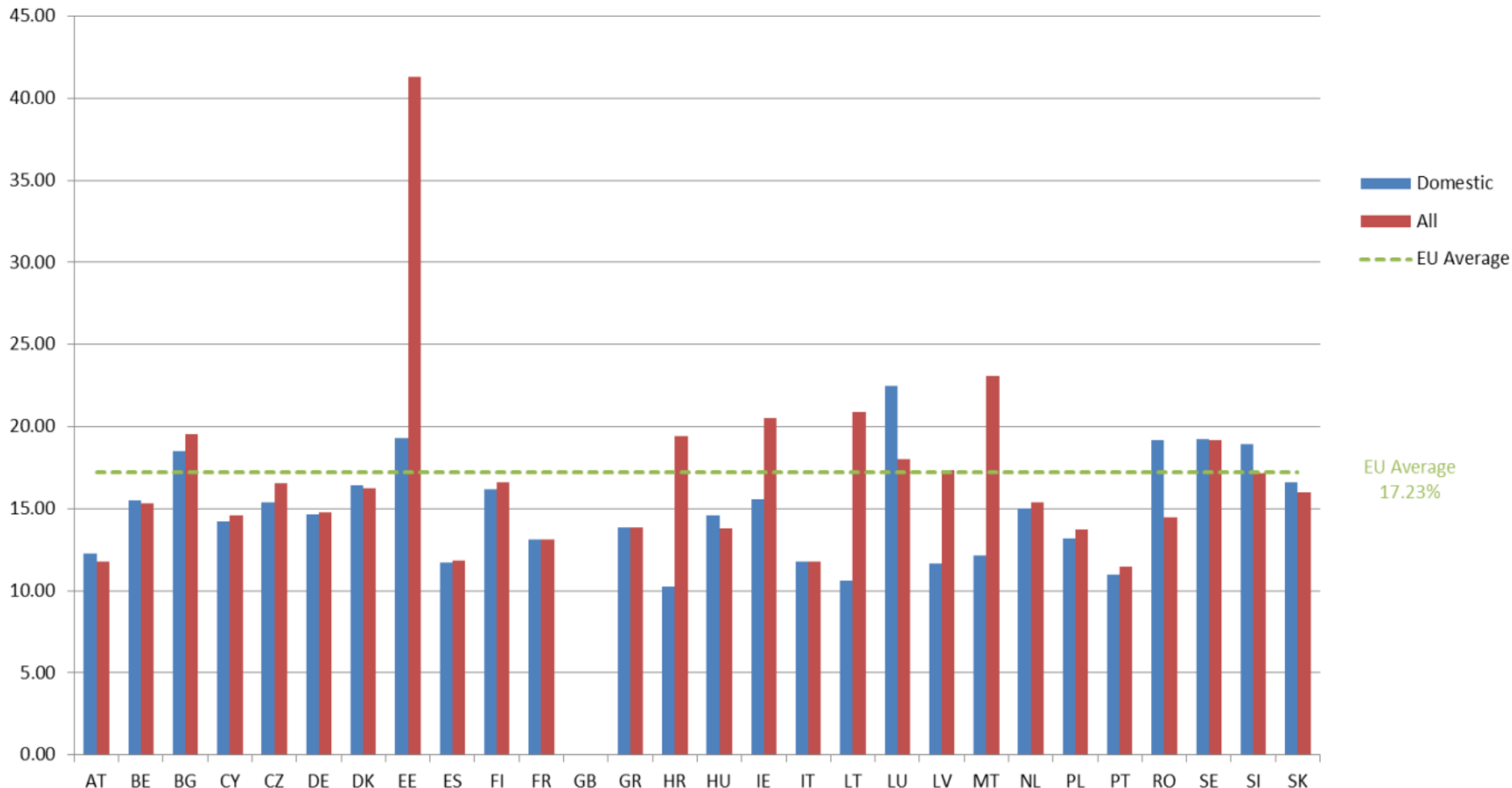
Examples and applications - 1



Source: ECB. Data are displayed in percentages.

Examples and applications - 2

Tier 1 Ratio



Source: ECB. Data are displayed in percentages.

Thank you

Questions?

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