THE EBA METHODOLOGICAL GUIDE

RISK INDICATORS AND DETAILED RISK ANALYSIS TOOLS

EBA
EUROPEAN BANKING AUTHORITY

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Abbreviations

ABS	Asset-backed Securities
AFS	Available for Sale
AMA	Advanced Measurement Approaches
AQM	Asset Quality Matrices
AQT	Asset Quality Risk Indicator
ASA	Alternative Standardised Approach
BIA	Basic Indicator Approach
CDS	Credit Default Swap
CEBS	Committee of European Banking Supervisors
CET1	Common Equity Tier I Capital Ratio
CIU	Collective Investment Undertaking
CM	Concentration matrices
CON	Concentration Risk Indicator
COREP	Common Reporting
CRD IV	Capital Requirements Directive IV
CRE	Commercial Real Estate
CRM	Credit Risk Mitigation
CRR	Capital Requirements Regulation
CVA	Credit Valuation Adjustment
DRAT	EBA Detailed Risk Analysis Tool
DTA	Deferred Taxation Adjustments
EBA	European Banking Authority
ECB	European Central Bank
EEA	European Economic Area
EL	Expected Losses
ELA	Emergency Liquidity Assistance (ECB monetary operation)
FBDS	Forborne Debt Securities

FBE	Forborne Exposures
FBL	Forborne Loans
FINREP	Financial Reporting
FND	Funding Risk Indicator
FSB	Financial Stability Board
FSI - IMF	Financial Soundness Indicators – International Monetary Fund
FVOCI	Fair Value through Other Comprehensive Income
GAAP	Generally Accepted Accounting Principles
IFRS	International Financial Reporting Standards
IP	Immovable Property
IRB	Internal Rating-based
ITS	Implementing Technical Standard
KRI	EBA Key Risk Indicator
LCR	Liquidity Coverage Ratio
LGD	Loss Given Default
LIQ	Liquidity Risk Indicator
MKR	Market Risk Indicator
NACE	Nomenclature of Economic Activities from the European System of National and Regional Accounts
NFC	Non-Financial Corporations
NPDS	Non-Performing Debt Securities
NPE	Non-Performing Exposures
NPL	Non-Performing Loans
NSFR	Net stable Funding Ratio
OCI	Other Comprehensive Income
OPR	Operational Risk Indicator
OTC	Over the Counter
PD	Probability of Default
PFT	Profitability Risk Indicator
POCI	Purchased or Originated Credit-impaired

PSE	Public Sector Entities
RLE	Rankings of Counterparties from Large Exposures
RNPE	Rankings of Defaulted and Non-Performing Exposures
RWA	Risk-weighted Asset
SA	Standardised Approach
SFT	Secured Financing Transactions
SME	Small and Medium Enterprises
SPE	Special Purpose Entity
SVC	Solvency Risk Indicator
SVR	Sovereign Risk Indicator
TLTRO	Targeted Longer-term Refinancing Operation (ECB monetary operation)
TSA	Standardised Approach
WS - RI	Work Stream – Risk Indicators
XBRL	eXtensible Business Reporting Language

Introduction

Background

Since February 2011, the EBA has started collecting, on a quarterly basis, statistical information referring to a sample of 55 banks across 20 EEA countries, in order to compute 65 Key Risk Indicators (KRIs). KRIs are ratios providing early warning signs of trends, potential risks and vulnerabilities in the EU banking sector.

All their building components[1] relied on the existing COREP and FINREP reporting frameworks, previously endorsed by the CEBS[2], and, therefore, a high degree of standardised concepts and definitions was ensured. However, not all Competent Authorities (CAs) had fully implemented these reporting guidelines and, as a result, data had to be collected on a best-efforts basis. That collection was performed either directly from the relevant financial institutions, or by mapping data available in national reporting formats onto the data items as defined in COREP and FINREP, or instead by using other sources to proxy the missing data.

To that end, KRIs constituted the minimum feasible set of metrics compiled by the EBA to undertake its micro-prudential analysis role and build meaningful risk dashboards and reports.

Over the past few years, the EBA has placed emphasis on uniform reporting requirements to ensure data availability and comparability. In particular, the EBA introduced the implementing technical standards (ITS) on supervisory reporting[3], serving as the 'backbone' for the collection and compilation of EU supervisory statistics.

The ITS set out the reporting requirements and define the scope of institutions reporting frequency and the reference and remittance dates. These standards also include annexes specifying the reporting requirements in the form of templates and instructions. Additionally, they provide reporting instructions with a Data Point Model (DPM) and a set of validation rules that ensure

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[1] Raw data involved in the KRI numerators and denominators, collected according to the EBA DC 031/2011.

[2] FINREP rev1 as published by the CEBS on 24 July 2007, COREP as published by the CEBS on 6 January 2010.

[3] Commission Implementing Regulation (EU) No 680/2014, laying down implementing technical standards with regard to supervisory reporting of institutions according to Regulation (EU) No 575/2013 of the European Parliament and the Council.

consistent application of the requirements, as published on the EBA website.[4] The EBA has also developed XBRL taxonomies to facilitate data exchanges for the data concerned.

In terms of content, the ITS cover fully harmonised supervisory reporting requirements for *solvency, large exposures, real estate losses, financial information, liquidity, leverage ratio and asset encumbrance* and provide a comprehensive set of harmonised data of all EU institutions. They also introduce harmonised definitions for non-performing and forborne exposures in order to promote a full comparison of the asset quality of EU banks. The information deriving from the reporting requirements assists supervisors in their Pillar 1 monitoring and their assessments of Pillar 2 risks.

> **Box 1. Areas covered by the harmonised reporting requirements of the EBA reporting framework**
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> **a.** Own funds requirements and financial information in accordance with Article 99 of Regulation (EU) No 575/2013;
>
> **b.** Losses stemming from lending collateralised by IP in accordance with Article 101(4)(a) of Regulation (EU) No 575/2013;
>
> **c.** Large exposures and other largest exposures in accordance with Article 394(1) of Regulation (EU) No 575/2013;
>
> **d.** Leverage ratio in accordance with Article 430 of Regulation (EU) No 575/2013;
>
> **e.** Liquidity coverage requirements and net stable funding requirements in accordance with Article 415 of Regulation (EU) No 575/2013;
>
> **f.** Asset encumbrance in accordance with Article 100 of Regulation (EU) No 575/2013;
>
> **g.** Supervisory benchmarking of internal approaches in accordance with Article 78(8) of Directive 2013/36/EU.

In light of the merits the ITS have brought – in terms of more granular information, data harmonisation, coverage, periodicity and timeliness – the EBA decided to enhance its set of KRIs, developing a comprehensive set of risk indicators (RIs).

In the same vein, a set of Detailed Risk Analysis Tools (DRATs) was developed. These tools go beyond the classical definition of indicators typically based on ratios. They use data visualisation techniques to increase the analytical power extracted by their underlying data components.

Purpose and structure of this Guide[5]

The primary purpose of this Guide is to serve EBA compilers of risk indicators and internal users presenting risk indicators and DRATs. A comprehensive list of risk indicators and DRATs is available

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[4] See also: EBA reporting frameworks.

[5] The Guide has benefited from the valuable contribution provided by the EBA workstream on risk indicators (WSRI) created under the aegis of EBA's Subgroup on Analysis Tools (SGAT), namely Achilleas Nicolaou (European Banking Authority), Andreas Pfeil (European Banking Authority), Angelos Vouldis (European Central Bank), Antigoni Kallergi (Bank of Greece), Antonella Romano (Banca d'Italia), Davide Vioto (European Banking Authority), Elena Pastuhova (Bulgarian National Bank), Eva Jauernik (European Banking Authority), Fátima Estacio Valero (Banco de España), Fernando Garcia

at the EBA website[6]. In addition, it thus provide guidance on indicators' concepts, data sources (i.e. precise ITS data points involved in their calculation), techniques upon which they are computed, and clarity on methodological issues that may assist in their accurate interpretation and use.

Furthermore, this Guide fosters transparency on the computation methodology, with regard to those indicators used in the context of the EBA official publications, such as the EBA's risk assessment report and the EBA Risk Dashboard. Most importantly, it informs the general public on how these indicators are computed.

Last but not least, this Guide enables other competent authorities to compute indicators following the same methodology, and thus compare, in a consistent manner, indicators for different samples of banks, as well as for the EU aggregates.

However, it has to be noted that this Guide is not intended to bind competent authorities and hence, it is not mandatory, but only aims at supporting computation of indicators, consistent with the EBA publications. Naturally, some of the indicators listed will follow closely the regulatory definitions as laid down in the Capital Requirements Regulation (CRR) and Capital Requirements Directive IV (CRD IV). In addition, the regulatory standards agreed by the Basel Committee on Banking Supervision also serve as an important source of inspiration for many other proposed indicators.

The Guide is a living document and, therefore, it may evolve periodically, reflecting new experiences and user needs or changes in EU supervisory reporting (i.e. ITS on supervisory reporting).

The Guide is structured in two parts. Part I presents the risk indicators by means of an introduction, along with a description of each of them, and concludes with a short reference to relevant methodological concerns, when those arise. Consequently, each risk indicator has been allocated either to one of the following nine categories, depending on the type of risk addressed (namely *liquidity, funding, asset quality, profitability, concentration, solvency, operational, market and sovereign risk*) or to the dedicated category for SME monitoring. Each of these categories has a dedicated chapter in Part I.

Finally, Part II discusses selective methodological issues that may arise when compiling or using the risk indicators and DRATs.

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[6] https://eba.europa.eu/risk-analysis-and-data/risk-indicators-guide

Part I. Risk indicators by type of risk

I.1 Liquidity risk

I.1.1. List of risk indicators and relevant DRATs

Table 1: List of LIQs and relevant DRATs

Number	Name	Number	Name
LIQ 1	Core funding ratio (% of total liabilities) – 'Turner ratio'	**LIQ 11**	Liquid assets to total assets (liquid asset ratio)
LIQ 2	Short-term wholesale funding Ratio (% of items providing stable funding)	**LIQ 13**	Financial assets held for trading to total assets
LIQ 5	Withdrawable funding (% of total liabilities)	**LIQ 14**	Financial liabilities held for trading to total liabilities and equity
LIQ 6	Term funding (% of total liabilities)	**LIQ 17**	Liquidity coverage ratio (%)
LIQ 8	Repos funding Ratio (% of items providing stable funding)	**LIQ 18**	Liquid assets to short-term liabilities
LIQ 9	Funding via derivatives (% of total items providing stable funding)	**LIQ 19**	Liquid assets to one-year liabilities
LIQ 10	Firm specific currency concentration (% of total items providing stable funding)		

I.1.2. Introduction

Liquidity risk refers to the risk of a firm being unable to fund its increases in assets or to meet its financial obligations, as they fall due, without incurring unacceptable costs or losses through fund raising and asset liquidation. This can be either the result of the financial institution's inability to manage unplanned decreases and changes in funding sources, or their failure to recognise or address changes in market conditions, that may affect the institution's ability to liquidate assets quickly and with minimal loss in value.

A liquidity crisis could potentially have a negative impact on earnings and capital and, in the extreme, could cause the collapse of an otherwise solvent institution. Earnings and growth potential could also be negatively affected if an institution's liquidity position constrains it from undertaking a transaction at normal market price. Conversely, illiquidity may lead to foregone investment opportunities or fire sales of assets, which could ultimately result in insolvency.

The banking sector is particularly susceptible to liquidity risk, as credit institutions fulfil a maturity transformation role in the financial system. The main role of banks (or financial institutions) is to take short-term deposits and savings and invest these funds in longer-term assets, such as mortgages.

In this sense, liquidity risk is also considered to be a systemic risk. The interconnectedness and general correlation of performance among financial sector institutions means that contagion effects can arise from liquidity crises in individual institutions. This has historically manifested itself in the form of bank runs, when a single failed institution triggers depositor runs for other institutions as well.

Moreover, liquidity risk could have systemic effects through other mechanisms. As seen in recent times, uncertainty about the solvency of institutions can lead to liquidity hoarding and a subsequent 'drying up' of credit in short-term interbank lending markets; liquidity crises can subsequently have spill over effects on the real economy in the form of reduced credit availability.

I.1.3. Description of the relevant risk indicators

The set of LIQs are mainly sourced from COREP liquidity templates (e.g. C 61.00) as well as FINREP templates.

This set of indicators considers the composition of assets and liabilities from the perspective of their impact on the institution's liquidity. Within this category, there are indicators that directly compare institutions' holdings of certain types of assets against certain types of liabilities. A prominent example is the Liquidity Coverage ratio (Regulation (EU) No 61/2015), which can be used to compare unencumbered, liquid assets with short-term cash flows given a severe liquidity stress scenario. In the same vein, there are indicators that focus on the institution's asset composition or liability composition separately, such as the core funding ratio (LIQ 1).

On the assets side, liquidity indicators can be used to assess the relative liquidity of a firm's holdings, i.e. the ease with which banks could sell their assets without impacting prices, or to consider the institution's reliance on certain types of assets that form their liquidity buffers (e.g. LIQ 14). Please note that while liquidity may impact asset quality (see chapter I.3) and vice versa, both concepts (and the respective indicators) differ substantially. Liquidity represents a risk category whereas asset quality may be understood as the compound of different asset characteristics, among which liquidity risk may be one.

Due to the reporting requirements for major currencies, COREP liquidity templates also allow the analysis of liquidity risk for specific currencies. Such indicators are important to consider, as liquidity is not always fungible across different currencies. A key use for such indicators is to identify potential liquidity shortfalls and risk areas for firms within different jurisdictions.

Besides these risk indicators, a DRAT covering liquidity has also been developed. These indicators can be compiled either at the institution level, assessing potential weaknesses in the positions held in a given currency, or at the level of the whole EU banking system in order to assess general patterns in the positions held in foreign currencies.

I.2 Funding risk

I.2.1. List of risk indicators and relevant DRATs

Table 2: List of FNDs and relevant DRATS

Number	Name	Number	Name
FND 1	Asset encumbrance to total assets	**FND 19**	Proportion of short-term liabilities with encumbered assets
FND 2	Encumbrance of central bank eligible assets	**FND 20**	Proxy of secured funding
FND 3	Encumbrance of debt securities issued by general governments	**FND 21**	Central Bank Eligible Unencumbered Own Assets and collateral available for encumbrance to total liabilities
FND 4	Encumbrance of collateral received	**FND 22**	Share of deposits in non-domestic markets
FND 5	Over collateralisation	**FND 23**	Share of financial liabilities in non-domestic markets
FND 6	Contingent encumbrance	**FND 24**	Share of deposits of households and non-financial corporations
FND 7	Encumbered assets at central bank	**FND 25**	Use of subordinated financial liabilities
FND 8	% of total deposits covered by a deposit guarantee scheme to total liabilities	**FND 26**	Gains and losses of financial liabilities at fair value to their carrying amount
FND 9	Debt securities to total liabilities	**FND 27**	Average interest expense of debt securities issued
FND 10	Deposits from credit institutions to total liabilities	**FND 28**	Covered bonds to total liabilities
FND 11	Loans and advances (excl. trading book) to total assets	**FND 29**	Asset-backed securities to total liabilities
FND 12	Debt-to-equity ratio	**FND 30**	Convertible compound financial instruments to total liabilities
FND 13	Off-balance-sheet items to total assets	**FND 31**	Share of total liabilities in the accounting and regulatory scope of consolidation
FND 14	Annual growth rate of total assets	**FND 32**	Loans and advances-to-deposit ratio for households and non-financial corporations
FND 15	Annual growth rate of total loans and advances	**FND 33**	Asset encumbrance ratio
FND 16	Annual growth rate of total customer deposits	**FND 35**	Customer deposits to total (non-interbank) loans
FND 17	Loan-to-deposit and advances ratio	**FND 36**	Credit growth to private sector

FND 18	Customer deposits to total liabilities

Number	Name
AQM 1	Term funding per currency

I.2.2. Introduction

Funding risk refers to the risk undertaken by a firm in accessing sufficient funds to meet its obligations when they fall due. Therefore, as in the case of liquidity risk, a bank's poor financial performance may lead to its reduced creditworthiness and, consequently, to its failure to access sufficient funds over a specific horizon. Implicitly, this will eventually make it unable to settle its obligations during this time.

Besides an institution's creditworthiness, the composition and quality of the funds (the so-called funding profile) are also important factors to identify the firm's funding risk profile. For instance, when a bank is able to finance itself at low costs – using customer deposits or other forms of long-term unsecured funds – it can be considered as an institution with a low funding risk profile.

Moreover, an analysis of asset encumbrance is critical to assess the ability of institutions to handle funding stress, as well their ability to switch from unsecured to secured funding under such stressed conditions. The main sources of asset encumbrance (i.e. the balance sheet liabilities for which collateral was provided by institutions) across the sample are repos, covered bonds issued, and over-the-counter derivatives or central bank funding such as TLTROs, ELA and so on. Banks may use their assets as collateral to facilitate either short-term funding (e.g. using repos) or long-term funding (e.g. using ABS or covered bonds to diversify their funding profile).

In this context, the EBA identifies 36 funding indicators and one DRAT (AQM 1).

I.2.3. Description of the relevant risk indicators

In general, FNDs can be divided into **two groups: indicators that are related to encumbrance of assets, and those relating to the composition and quality of funding and liabilities**. The former set of indicators, i.e. those based on asset encumbrance, consists of indicators FNDs 1 to 7 and FND 33, while the latter consists of FNDs 8 to 32 and FND 34 on funding and balance sheet structure.

Considering the specialisation of the above-mentioned indicators, it is clear that the indicators cannot be analysed independently, as they do not provide a sufficient level of information about the bank's funding structure and related risk profile. However, when observed jointly, they show a good and overall picture of the associated funding risks.

As mentioned above, the FNDs 1 to 7 and FND 33 are risk indicators for asset encumbrance.

Analysts should consider an asset encumbered if it has been pledged or if it is subject to any form of arrangement to secure, collateralise or credit enhance any transaction from which it cannot be freely withdrawn. This definition covers but is not limited to:

- **Secured financing transactions**, including repurchase contracts and agreements, securities lending and other forms of secured lending;

- **Various collateral agreements** – for instance, collateral placed for the market value of derivatives transactions;

- **Financial guarantees** that are collateralized;

- **Collateral placed at clearing systems**, CCPs and other infrastructure institutions as a condition for access to service;

- **Central bank facilities**;

- **Underlying assets from securitization structures**, where the financial assets have not been derecognised;

- **Assets in cover pools** used for covered bond issuance.

Therefore, these risk indicators provide a deeper insight into the proportion of encumbered assets, proportionally to the total assets. Knowledge about the volume and composition of the assets and collateral available for encumbrance can provide insights into the degree of leverage an institution has in raising additional secured funding.

The FNDs 8 to 18 are employed to measure funding risk and mainly concern the bank's balance sheet, providing a general overview of its evolution. FND 8 indicates the share of guaranteed deposits in the total items providing stable funding. FND 9 and FND 10 take a closer look at the share of the wholesale funding of the firm. FNDs 11 to 16 observe the balance sheet structure and the evolution of the main balance sheet items. Finally, FND 17 and FND 18 offer an insight into how extensively loans can be financed by deposits, while the share of deposits in total liabilities may also provide a notion of the institution's funding profile.

Indicators FND 19 to 31 and, FND 32 and 34 offer insights into the concentration of funding, its geographical distribution, and the quality of the secured and unsecured funding of an institution.

Indicators FND 35 and 36 were added to the list after the review of the EBA IMF-FSI Guide.

Complementary to these risk indicators, there is also a DRAT that fall under the area of funding. The DRAT on liquidity and funding information LFI2 provides a breakdown by currency of term funding, as defined in the domain of the Net Stable Funding Ration (NSFR).

I.2.4. Further methodological issues and potential ways to address them

Despite the rich information available in the context of the ITS on supervisory reporting, additional information may also be deemed necessary in order to properly size a bank's funding profile. This funding profile can be enriched by analysing additional market data on the actual funding costs, the average saving rates, interbank rates for the major currencies, repo rates and capital market credit spreads.

However, there is still room for further developments. An area that is also not sufficiently covered concerns data regarding capital and the money market instruments of an institution. Furthermore, the CDS spreads of an institution can also provide an indication of how markets evaluate an institution's creditworthiness. Consequently, the higher the likelihood of an institution defaulting, judging by its CDS spreads, the higher the chance this will be reflected in its funding risk profile.

I.3 Asset quality

I.3.1. List of risk indicators and relevant DRATs

Table 3: List of AQTs and relevant DRATS

Number	Name	Number	Name
AQT 1	Non-performing debt instruments (loans and advances & debt securities) net of impairments to prudential own funds	AQT 52.2	Forborne loans to total gross loans and advances (FBL at cost or at amortised cost)
AQT 2	Non-performing debt instruments (loans and advances & debt securities) net of impairments to Tier one capital	AQT 52.3	Forborne debt securities to total gross debt securities (FBDS at cost or at amortised cost)
AQT 3.1	Non-performing debt instruments (loans and advances & debt securities) other than held for trading to total gross debt instruments (NPE ratio)	AQT 53.1	Forborne loans and debt securities to total gross debt securities and loans and advances (FBE at fair value through other comprehensive income or through equity subject to impairment)
AQT 3.1.1	Non-performing debt instruments held for sale	AQT 53.2	Forborne loans to total gross loans and advances (FBL at fair value through other comprehensive income or through equity subject to impairment)
AQT 3.1.2	Non-performing debt instruments (including held for sale)	AQT 53.3	Forborne debt securities to total gross debt securities (FBDS at fair value through other comprehensive income or through equity subject to impairment) 1
AQT 3.2	Share of non-performing loans and advances (NPL ratio)	AQT 53a.1	Forborne loans, advances, and debt securities to total gross debt securities and loans and advances (FBE at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)
AQT 3.2.1.1	Share of non-performing loans and advances excluding cash balances at central banks and other term deposits and loans to credit institutions (NPL)	AQT 53a.2	Forborne loans to total gross loans and advances (FBL at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)

AQT 3.2.1.2	Share of non-performing loans excluding cash balances and other demand deposits (NPL)	AQT 53a.3	Forborne debt securities to total gross debt securities (FBDS at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)
AQT 3.2.2 to AQT 3.2.5	Share of non-performing loans and advances by counterparty sector (Central Banks, General governments, Credit institutions, Other financial corporations and non-financial corporations) (NPL)	AQT 54	Texas ratio
AQT 3.2.5.1 to AQT 3.2.5.3	Share of non-performing loans and advances by counterparty sector (Small and Medium-sized Enterprises (SMEs, Large corporations, Loans collateralised by commercial immovable property (CREs)) (NPL)	AQT 55	Non-performing loans and advances plus foreclosed assets to total gross loans and advances plus foreclosed assets (NPA ratio)
AQT 3.2.6	Share of non-performing loans and advances by counterparty sector - Households (NPL)	AQT 56	Share of stage 1 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at fair value through other comprehensive income
AQT 3.2.6.1	Share of non-performing loans and advances by counterparty sector - Loans collateralised by residential immovable property (RREs) (NPL)	AQT 57	Share of stage 2 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at fair value through other comprehensive income
AQT 3.2.6.2	Share of non-performing loans and advances by counterparty sector - Credit for consumption (NPL)	AQT 58	Share of stage 3 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at fair value through other comprehensive income
AQT 3.2.7	Ratio of non-performing loans and advances to NFCs & Households (NPL-core)	AQT 59	Share of stage 1 loans and advances to total gross loans and advances - Financial assets at fair value through other comprehensive income
AQT 3.3	Non-performing debt securities to total gross debt securities (NPDS ratio)	AQT 60	Share of stage 2 loans and advances to total gross loans and advances - Financial assets at fair value through other comprehensive income

AQT 3.3.1 to AQT 3.3.5	Share of non-performing debt securities by counterparty sector (Central banks, General governments, Credit institutions, Other financial corporations and non-financial corporations) (NPDS)	**AQT 61**	Share of stage 3 loans and advances to total gross loans and advances - Financial assets at fair value through other comprehensive income
AQT 4.1.1	Share of non-performing debt instruments by counterparty sector - Central banks & Credit Institutions	**AQT 62**	Share of stage 1 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at amortised cost
AQT 4.2 to AQT 4.5	Share of non-performing debt instruments by counterparty sector (General governments, Other financial corporations and non-financial corporations). (NPE)	**AQT 63**	Share of stage 2 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at amortised cost
AQT 5.1 to AQT 5.6	Share of non-performing debt instruments (loans and advances & debt securities) by country (residency counterparty) - (Central banks, General governments, Credit institutions, Other financial corporations, non-financial corporations and Households)	**AQT 64**	Share of stage 3 debt instruments to total gross debt instruments (loans and advances & debt securities) - Financial assets at amortised cost
AQT 6.2 to AQT 6.3	Share of impaired assets that are past due by instrument type (Debt securities and Loans and advances)	**AQT 65**	Share of stage 1 loans and advances to total gross loans and advances - Financial assets at amortised cost
AQT 8.1 to AQT 8.5	Share of impaired debt securities that are past due by sector (Central banks, General governments, Credit institutions, Other financial corporations and non-financial corporations)	**AQT 66**	Share of stage 2 loans and advances to total gross loans and advances - Financial assets at amortised cost

AQT 9.1 to AQT 9.6	Share of impaired loans and advances that are past due by sector (Central banks, General governments, Credit institutions, Other financial corporations, non-financial corporations and Households)	AQT 67	Share of stage 3 loans and advances to total gross loans and advances - Financial assets at amortised cost
AQT 10.1 to AQT 10.2	Accumulated impairment and accumulated negative change in fair value due to credit risk on non-performing exposure of debt instruments by country (Debt securities and Loans and advances)	AQT 68.1	Share of financial instruments measured at FV through P&L in total financial instruments
AQT 11	Proportion of defaulted exposures	AQT 68.1.a	Share of financial instruments measured at FV through P&L in total IFRS 9 assets
AQT 12	Value adjustments and provisions compared to original exposure	AQT 68.2	Share of financial instruments measured at FV through other comprehensive income in total financial instruments
AQT 13	Risk Weight ratio (credit risk)	AQT 68.2a	Share of financial instruments measured at FV through other comprehensive income in total IFRS 9 assets
AQT 14	Post-CRM exposure to original exposure	AQT 68.3	Share of financial instruments measured at (amortised) cost in total financial instruments
AQT 15	EL amount compared to original exposure	AQT 68.3a	Share of financial instruments measured at (amortised) cost in total IFRS 9 assets
AQT 16.1	Share of defaulted exposures by sector and country - General governments (Central, Regional and PSE), Central Banks, Multilateral Development Banks and International Organisations	AQT 69.1	Movements from stage 1 to 2
AQT 16.2 to AQT 16.4	Share of defaulted exposures by sector and country (Institutions, Corporates and Retail)	AQT 69.2	Movements from stage 1 to 3

AQT 17.1	Share of newly defaulted exposures (or increase of defaults for the period) by sector and country - General governments (Central, Regional and PSE), Central Banks, Multilateral Development Banks and International Organisations	AQT 69.3	Movements from stage 2 to 3
AQT 17.2 to AQT 17.6	Share of newly defaulted exposures (or increase of defaults for the period) by sector and country (Institutions, Corporates, Retail, Equity and Other non-credit obligation assets	AQT 69.4	Movements from stage 2 to 1
AQT 18	Share of re-securitisations	AQT 69.5	Movements from stage 3 to 2
AQT 19	Share of impaired and past due >90 days collateralised loans	AQT 69.6	Movements from stage 3 to 1
AQT 20	Quality of Off-Balance Sheet exposures (share of NP OBS exposures)	AQT 69.7	Deterioration rate - Movements from Stage 1 (to Stage 2 or Stage 3)
AQT 20a.1	Quality of Off-Balance Sheet exposures (share of Stage1 OBS exposures)	AQT 69.8	Default rate - Movements to Stage 3 (from stage 1 or 2)
AQT 20a.2	Quality of Off-Balance Sheet exposures (share of Stage 2 OBS exposures)	AQT 69.9	Movements to Stage 1 (from stage 3 or stage 2)
AQT 20a.3	Quality of Off-Balance Sheet exposures (share of Stage 3 OBS exposures)	AQT 69.10	Movements to stages 1 and 2 from stage 3, compared to total financial instruments in stage 3
AQT 21	Net allowances for credit losses : debt securities and loans and advances	AQT 69.11	Movements to stage 1 from stage 3, compared to total financial instruments in stage 3
AQT 22.1	Share of fair value level for assets - Level 1	AQT 70.1	Stage 1 Gross Carrying Amount Allocation - On balance sheet items
AQT 22.2	Share of fair value level for assets - Level 2	AQT 70.2	Stage 2 Gross Carrying Amount Allocation - On balance sheet items
AQT 22.3	Share of fair value level for assets - Level 3	AQT 70.3	Stage 3 Gross Carrying Amount Allocation - On balance sheet items
AQT 23	Share of large exposures in default	AQT 71.1	Coverage stage 1 - On balance sheet items
AQT 24.1 to AQT 24.2	Ratio of forborne assets by country (Debt securities and Loans and advances)	AQT 71.2	Coverage stage 2 - On balance sheet items

AQT 25	Past due (>90 days) but not impaired loans and advances to total loans and advances	**AQT 71.3**	Coverage stage 3 - On balance sheet items
AQT 26	Impaired and past due >90 days loans and advance to total loans	**AQT 72.1**	Stage 1 Carrying Amount Allocation - On balance sheet items
AQT 27	Change in allowances by type of instrument : loans and advances	**AQT 72.2**	Stage 2 Carrying Amount Allocation - On balance sheet items
AQT 28	Past due (>90 days) but not impaired debt instruments (loans and advances & debt securities) to debt instruments	**AQT 72.3**	Stage 3 Carrying Amount Allocation - On balance sheet items
AQT 31	Impaired financial assets to total assets	**AQT 73.1**	Percentage of total credit risk allowances allocated to Stage 1 – On balance sheet items
AQT 32	Impaired debt instruments to total debt instruments subject to impairment	**AQT 73.2**	Percentage of total credit risk allowances allocated to Stage 2 – On balance sheet items
AQT 34	Impairments on financial assets to total operating income	**AQT 73.3**	Percentage of total credit risk allowances allocated to Stage 3 – On balance sheet items
AQT 35	Annual growth rate of impairments on financial assets	**AQT 74.1**	Allocation of non-credit impaired financial assets to stage 2
AQT 36	Annual growth rate of past due (>90 days) loans and debt instruments and total gross impaired loans and debt instruments	**AQT 75.1**	Stage 3 Assets over total non-performing financial assets
AQT 37	Forborne non-performing exposures to total forborne exposures	**AQT 75.2**	Stage 3 assets exposures over total exposures subject to impairment non-performing exposures (including off-balance sheet and off-balance sheet exposures)
AQT 38.1	Share of non-financial corporations on total forborne exposures	**AQT 76.1**	Percentage of >30 days past due instruments classified as stage 1
AQT 38.2	Share of households on total forborne exposures	**AQT 76.2**	Percentage of >90 days past due instruments classified as stage 1 or stage 2
AQT 39	Proportion of performing forborne exposures under probation	**AQT 77.1**	Share of purchased or originated credit-impaired financial assets (POCIs) in relation to total assets subject to impairment

AQT 40	Coverage ratio for performing debt instruments (loans and advances & debt securities)	**AQT 78.1**	Off-balance sheet exposures - Share of stage 1 exposures
AQT 41.1	Coverage ratio of non-performing debt instruments (loans and advances & debt securities)	**AQT 78.2**	Off-balance sheet exposures - Share of stage 2 exposures
AQT 41.1.1.1 to AQT 41.1.5	Coverage ratio of non-performing debt instruments (loans and advances & debt securities) - (Central banks, General governments, Credit institutions, Other financial corporations and non-financial corporations)	**AQT 78.3**	Off-balance sheet exposures - Share of stage 3 exposures
AQT 41.2	Coverage ratio of non-performing loans and advances	**AQT 79.1**	Coverage ratio of stage 1 financial assets
AQT 41.2.1.1	Coverage ratio of non-performing loans and advances excluding cash balances and other demand deposits	**AQT 79.2**	Coverage ratio of stage 2 financial assets
AQT 41.2.1.2	Coverage ratio of non-performing loans and advances - Central banks & Credit Institutions	**AQT 79.3**	Coverage ratio of stage 3 financial assets
AQT 41.2.2	Coverage ratio of non-performing loans and advances - General governments	**AQT 80.1**	Level 1 financial assets as share of total financial assets
AQT 41.2.4	Coverage ratio of non-performing loans and advances - Other financial corporations	**AQT 80.2**	Level 2 financial assets as share of total financial assets
AQT 41.2.5	Coverage ratio of non-performing loans and advances - non-financial corporations	**AQT 80.3**	Level 3 financial assets as share of total financial assets
AQT 41.2.6	Coverage ratio of non-performing loans and advances - Households	**AQT 81.1**	Growth of inflows to non-performing exposures
AQT 41.2.7	Coverage ratio for non-performing debt instruments held for sale	**AQT 81.2**	Growth of outflows to non-performing exposures

AQT 41.2.8	Coverage ratio for all non-performing debt instruments including held for sale	**AQT 81.3**	Growth of inflows to non-performing exposures
AQT 41.3	Coverage ratio of non-performing debt securities	**AQT 81.4**	Growth of outflows to non-performing exposures
AQT 41.3.1 to AQT 41.3.5	Coverage ratio of non-performing debt securities - (Central banks, General governments, Credit institutions, Other financial corporations and non-financial corporations)	**AQT 82.1**	Commercial Real Estate to SMEs NPL ratio
AQT 42.1	Forbearance ratio (gross amount) (FBE)	**AQT 82.2**	Commercial Real Estate to other than SMEs NPL ratio
AQT 42.1.1.1	Forbearance ratio (gross amount) for debt instruments (FBE) - Central banks & Credit Institutions	**AQT 82.3**	Loans collateralised by commercial immovable property NPL ratio
AQT 42.1.2 to AQT 42.1.5	Forbearance ratio (gross amount) for debt instruments (FBE) - (General governments, Other financial corporations and non-financial corporations)	**AQT 82.4**	Loans collateralised by residential immovable property NPL ratio
AQT 42.2	Forbearance ratio- Loans and advances (gross amount) (FBL)	**AQT 83.1**	% Non-performing Loans and advances in pre-litigation status
AQT 42.2.1.1	Forbearance ratio (gross amount) for loans and advances - Central banks & Credit Institutions	**AQT 83.2**	% Loans and advances in litigation status
AQT 42.2.2 to AQT 42.2.6	Forbearance ratio (gross amount) for loans and advances - (General governments, Other financial corporations, non-financial corporations and Households)	**AQT 83.3**	Cure Rate of non-performing Loans and Advances
AQT 42.3	Forbearance ratio - Debt securities (gross amount) (FBDS)	**AQT 83.4**	Default Rate of non-performing Loans and Advances

AQT 42.3.1 to AQT 42.3.5	Forbearance ratio (gross amount) for debt securities - (Central banks, General governments, Credit institutions, Other financial corporations and non-financial corporations)	**AQT 83.5**	Re-Default Rate of non-performing Loans and Advances
AQT 43	% growth of defaulted exposures during the last four quarters	**AQT 83.6**	Coverage Ratio of Total Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E)
AQT 44	Variation of allowances	**AQT 83.7**	Ratio of Total Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E) > 5 years
AQT 46	Net allowances by type of instrument : debt securities	**AQT 83.8**	% Inflow of Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E)
AQT 47.1	Level of performing forborne loans not under probation (of total loans) (all gross)	**AQT 83.9**	% Outflow of Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E)
AQT 47.2	Level of performing forborne loans under probation (of total loans) (all gross)	**AQT 83.10**	% Non-performing forborne loans and advances that failed to meet the non-performing exit criteria
AQT 47.3	Level of non-performing forborne loans (of total loans) (all gross)	**AQT 83.11**	% Performing Loans and advances collateralised by immovable property with LTV less than or equal to 60%
AQT 48.1	Non-performing debt instruments (loans and advances & debt securities) to total gross debt securities and loans and advances (NPE at cost or at amortised cost)	**AQT 83.12**	% Performing Loans with a LTV higher than 60% and lower than or equal to 80%
AQT 48.2	Non-performing loans and advances to total gross loans and advances (NPL at cost or at amortised cost)	**AQT 83.13**	% Performing Loans with a LTV higher than 80% and lower than or equal to 100%
AQT 48.2.1	Ratio of non-performing loans and advances to NFCs and Households (NPL-core at cost or at amortised cost)	**AQT 83.14**	% Performing Loans with a LTV higher than 100%

AQT 48.3	Non-performing debt securities to total gross debt securities (NPDS at cost or at amortised cost)	**AQT 84.1**	Cure Rate of non-performing Loans and Advances
AQT 49.1	Non-performing debt instruments (loans and advances & debt securities) to total gross debt instruments (NPE at fair value through other comprehensive income or through equity subject to impairment)	**AQT 84.2**	Default Rate of non-performing Loans and Advances
AQT 49.2	Non-performing loans to total gross loans and advances (NPL at fair value through other comprehensive income or through equity subject to impairment)	**AQT 84.3**	Re-Default Rate of non-performing Loans and Advances
AQT 49.3	Non-performing debt securities to total gross debt securities (NPDS at fair value through other comprehensive income)	**AQT 84.4**	% Reduction of non-performing loans and advances due to partial or total loan repayment
AQT 49a.1	Non-performing debt instruments to total gross debt instruments (loans and advances & debt securities) - NPE at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment	**AQT 84.5**	% Reduction of non-performing loans and advances due to collateral liquidations
AQT 49a.2	Non-performing loans to total gross loans and advances (NPL at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)	**AQT 84.6**	% Reduction of non-performing loans and advances due to taking possession of collateral
AQT 49a.3	Non-performing debt securities to total gross debt securities (NPDS at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment	**AQT 84.7**	% Reduction of non-performing loans and advances due to sale of instruments

AQT 50.1	Coverage ratio of non-performing debt instruments (loans and advances & debt securities) at cost or at amortised cost	**AQT 84.8**	% Reduction of non-performing loans and advances due to risk transfers
AQT 50.2	Coverage ratio of non-performing loans and advances (at cost or at amortised cost)	**AQT 84.9**	% Reduction of non-performing loans and advances due to write-offs
AQT 50.3	Coverage ratio of non-performing debt securities (at cost or at amortised cost)	**AQT 84.10**	% Reduction of non-performing loans and advances due to reclassification as held for sale
AQT 51.1	Coverage ratio of non-performing loans and debt securities (at fair value through other comprehensive income or through equity subject to impairment)	**AQT 84.11**	% Increase of non-performing loans and advances due to purchase of exposures
AQT 51.2	Coverage ratio of non-performing loans and advances (at fair value through other comprehensive income or through equity subject to impairment)	**AQT 84.12**	% Increase of non-performing loans and advances due to accrued interest
AQT 51.3	Coverage ratio of non-performing debt securities (at fair value through other comprehensive income or through equity subject to impairment)	**AQT 85.1**	Coverage Ratio of Total Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E)
AQT 51a.1	Coverage ratio of non-performing debt instruments (loans and advances and debt securities) at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment	**AQT 85.2**	Ratio of Total Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E) > 5 years
AQT 51a.2	Coverage ratio of non-performing loans and advances (at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)	**AQT 85.3**	% Inflow of Collateral obtained by taking possession other than collateral classified as Property Plant and Equipment (PP&E)
AQT 51a.3	Coverage ratio of non-performing debt securities	**AQT 85.4**	% Outflow of Collateral obtained by taking possession other than collateral

	(at strict LOCOM, or fair value through profit or loss or through equity not subject to impairment)		classified as Property Plant and Equipment (PP&E)
AQT 52.1	Forborne loans and debt securities to total gross debt securities and loans and advances (FBE at cost or at amortised cost)	**AQT 86.1**	% Non-performing forborne loans and advances that failed to meet the non-performing exit criteria

Number	Name	Number	Name
RNPE1 100	Ranking of countries according to non-performing exposures (million €)	**AQM1 200**	Average PD of IRB exposures by exposure class
RNPE1 200	Ranking of countries according to non-performing exposures to total financial assets	**AQM1 300**	Average PD of non-defaulted IRB exposures by exposure class
AQM1 100	Average LGD per exposure class		

I.3.2. Introduction

The asset quality framework reflects the quantity of existing and potential credit risks related with loan and investment portfolios (which are typically the majority of a bank's assets) and other assets, as well as off-balance-sheet transactions, which are granted or owned by an institution against various counterparties, such as corporates, retail customers, other credit institutions, governments and others.

Credit risk is most simply defined as the potential risk that a bank borrower or counterparty will fail to meet its obligations in accordance with the pre-agreed terms. The goal of credit risk management is to maximise a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent in the entire portfolio, as well as the risk in individual credits or transactions.

The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking institution. This is therefore

reflected on assets quality, as they show the existing and potential credit risks associated to loans and investment portfolios (which typically comprise the majority of a bank's assets).

The credit risk is one of the most relevant and supervised areas in a bank's business model. It is important to understand institutions' current state of play, monitor the trends and thus understand vulnerabilities drivers, and be in a position to react taking supervisory measures. Thus, is not surprising that were identified 260 asset quality indicators and 5 DRATs.

I.3.3. Description of the relevant risk indicators

Several AQTs have been identified in the context of the EBA risk indicators. Some of these ratios focus on the level of loan loss provisioning to cover defaulted, impaired or non-performing assets, while others cover different aspects of the asset quality concept, such as the fair value level according to IFRS and the importance of forbearance or exposures on re-securitised products.

Additionally, some of the indicators refer to more granular asset classes or counterparty sectors, such as corporates, large or foreign exposures towards borrowers in a country or group of countries, in a more detailed manner.

Some indicators can be computed for IFRS or national GAAP compatible IFRS, only. For national GAAP based on BAD, in some cases there is no equivalent indicator by definition, e.g. for indicators based on the fair value hierarchy or on the stages 1 to 3 according to IFRS 9.

In general, AQTs can broadly be divided into seven categories.

In the **first group** we have 17 indicators (namely AQT 1 to 5, 20, 20a, 37, 41 and 48 to 51a, 55, plus AQT 54, which covers the "Texas ratio") **referring to non-performing exposures** (loans, debt securities). These assets are compared to other significant figures (such as Tier 1 capital), or show the level of coverage, encumbrance, or the share by country of such assets. The EBA definition of non-performing exposures builds upon the definitions of impairment and default according to IFRS and Regulation (EU) No 575/2013 (CRR). The NPE definition is broader than these notions, with the setting of common identification and discontinuation criteria (90 days past-due or unlikeliness to pay) to serve as a more harmonised asset quality indicator across Europe to compare the banking institutions one to another.

The **second group includes 14 indicators** (AQT 6, 8 to 10, 19, 25, 26, 28, 31, 32, 34 to 36, 40 and 75,) that specifically **refer to impaired assets**. Under IFRS, impaired assets are considered as stage 3 assets. More particularly, AQT 19 focuses on those impaired assets that have been collateralised, as this category can be considered particularly sensitive, since it may reflect the potential impact of cash flows (due to the costs for obtaining and selling the collateral) on whether or not foreclosure is probable.

AQT 22 analyses the structure of fair value assets based on their measurement methodology. The fair value hierarchy is a concept used in the IFRS accounting framework to reflect the way assets were evaluated in fair value within the books. In particular, there are three levels that reflect the inputs used to measure fair value, ranging from quoted prices in active markets to unobservable inputs. Level 3 demonstrates those assets that were valuated relying on unobservable price inputs and, therefore, have now become a potential source of loss in case of overestimation. Hence, AQT 22 tries to reflect this kind of particular risk. As there is no equivalent concept in national GAAPs based on BAD, the analysis is limited to banks applying IFRS. Note that AQT 68 shows the classification of financial instruments (at fair value through profit or loss, fair value through other comprehensive income and amortised cost respectively).

The fourth group of eight indicators, namely AQT 24, 38, 39, 42, 47, 52, 53 and 53a, refer to the level of forbearance, i.e. the share of forborne exposures. The use of forbearance is interesting when considered from a risk policy perspective, especially over several periods of time – for example, when steep increases occur – in order to assess whether there has been some change in the bank's behaviour regarding this type of asset. This point of view may also reveal the share of successful forbearance at a given point of time, which can be deduced by looking at the amount of forborne exposures that have been reclassified from the non-performing to the performing category (described as loans under probation) and/or by measuring the proportionality of reclassified forborne loans.

Four other indicators, AQTs 11, 16 and 17, and 43, refer to 'defaulted exposures', allowing a comparison to a certain extent with non-performing indicators.

A sixth group identifies five indicators, AQTs 12, 21, 27, 44 and 46, that **cover value adjustments and allowances** (reducing the accounting value of an asset) by instrument (e.g. loans, equity etc.). Net value adjustments (flows of credit loss allowances, i.e. closing balance minus opening balance) provide information on the development of allowances for credit losses depending on the type of counterparty.

A seventh group of indicators, AQT 56 to 67, AQT 70, 72 and 78 shows the share of assets and off balance sheet exposures (AQT 78) for impairment measurement under IFRS 9, classified by different stages. Therefore, these indicators can only be built for banks applying IFRS. To also note that indicator AQT 69 shows the transfer of financial assets between different stages.

Of the remaining indicators, **two indicators**, AQT 71 and 73 are built around the amount of IFRS **impairment losses by stage**. AQT 73 therefore shows the percentage allocation of credit risk allowances per stage (if compared to the total amount of impairments across all stages), while AQT 71 is showing the coverage ratio of exposures per stage (reflecting the total amount of loss allowances for each stage, compared with the total gross exposures per stage). **One indicator** - AQT 74 also shows the total amount of non-credit-impaired financial assets (stages 1 and 2 under IFRS 9) classified in stage 2 (i.e. assets for which the institution has concluded that credit risk has increased significantly since initial recognition).

One indicator (AQT 76) provides information on the use of the '30 days past due' and '90 days past due' indicators as backstops for transferring exposures from stage 1 to stage 2 (30 days past due) and from stage 2 to stage 3 (90 days past due).

Another indicator (AQT 77) shows the share of purchased or originated credit-impaired financial assets as a percentage of total assets subject to impairment.

Finally, the **remaining 5 indicators**, AQTs 13 to 15, 18 and 23 (including their sub indicators, e.g. by counterparty) are built based on COREP templates and provide **detailed information on defaulted exposures**, both outstanding and recorded during the observed period, regarding the EL compared to original risk exposures and risk-weighted measures. Among these, two indicators (AQT 18, AQT 23) cover the share of defaulted exposures within large exposures and re-securitisations.

Furthermore, all country breakdowns are subject to a threshold, and thus reported only by institutions whose foreign exposures are at least 10% of the total. Effectively, that means that all indicators based on them can be computed only for institutions with significant foreign exposures.

Following the introduction of new enhanced supervisory reporting for asset quality and more specifically on non-performing loans flows in ITS 2.9, the list of asset quality risk indicators has been enriched to capture cure, defaults and re-defaults rates, inflows and outflows of NPLs as well as collaterals. These indicators referrer to AQT 81.1 to AQT 86.1.

To conclude, the DRAT presents 5 figures in the context of analysing asset quality. The first two, within the rankings of defaulted and non-performing exposures (RNPE1), DRAT codes 100 and 200, propose a ranking of countries according to the absolute and relative amounts of non-performing exposures respectively, with data extracted from FINREP template F 20.04. These indicators can provide insights into the geographical areas where EU banks recognise more financial assets as non-performing. Within the asset quality matrices (AQM1), DRAT codes 100, 200 and 300 consist of a matrix (for IRB banks only) providing information on LGD, average PD on total IRB exposures and average PD without taking defaulted exposures into account.

I.3.4. Further methodological issues and ways to address these

Some of the above-mentioned indicators could be also presented using matrices – for example, with regard to those dealing with countries or country groups, or categories of assets (equity, loans, etc.), or counterparty sectors (households/retail, corporates, sovereign exposures types).

Furthermore, one should bear in mind that the Expected Losses (EL) used in AQT 15 are estimated and thus not effective values. They are very useful tools used for supervisors to assess the solvency of the banking industry. However, they should be compared with care to effective losses and defaults, as EL are calculated only for IRB exposures, and thus, do not reflect the whole amounts of the exposures.

I.4 Profitability risk

I.4.1. List of risk indicators and relevant DRATs

Table 4: List of PFTs and relevant DRATS

Number	Name	Number	Name
PFT 1	Staff expenses as % of total administrative expenses	PFT 24.5	Impairments on financial assets to total assets
PFT 2	Staff expenses per total operating income	PFT 24.6	Return (before taxes) on assets
PFT 3	Administrative expenses per total operating income	PFT 25	Net interest income to total net operating income
PFT 4	Tax rate on continuing operations	PFT 26	Net fee and commission income to total net operating income
PFT 5	Interest income from households	PFT 27	Dividend income to total net operating income
PFT 6	Interest income from credit institutions	PFT 28	Net realized gains (/losses) on financial assets and liabilities not measured at fair value through profit and loss to total net operating income
PFT 7	% of interest income earned domestically	PFT 29	Net trading income to total net operating income
PFT 8	% of interest expenses spent domestically	PFT 30	Net gains on financial assets and liabilities at fair value through profit or loss and on non-trading financial assets and liabilities to total net operating income
PFT 9	% of dividend income earned domestically	PFT 31	Net other operating income to total net operating income
PFT 10	% of fee and commission income earned domestically	PFT 32	Net income to total net operating income
PFT 11	% of total net operating income earned domestically	PFT 33	Annual growth rate of the total net operating income
PFT 12	Structure of fee and commission income net − payment services	PFT 34	Average interest income for households
PFT 13	Structure of fee and commission income net − structured finance	PFT 35	Asset-deposit spread for central banks
PFT 14	Structure of fee and commission income net − asset management	PFT 36	Asset-deposit spread for general governments

PFT 15	% of total profit or loss earned/lost in domestic activities	PFT 37	Asset-deposit spread for credit institutions
PFT 16	% of total profit or loss earned/lost in non-domestic activities	PFT 38	Asset-deposit spread for other financial corporations
PFT 17	Return on investment (RoE analysis)	PFT 39	Asset-deposit spread for non-financial corporations
PFT 18	Leverage (RoE analysis)	PFT 40	Asset-deposit spread for households
PFT 19	Non-operating earnings (RoE analysis)	PFT 41	Net interest margin
PFT 20	Tax effect (RoE analysis)	PFT 43	Cost of risk
PFT 21	Return on equity	PFT 43.1	Cost of Risk (IFRS)
PFT 22	Return on regulatory capital requirements	PFT 43.2	Cost of Risk (nGAAP)
PFT 23	Cost to income	PFT 44	Share of Net Ordinary Operating Income to Net Operating Income
PFT 24	Return on assets	PFT 45	Impairment and provisioning on financial assets to Net Ordinary Operating Income
PFT 24.1	Net interest income to total assets	PFT 46	Return on tangible equity
PFT 24.2	Net fee and commission income to total assets	PFT 47	Interest margin to gross income
PFT 24.3	Net income on trading assets and liabilities to total assets	PFT 48	Noninterest expenses to gross income
PFT 24.4	Administrative expenses to total assets		

I.4.2. Introduction

A bank's profitability can be traced back to cyclical as well as structural aspects. Cyclical sources of profitability refer to, for instance, the level of the interest rates, the gradient of the yield curve, the availability of high-yield assets, the burst or development of asset price bubbles and the economic environment, such as the current phase of the business cycle or the level of competition in the financial sector.

On the other hand, structural reasons that determine a bank's profitability could indicate how well a bank reacts to business developments – such as an increasing banking activity over the internet – and, therefore, if the business model is appropriate and up to date. It can also indicate the structure of the economy as such and whether a bank has an appropriate business model to meet the demands, a bank's cost structure, relics from former management and business decisions. Examples of these points include portfolio decisions with long-term effects, a bank's management and how banks are affected by the regulatory environment.

There are several channels through which the risk of low profitability could materialise. A direct consequence is to encounter problems when seeking refinancing from the markets, i.e. other banks and investors are less willing to invest in the bank or lend it money. Further consequences of materialisation, and the points most worth noting, are that a **bank's equity shrinks** or that the bank may not be able to **generate new equity**. There are several ways in which a bank can answer to low profitability and all of them entail certain risks.

Profitability does not come without risks. In attempt to improve profitability, a bank could cut costs, which could possibly result in insufficient internal control structures or lead to increased legal and reputational risks that could effectively have severe financial consequences. In their attempt to increase profitability, banks may also engage in a search for yield, and thus invest into risky assets that could potentially cause problems if these risks materialise.

Furthermore, the **risk of asset price bubbles** may also increase when many banks invest in the same asset class. Another structural problem for banks' balance sheets arises when banks try to raise profitability by increasingly using maturity transformations. In addition, banks may try to change their business model, which is a complex task that requires experienced management to be involved.

I.4.3. Description of the relevant indicators

The first indicators give an overview perspective of banks' income. Indicators PFT 21 to PFT 33 were initially employed in the context of the KRIs and were intended to measure banks' profitability, which mainly concerns a bank's income and gives a general overview of the development of the overall profitability. Also PFTs 41, 43 45, and 46 are dealing with a general overview perspective whereby for PFTs 44 and 45, extraordinary market conditions are excluded. Indicators PFT 41 and 44 provide information about interest income, with PFT 44 abstracting from the effect of negative rates.

Then, additional indicators allowing a deeper understanding of profitability's roots were included. These additional indicators, PFTs 1 to 20 and PFTs 34 to 40, provide useful insights into the income structure, i.e. banks' business, or the cost structure. Thus, these indicators may help to detect shifts in business models and their potential to increase banks' revenues. They also ease international comparisons or peer-to-peer analysis, allowing for differences in the income structure of banks to be scrutinized, as well as to identify relevant outliers. Indicator PFT 42 (Provisions for pending legal issues and tax litigation as % of Own Funds) was moved to the Operational Risk section, and renamed OPR 16.

These additional profitability indicators can be broadly split into five groups: the **first set** focuses on the cost structure, namely staff and administrative expenses and taxes; the **second group** looks at the geographical structure of income and expenses; the **third** shows the structure of the interest income; and the **fourth** set focus on the structure of fee and commission income. Last but not least, in the so-called 'follow-the-money' approach, profitability indicators are put into perspective with regard to the bank's balance sheet information (see also Part II.6 '"Follow-the-money" approach').

These indicators explain not only the main drivers of revenues, but also how meaningful are the amounts depleted with staff expenses. . More particularly, **the first set contains PFTs 1 to 4, which are based on statement of profit or loss.** These indicators analyse how much of the administrative expenses can be attributed to staff expenses, and how many euros of staff or administrative expenses are required to earn one euro of total operating income. Thereby, it can be analysed how personnel-intensive or staff-dependent a bank's business model is.

Furthermore, these indicators can provide an overview of the cost structure of the bank. In a peer comparison, e.g. among banks with similar business models, these indicators also allow one to learn about the potential deficits of a bank. The risk indicator looking at the tax rate on continuing operations allows one to study how much of the earnings from continuing operations banks have to pay as taxes. This is, in particular, interesting if compared internationally.

In the second group, income and expenses are analysed separately, according to whether they are earned or spent domestically or non-domestically. PFT 15 and PFT 16 demonstrate the percentage of total profits or losses earned/lost in domestic (PFT 15) versus non-domestic activities (PFT 16).

Some indicators show information for the main sources of income by geographic origin. PFTs 7 to 11 provide a more granular view by analysing the main income and expenses according to their geographic origin. In particular, these PFTs demonstrate what percentage of interest income, interest expenses, dividend income, fee and commission income and total net operating income is generated by domestic entities. All such indicators can contribute to our understanding of how dependent a bank's business model is on domestic and non-domestic income respectively.

The third group of indicators, PFTs 5 to 6, and 34 to 40, provides a more detailed insight into the origin of interest income, specifically, what share of the interest income is generated by the business with households and credit institutions. These two indicators do not necessarily add up to a total of 100%, as there may be also other sources of interest income that are classified as less important in this analysis and thus are not observed separately (for example, the net interest income on interest-bearing assets).

The fourth group of indicators, PFTs 12 to 14, observes the sources of fee and commission income. Such indicators show the share of fees and commissions earned by the main activities of payment services, structured finance and asset management respectively.

Finally, the 'follow-the-money' approach contains PFTs 17 to 21. This approach may assist analysts in understanding the main drivers of revenues and to determine the source of the underlying risks. It starts from a widely used risk indicator – the return on equity (RoE) (PFT 21) – and is broken down into an indicator's tree (PFTs 17 to 20). Basically, the idea is to drill down and split up the return on equity into its different components:

$$RoE = \frac{Net\ operating\ Profit}{Assets} \times \frac{Assets}{Equity} \times \frac{Earnings\ before\ Tax}{Net\ operating\ Profit} \times \frac{Net\ Profit}{Earnings\ before\ Tax}$$

Return on investment | 1/Leverage | Non-operating earnings

I.4.4. Further methodological issues and ways to address them

As illustrated in Part II of the Guide, some of the new indicators may involve numerators and denominators with either positive or negative signs. Occasionally, this may raise concerns about the interpretability of their results. Consequently, those profitability indicators with both negative numerator and denominator should be normally artificially transformed into negative (see also Part II.2 'Negative values in numerators and denominators of ratios'). This kind of adjustment is particularly required for this type of risk indicators.

The 'follow-the-money' approach, as explained in detail in Part II of this Guide, could be further studied by splitting the respective indicators into more granular subcomponents. At this stage, only few of the new risk indicators were defined in this context. To fully pursue the 'follow-the-money' approach, it would be necessary to define additional risk indicators.

I.5 Concentration risk

I.5.1. List of risk indicators and relevant DRATs

Table 5.1: List of CONs and relevant DRATs

Number	Name	Number	Name
CON 1	Total large exposures	CON 9	Interests in SPE
CON 2	Exposures equal to or over 10% of capital[7]	CON 10	Interests in asset managers
CON 3	10 largest exposures to institutions	CON 11	Interests in other unconsolidated structured entities
CON 4	10 largest exposures to unregulated financial entities	CON 12	Large exposures to capital
CON 5	Non-domestic assets	CON 13	Loan concentration by economic activity
CON 6	Loans collateralised by Immovable Properties (IPs)	CON 14.1	HHI Index of loans and advances to NFC
CON 7	Residential mortgage loans to households	CON 14.2	HHI Index of performing loans and advances to NFC
CON 8	CRE loans	CON 14.3	HHI Index of non-performing loans and advances to NFC

Number	Name	Number	Name
CM1 100	Distribution matrix of original exposure by sector and country	CM5 100	Distribution of loans and advances to non-financial corporations by NACE codes and country
CM1 200	Distribution matrix of defaulted exposure by sector and country	CM5 200	Distribution of loans and advances cumulative impairments by NACE codes and country
CM1 300	Distribution matrix of observed new defaults by sector and country	CM6 100	Distribution of liquid assets among currencies
CM1 400	Distribution matrix of provision coverage ratio by sector and country	CM6 200	Total inflows minus outflows by currencies (A - B)
CM1 500	Distribution matrix of write-offs by sector and country	CM7 100	Exposures by sector (all portfolios)
CM1 600	Distribution matrix of RWA by sector and country of non-defaulted exposures	CM7 200	Exposures by sector (trading book)

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[7] According to Article 392 CRR (definition of a large exposure)

CM1 700	Distribution matrix of own funds requirements for credit risk (as calculated for capital buffers) by country	RLE1 100	Top 10 counterparties classified as institutions
CM2 100	Distribution of overall losses from property by country group	RLE1 200	Top 10 counterparties classified as unregulated financial entities
CM2 200	Distribution of loss rates from property by country	RLE1 300	Top 10 counterparties classified as non-financial corporations
CM3 100	Distribution of FINREP assets and off-balance-sheet items by country	RLE1 400	Top 10 counterparties classified as institutions by number of large exposures
CM3 200	Distribution of FINREP coverage ratios by assets and off-balance-sheet items and by country	RLE1 500	Top 10 counterparties classified as unregulated financial entities by number of large exposures
CM3 300	Distribution of Finrep NPL ratios by Assets and Off-balance sheet items and by Country	RLE1 600	Top 10 counterparties classified as non-financial corporations by number of large exposures

I.5.2. Introduction

This set of indicators aims at analysing concentration risk. Concentration risk (CON) refers to the risk of a financial institution suffering heavy losses, which could eventually lead to insolvency due to the default of a single counterparty or a set of counterparties. Monitoring excessive concentration is a key aspect, as most of the recent banking crises have resulted exactly from this type of risk (although they were amplified by other factors).

Concentration risk is important at micro and macro level. While the focus on single counterparties is more relevant at a micro level, aggregated data can reveal how a financial system concentrates such risks. Monitoring the significance of exposures towards counterparties revealing high PDs could also be of interest.

Nevertheless, for a banking system as a whole, the analysis of concentration on correlated counterparties, such as country, sector or collateral type, is of higher importance, as it can be used both to detect concentration risk as such and to examine possible contagion effects through interconnectedness.

I.5.3. Description of the relevant indicators

The first group of indicators (CON 1 to CON 4) are focused on large exposures. An exposure is classified as 'large' if its value is equal to or exceeds 10% of the Tier 1 capital of the institutions[8]

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[8] For more details, see Article 392 of the CRR.

The remaining indicators reported under concentration risk area can be grouped into five categories: 1) exposures over EUR 300 million[9]; 2) the top 20 exposures when the reporting institution is using the IRB approach; 3) the top 10 exposures to institutions; 4) the top 10 exposures to unregulated financial entities[10]; and finally 5) the concentration of the loans and advances to the non-Financial Corporations portfolio.

CON 1 covers total large exposures (original) as a share of total (original) exposures and, therefore, it is intended to be the main indicator, referring to the concentration towards a single counterparty. CON 2 covers exposures equal to or exceeding 10% of the Tier 1 capital of the institution, while CONs 3 and 4 respectively cover the third and the fourth category as described above.

While first group of indicators focused on large exposures, the second group of CONs 5 to 11 concern all exposures and are, therefore, intended to measure the concentration on counterparties, which can be correlated.

CON 5 measures the degree of internationalisation for a bank or a banking system. CONs 6 to 8 measure the exposures to residential and commercial real estate loans, which are traditionally one of the main sources of potential risks for banks.

CONs 9 to 11 measure the interests in three categories of entities (which are connected to the reporting institution) that may as well be a source of risk, namely: securitisation vehicles, asset managers and other structured entities. For these indicators, the underlying data is available only on a semi-annual frequency.

CONs 13 and 14.1-14.3 measure the degree of concentration of the Loans and Advances of non-Financial Corporations to the various industries as per their NACE classification. Together with CON 12, they were added to the list after the review of the EBA IMF-FSI Guide.

I.5.4. Description of the relevant Detailed Risk Analysis Tools

In the context of the DRAT for concentration risk, matrices demonstrate the distribution of assets and exposures or other dimensions by country, sector (according to COREP and NACE breakdowns), currency or asset class. Such indicators could also be used to identify areas of excessive concentration or, more generally, to visualise the interconnectedness between countries or sectors through a map. For that reason, these indicators have been chosen to be included in this section, even though some of them could have also fallen under the categories of asset quality, profitability or liquidity.

The country tables consist of individual EEA Member States, along with additional 16 countries against which EU banks have the highest exposures. The number 16 has been chosen as the gap between the 16th and the 17th country (respectively, South Africa and Chile) is wider than between other positions. In parallel, exposures corresponding to the 17th country onwards start to be less

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[9]In accordance with Article 9(g) of the Commission Implemented Regulation EU No 680/2014

[10] In accordance with Article 394 (1) and (2) of the CRR.

significant in quantitative terms and their inclusion in the tables may add little value to the overall analysis.

Regarding sectoral breakdown, it is necessary to signal that COREP sectors are different for SA and IRB exposure and, therefore, they need to be grouped in order to facilitate comparability (for the relevant methodological issues, please refer to section I.5.3 below). NACE breakdowns are based on the higher-class level of the standard (i.e. 19 sectors, identified by a single letter code). Otherwise, any further aggregation may have resulted in less relevant information.

Furthermore, DRAT CM1 100 and 700, CM3 100, and CM7 100 provide breakdowns of total exposures (or own funds requirements in the case of CM1 700) by sector/instrument and/or country (the first two stem from COREP by exposure class, the other two from FINREP by sector and instrument).

DRAT CM5 100 and CM7 200 focus on two subsets of exposures – more particularly, loans to the non-financial sector and trading book. These indicators aim at monitoring, respectively, the so-called 'sectoral risk', and market risk/interconnectedness.

DRAT CM1 200 to 500, CM3 100 to 300 relate to defaults, losses and coverage ratios and, therefore, provide insight into from where problems may arise for a bank or a banking system. These are indicators related to asset quality and their concentration.

DRAT CM1 600 shows the distribution or RWAs of non-defaulted exposures. Hence, it demonstrates the distribution of capital requirements and, compared with DRAT CM1 100, it may be used to understand how risky each sector or country could be perceived by banks.

The reporting templates on IP losses are the basis for DRAT CM2 100 and 200, which cover only EU countries. DRAT CM6 100 and 200 refer to the currency concentration, thus focusing only on liquid assets for which data is available. Concretely, it should be noted that assets denominated in the bank's reporting currency are excluded. This implies that only the combination of banks with the same reporting currency will be considered significant for more details (see also Part II.5). Moreover, for the aggregates, reported currencies will not necessarily be the most significant ones, as a currency representing 5% only in one bank would be included, while, theoretically, another representing 4.9% in all other banks would be excluded. The final list of currencies to be displayed in that context can only be defined once sufficient back data is available and the currencies demonstrate their predominance.

Finally in the DRAT, the rankings of counterparties from large exposures RLE1 (100 to 600) are derived from large exposures templates and they intend to rank the counterparty institutions by reporting institutions. These indicators determine those that are the most recurrent counterparties of EU banks, classified as institutions, unregulated financial entities and non-financial corporations.

I.5.5. Further methodological issues and potential ways to address them

For each large exposure, three different values are available: original exposure, exposure value before application of exemptions and Credit Risk Mitigation (CRM) (but after provisions), and exposure value after application of exemptions and CRM. Among them, the most suitable metric needs to be chosen and used for the computation of the relevant risk indicators.

Despite the fact that the second option seems the most suitable, as it is the value that qualifies an exposure to be flagged as 'large', it was decided to use the first option (original exposures). This is due to the fact that original exposures are collected in many templates and, therefore, when it comes to computing concentration ratios, it is easier to find a suitable denominator and comparative term. Indicators on the other two values could be added, provided that the denominator is consistent.

Additionally, all country breakdowns are subject to a threshold and thus reported only by institutions whose foreign exposures are at least 10% of the total. Effectively, that means all indicators based on these figures (CON 5 and DRAT concentration matrices CM1, CM3 CM4 and CM5) can be computed only for institutions with significant foreign exposures.

Alternatively, assuming that all the figures referring to institutions not reporting the geographical breakdown information are assigned to domestic totals, total exposures for COREP and total assets and off-balance-sheet items for FINREP could also be used. However, this approach has the disadvantage of potentially underestimating foreign exposures for those institutions. A similar approach could also be used to add data on own country when they are not reported for all indicators based on template FINREP 20.00, such as DRAT concentration matrices CM3, CM4 and CM5.

Finally, exposure classes in COREP are different in the SA and in the IRB approach. Therefore, to make them comparable, a mapping is proposed, as illustrated in the comprehensive list of risk indicators and DRATs available at the EBA website. This implies some degree of approximation, as definitions are not exactly the same, but the only alternative would be to have separate tables for SA and IRB exposures and such tables, each providing a partial picture, would be of limited use.

I.6 Solvency risk

I.6.1. List of risk indicators and relevant DRATs

Table 6: List of SVCs and relevant DRATS

Number	Name	Number	Name
SVC 1	Tier 1 capital ratio	SVC 16.3	IRB excess relative to Common Equity Tier 1 Capital
SVC 2	Total capital ratio	SVC 17	Net DTA that rely on future profitability to total Tier 1 capital
SVC 3	CET 1 capital ratio	SVC 18	Adjustments to CET 1 due to prudential filters to total Tier 1 capital
SVC 4	Credit risk exposure amounts of total risk exposure amounts	SVC 19	Deductible goodwill and other intangible assets to total Tier 1 capital
SVC 5	SA risk-weighted exposure amounts of total credit risk exposure amounts	SVC 20	Defined benefit plan assets to total Tier 1 capital
SVC 6	Securitisation risk exposure amounts of total credit risk exposure amounts	SVC 21	Capital and share premium to total equity
SVC 7	IRB approach risk exposure amounts of total credit risk exposure amounts	SVC 22	Accumulated OCI to total equity
SVC 8	Market risk exposure of total risk exposure amounts	SVC 23	Retained earnings and reserves to total equity
SVC 9	Operational risk exposure of total risk exposure amounts	SVC 24	Treasury shares to total equity
SVC 10	Settlement risk exposure of total risk exposure amounts	SVC 25	Minority interests to total equity
SVC 11	Other risk exposure of total risk exposure amounts	SVC 26	Equity to total liabilities and equity
SVC 12	Leverage ratio (fully phased-in definition of Tier 1)	SVC 27	Tier 1 capital to 'total assets – intangible assets'
SVC 13	Leverage ratio (transitional definition of Tier 1)	SVC 28	Annual growth rate of RWAs
SVC 14	Regulatory own funds to accounting own funds	SVC 29	CET 1 ratio (fully phased-in definition)
SVC 15	Transitional adjustments due to grandfathered CET 1 Instruments to total Tier 1 capital	SVC 30	Total capital ratio (fully phased-in definition)
SVC 16.1	IRB shortfall to total Tier 1 capital	SVC 31	Adjustments due to the application of IFRS 9 transitional arrangements (Regulation (EU) 2017/2395) relative to Common Equity Tier 1.

SVC 16.2	IRB shortfall relative to Common Equity Tier 1 Capital

I.6.2. Introduction

Solvency risk can be understood as the risk of an institution lacking the ability to absorb losses or decrease in earnings. Hence, insolvent firms have persistently and disproportionately large liabilities compared to RWAs. As a result, banks are unable to borrow further funds so as to face unexpected loss events. Specific regulatory capital requirements and compulsory values for SVCs are the most traditional measures that supervisors have used to avert such bank failures.

Noticeably, some of the indicators included in this risk type are so crucial that they have been set as a legal requirement that institutions need to abide with.

I.6.3. Description of the relevant risk indicators

SVCs, such as SVCs 1 to 11 and SVCs 26 to 28 respectively, are employed for measuring solvency risk and are mainly concerned with the composition of an institution's risk profile, the compulsory capital requirements indicators, compliance level and the divergence of regulatory capital from accounting figures. They are all structured in such a way that would facilitate monitoring and assessment of regulatory capital-requirements compliance from period to period.

The rest of the SVCs can be broadly structured into four categories:

- SVCs 12 to 13 and SVCs 29 to 30 observe the mandatorily calculated regulatory leverage and own funds ratios, as prescribed by Regulation (EU) No 575/2013

- SVC 14 compares the published financial statements' own funds against supervisory capital. A large divergence between these ratio components signals low future loss-absorbing ability and an adversely high impact of prudential filters (see Article 32-35, Regulation (EU) No 575/2013);

- The ratios of SVCs 21 to 25 elaborate the composition of the core components of the accounting equity;

- The ratios of SVCs 15 to 20 decompose transitional or phase-in adjustments to regulatory own funds allowed by the competent national authorities, and are intended to measure solvency risk for the institution in the case that national discretions are lifted.

Finally, one last indicator (SVC 31) measures the CET 1 add-back arising from the application of IFRS 9 transitional arrangements (Regulation (EU) No 2017/2395). Note that, as the application of these

transitional arrangements is optional for banks in the EU, this indicator is only applicable to those institutions applying these arrangements.

I.6.4. Further methodological issues and ways to address them

Ratios which decompose transitional or phase-in adjustments to regulatory own funds (SVCs 12, 13, and 15 to 20) have Tier 1 as a denominator, as a minimum Tier 1 ratio is prescribed by Article 92(1)(b) of Regulation (EU) No 575/2013 and it contains the largest amount of adjustments between the two options for a denominator (CET 1 or Tier 1). In addition, CET 1 and total capital ratio (SVCs 29 and 30) are computed with fully phased-in definitions.

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I.7 Operational risk

I.7.1. List of risk indicators and relevant DRATs

Table 7: List of OPRs and relevant DRATs

Number	Name	Number	Name
OPR 1	Total Risk Exposure for Op Risk (% of Total Risk Exposure)	**OPR 9**	Total Risk Exposure for OpR compared to Total Risk Exposure for Credit Risk
OPR 2	OpR BIA Risk Exposure (% of Total Risk Exposure OpR)	**OPR 10**	Total Risk Exposure for Market Risk compared to Total Risk Exposure for OpR
OPR 3	OpR STA/ASA Risk Exposure (% of Total Risk Exposure OpR)	**OPR 11**	Conduct risk as % of Own Funds Requirements for OpR
OPR 4	OpR AMA Risk Exposure (% of Total Risk Exposure OpR)	**OPR 12**	Employment practices and Workplace Safety loss as % of Own Funds Requirements for OpR
OPR 5	OpR Loss as Percentage of Own Funds Requirements for OpR	**OPR 13**	Clients Products and Business Practices loss as % of Own Funds Requirements for OpR
OPR 6	Internal Fraud Loss as percentage of Own Funds Requirements for OpR	**OPR 14**	Damage to Physical Assets loss as % of Own Funds Requirements for OpR
OPR 7	External Fraud Loss as percentage of Own Funds Requirements for OpR	**OPR 15**	Execution, Delivery & Process management loss as % of Own Funds Requirements for OpR
OPR 8	Business Disruption and System Failures Loss as percentage of Own Funds Requirements for OpR	**OPR 16**	Provisions for pending legal issues and tax litigation as % of Own Funds

I.7.2. Introduction

OpR can be described as the risk of loss resulting from inadequate or failed internal processes, systems and people intervention, or from external events.

A representative selection of different OpR types included in this context is:

- People: may include fraud, breaches of employment law, unauthorised activity, key person risk, inadequate training or supervision;

- Processes: failures in payment or settlement, deficient documentation, valuation or pricing errors, project management failures and internal or external reporting problems;

- Systems: typically, this would include system failures, errors in system development and implementation, and inadequate IT resources;

- External events: these would include, amongst others, crime, outsourcing risks, natural disasters, regulatory and political risks, as well as competition.

To that end, OpR usually reflects losses that are identified in a number of event types included in the new reporting framework, as follows:

1. Internal fraud: this category would include misappropriation of assets, tax evasion, and bribery;

2. External fraud: this would cover, for example, theft of information, hacking damage, third-party theft and forgery;

3. Employment practices and workplace safety: this would include, for example, discrimination, employee compensation, and worker health and safety;

4. Clients, products and business practices: this category would include market manipulation, antitrust and account churning;

5. Damage to physical assets: this would occur due to natural disasters, terrorism, vandalism, and so on;

6. Business disruption and system failures: software or hardware failures and disruption of services;

7. Execution, delivery and process management: data entry errors, accounting errors and failed reporting requirements.

Even though legal risk is included as the risk of changing legislation and arbitrary court decisions, it excludes strategic and reputational risks.

OpR, by its nature, is unavoidable and it is neither willingly incurred nor is revenue driven. Moreover, it is not diversifiable and thus it cannot be fully eliminated. However, it can be transferred (e.g. by insurance).

OpR is manageable to some extent by introducing proper controls that would keep relevant losses within the risk appetite levels defined by the board of a bank. Thus, OpR is ultimately all about the failure of controls.

I.7.3. Description of the relevant risk indicators

OpR requires a specific type of management, as well as data collection processes, to cover both the high frequency and low cost events but also the low frequency and high impact events throughout the institution.

The first group of indicators covers OPRs 1 to 4 and 9 and 10 fall in this group and they intend to **measure the relative importance of OpR exposures** and subtypes compared to other risk exposures (either the total, from other risk categories, or within the OpR category).

In general, low values are expected for these indicators compared to other risk classes, as OpR should not be one of the main risk categories in the institution's business model.

However, trends over time and spikes such as low frequency or high impact events, along with peer group analysis, could provide an indication of the overall quality of controls the institution has in place to manage this type of risk. Some of these indicators provide information on the size of the risk exposure for different OpR measurement approaches, such as OPRs 2, 3 and 4.

The second group of risk indicators provide insight into the loss size across different event types as well as overall:

- OPR 6 indicates which share of the Operational minimum capital requirement had to be used for internal fraud losses during the previous business year;

- OPR 7 indicates which share of the Operational minimum capital requirement had to be used for external fraud losses during the previous business year;

- OPR 8 indicates which share of the Operational minimum capital requirement had to be used for Business disruptions and system failures during the previous business year;

- OPR 12 indicates which share of the Operational minimum capital requirement had to be used for Workplace safety losses during the previous business year;

- OPR 13 indicates which share of the Operational minimum capital requirement had to be used for Clients, Products and Business Practices losses during the previous business year;

- OPR 14 indicates which share of the Operational minimum capital requirement had to be used for Damage to physical assets losses during the previous business year;

- OPR 15 indicates which share of the Operational minimum capital requirement had to be used for Execution, Delivery & Process management losses during the previous business year;

- OPR 16 which was (included in the Profitability section in the previous editions of this Guide) provides a good indication about the potential operational risk losses the institution

might suffer from legal issues and tax litigation. As an operational risk indicator it has a good forward looking perspective and indicates the loss potential from already known events.

Higher proportions of an event type may indicate areas where controls need to improve or where remedial actions need to be put in place. These indicators attempt to provide an indication of the high or low impact of the OpR compared to the number of events that have occurred in the institution for a given period of time. Special attention should also be paid to those cases where a few events have a high impact in the institution, as these could cause a destabilising effect and are more difficult to control and manage.

Despite the increased number of risk indicators that can be computed across each event and business line combination, this study concentrates on the main types that can give a general flavour of what the level of OpR is in a particular institution.

I.7.4. Further methodological issues and ways to address them

A few methodological issues need to be considered, which mainly affect the availability of data for the calculation of the risk indicators.

Regarding the relevant indicator for years -3, -2 and -1, this is generally the net interest income plus the net non-interest income. The methodological issue is due to the accounting standard base on which this will be calculated (GAAP vs IFRS). Therefore, the use of different standards may affect the comparability of the final computed ratios. Reporting obligations for templates C 17.01.a and C 17.01.b depend on the methodology the institution uses.

o BIA: Templates are not required when an entity reports OpR under the basic indicator approach.

o TSA/ASA: Institutions under these approaches are expected to report only rows 910, 920, 930, 940 and column 080 of template C 17.01.a, which are the total of business lines and total of event lines, if the total individual assets (FINREP) <1% total individual assets in the country. If it is higher than 1%, then they would report the full template.

Templates used for the computation of OpR indicators have different frequencies. For example, templates C 17.01.a and C 17.01.b are semi-annual, while the rest are quarterly, meaning that there will be two quarters where there will be no data available to compute risk indicators feeding from these templates.

I.8 Market risk

I.8.1. List of risk indicators and relevant DRATs

Table 8: List of MKRs and relevant DRATs

Number	Name	Number	Name
MKR 1	OTC trading derivatives to total trading derivatives	**MKR 7.3**	Net position subject to general equity risk capital requirement to the maximum gross equity position
MKR 2	Commodities trading derivatives to total assets and liabilities	**MKR 8**	Share of risk exposure amounts of foreign exchange to risk exposure amounts
MKR 2.1	Commodities trading derivatives with positive MtM to total assets	**MKR 9**	Share of risk exposure amounts of commodities to risk exposure amounts
MKR 2.2	Commodities trading derivatives with negative MtM to total liabilities	**MKR 10**	Stress indicator
MKR 3	Commodities derivatives to total assets and liabilities	**MKR 11**	Total unsettled transactions to risk-weighted exposure amounts
MKR 4	Total long positions in non-reporting currencies to total long positions	**MKR 12**	Total unsettled transactions for more than 46 days to total unsettled transactions
MKR 5	Total short positions in non-reporting currencies to total short positions	**MKR 13**	Proportion of derivatives and SFT to total risk-weighted exposure amounts
MKR 6	Share of weighted risk exposure amounts of traded debt instruments and interest rates derivatives to risk exposure amounts	**MKR 14**	Total long and short positions on commodities to total exposures
MKR 6.1	Total of interest rates gross long positions (securities and derivatives) to total asset.	**MKR 15**	Share of risk exposure amounts of CIUs to risk exposure amounts
MKR 6.2	Total of interest rates short positions (securities and derivatives) to total liabilities	**MKR 16**	Interest rates trading derivatives to total assets and liabilities
MKR 6.3	Net position subject to general interest rate risk capital requirement to the maximum gross interest rate position	**MKR 17**	Interest rates trading derivatives with positive MtM to total assets
MKR 7	Share of risk exposure amounts of equity to risk exposure amounts	**MKR 18**	Interest rates trading derivatives with negative MtM to total liabilities

MKR 7.1	Total of equity gross long positions (securities and derivatives) to total asset	MKR 19	Interest rates derivatives to total assets and liabilities
MKR 7.2	Total of equity gross short positions (securities and derivatives) to total liabilities		

I.8.2. Introduction

Market risk can be defined as the risk of losses in on-balance-sheet – and, in rare cases, on off-balance-sheet – positions arising from adverse movements in market prices. From a prudential point of view, market risk stems from all the positions included in banks' trading book, as well as from commodity and foreign exchange risk positions in the banking book.

Furthermore, positions in the AFS portfolio and financial assets and liabilities designated at fair value may also bear some degree of market risk. Traditionally, trading book portfolios consist of liquid positions that are easy to trade or hedge.

However, recent developments in the banks' portfolios have led to an increase in illiquid positions not suited to the original market capital framework. Therefore, as market risk has a wider impact than only on liquid trading book positions, the need to have a more comprehensive view has increased.

I.8.3. Description of the relevant risk indicators

Overall, MKRs provide deeper insights into the role of various market risk portfolios and exposure types.

More particularly, these indicators can be structured into the following categories:

- MKR 6 to MKR 9, MKR 11, and MKR 13, which describe 'risk-weight exposure amount' participation by instrument type. High values on these indicators usually point to the instrument types that aggravate capital-adequacy compliance. Moreover, MKR 13 explicates the marketability of trading book positions at the time of reporting;

- MKR 4, MKR 5 and MKR 14, which decompose the long or short positions of the institution. Such analysis is especially valuable in cases where market conditions render the liquidation of buyers' positions more difficult than sellers' positions or vice versa;

- MKR 1 to 3, which demonstrate the trading activity of commodities or derivatives as reflected in the trading book or the balance sheet when carried out in a given period;

- MKR 10, which is specially targeted for institutions using internal models that measure how current value-at-risk compares to the stressed value-at-risk. MKR 8 measures FX-risk participation within the total market risk own funds requirements faced by an institution using the SA.

Some new indicators (12) have been added in order to complement the current market risk analysis:

- The scope of market activities subject to indicators is broader and covers interest rates and equity market risk. The current indicators are focused on commodity risk. But, generally one may consider that interest rates and equity trading activities are more significant than commodities trading activity, this latter activity being negligible when compared with the 2 other ones. This is a first justification for the relevancy of MKR 6.1 to MKR 6.3, MKR 7.1 to MKR 7.3 and MKR 16 to MKR 19.

- A refinement of the current metrics used to assess the importance of market activities in credit institutions balance sheet has been introduced. MKR 2.1, MKR 2.2 (commodity risk), MKR 17 and MKR 18 (interest rate risk) can be considered as a logical extension of some existing indicators measuring the part of positive and negative Marked to Market (MtM) amount in the sum of total assets and liabilities. The before mentioned new indicators compare positive MtM with total assets and negative MtM with total liabilities. The combined use of these 3 ratios may help identifying significant long or short unhedged exposures.

- Alternative metrics aiming at assessing the importance of market activities have been created. Instead of comparing MtMs with assets/liabilities, gross long and short positions as defined in the regulatory reporting (Standardized approach) are compared with assets/liabilities. MKR 6.1, MKR 6.2, MKR 6.3 (interest rates risk), MKR 7.1, MKR 7.2 and MKR 7.3 (equity risk) are designed according to this principle. Gross positions are relevant indicators for market risk exposures as long/short positions are not offset by short/long positions (on contrary to MtM accounting values). These indicators may be used to estimate (roughly) potential distortion risk. This latter risk refers to cases where hedging strategies become inefficient. For instance, a short borrowing position on the 2 years tenor hedging a long position on the 5 years tenor may generate losses in case of significant steepening of yield curve.

- MKR 16 and MKR 19 are not really new indicators. They may be seen as a duplication of MKR 1 and MKR 3 applied to interest rates risk. The sum of negative and positive MtMs are compared to the sum of total assets and liabilities. MKR 16 focuses only on trading book exposures as MKR 19 includes both trading and banking book exposures.

I.8.4. Further methodological issues and potential ways to address them

The application of additional market risk ratios, especially with regard to internal models, is vital to avert sudden and possible failures that could eventually cause losses. Therefore, geographical or currency analysis of certain instrument types can uncover major potential risks for the reporting

institution. At the same time, the set of legally binding reporting templates is, by nature, limited and cannot always expose specific inefficiencies in the risk handling that concerns the trading portfolio.

On a more practical basis, after examining the list of risk indicators, supervisors should also try to determine any hidden market risk within the banking book and especially in relation to the movements of balances within the AFS portfolio, prudent valuation adjustments or credit value adjustments (CVA).

The 'arbitrage' of capital requirements, which refers to the exchange of market risk capital requirements for lower credit risk capital requirements, can only be avoided after both the banking book and the trading book have been evaluated simultaneously and over different reporting time points.

The set of indicators listed in table 8 should be complemented by other analysis approaches:

- The counterparty risk implied by derivatives should be assessed using information from various COREP (C07.00, C08.01, C25.00, C40.00, C47.00…) and FINREP templates (F10.00, F11.01…). In this paragraph CVA risk is considered as a subset of counterparty risk.

- The perimeter of analysis mainly focused on standardized approach should be expanded to internal models. The COREP template C24.00 provide some information on value at risk amounts, which could be used to monitor the variations of value at risks in order to identify potential increase of market risks.

- The complexity of derivatives is another issue which has to be addressed. The regulatory reporting is not granular enough for a full assessment of the level of complexity. However, it would be interesting to investigate on prudent valuation templates (COREP C32.01 to C32.04). FINREP reporting is another source for building indicators of complexity (proportion of options, non CDS credit derivatives…).

I.9 SME risk indicators

I.9.1. List of risk indicators and DRATs

Table 9: List of SME risk indicators and DRATs

Number	Name	Number	Name
SME 1	Share of SME exposures in total exposures	**SME 9**	Probability of default for SME exposures subject to SME Supporting Factor (IRB only)
SME 2.1 to SME 2.2	Share of SME exposures in exposures to the real economy (corporates, retail and secured by IP) for SA/IRB approach	**SME 10**	LGD for SME exposures (IRB only)
SME 3	Share of SME exposures subject to SME Supporting Factor in total exposures	**SME 11**	LGD for SME exposures subject to SME Supporting Factor (IRB only)
SME 4	% change (year-on-year) of SME exposures during the period	**SME 12**	Share of SME exposures in default in total SME exposures
SME 5	% (year on year) growth of SME exposures subject to SME Supporting Factor during the period	**SME 13**	% change (year-on-year) of defaulted SME exposures during the period
SME 6.1 to SME 6.2	Risk weighted ratio for SME exposures for SA/IRB approach	**SME 14**	Post-CRM SME exposure to original SME exposure
SME 7.1 to 7.2	Risk weight ratio for SME exposures subject to SME supporting factor for SA/IRB approach	**SME 15**	Post-CRM SME exposure subject to SME Supporting Factor to original exposure
SME 8	PD for SME exposures (IRB only)	**SME 16**	Increase in CET1 capital ratio with the application of SME supporting factor

I.9.2. Introduction

In accordance with Article 8(1)(f) of the Regulation (EU) No 1093/2010 on establishing a European Supervisory Authority, the EBA shall 'monitor and assess market developments in the area of its competence, including, where appropriate, trends in credit; in particular, to households and SMEs'. Therefore, it seems natural for the EBA to develop indicators with a view to monitor the SME lending trends in the EU on an ongoing basis.

I.9.3. Description of the relevant risk indicators

The purpose of SME monitoring is to keep track of lending trends to SMEs and their riskiness in the context of the banking sector.

As such, the following groups of indicators are proposed:

- SMEs 1, 2 and 4 refer to SME lending indicators, which provide information on the lending trends to SMEs and their importance in terms of SME exposures in the overall banking sector;

- SMEs 6 to 13 on SME riskiness indicators provide information about the asset quality and the riskiness of SME related exposures;

- SME 14 refers to the dependency on credit protection and provides information on the extent to which SME exposures are covered by credit protection;

More particularly, SME 1 covers the share of SME exposures in total exposures and thus gives broader information on the weight of SME exposures in total bank exposures. SME lending is based on the non-harmonised SME definitions used by each bank.

SME 2 reflects the share of SME exposures in exposures to the real economy (corporates, retail, and secured by IP) and allows the assessment of the relative importance of SME lending as compared to other lending to the private sector. ..

SME 4 monitors the annual growth of SME exposures during the period. This figure does not represent new business, merely growth in the exposure amount. This indicator offers information on the development (increases or decreases) in the volume of SME exposures, independent from their level.

SME 6 displays the risk weighted ratio for SME exposures. It gives information on the average level of credit risk carried by SME exposures, keeping in mind that the SME supporting factor has also been applied to some of these exposures. This indicator takes into account credit risk mitigation techniques with substitution effects, which means that some SME exposures may be reported as another exposure class for the purpose of risk weighting and computation of overall own funds requirements.

SME 7 reflects the risk weight ratio for SME exposures subject to the SME supporting factor. It gives information on the average level of credit risk carried by SMEs subject to supporting factor assets.

SME 8 monitors the PD for SME exposures. It offers information on the PD associated with SME exposures in the case of IRB banks. It should be noted that part of the information on expected and unexpected loss is captured by LGD.

SME 10 gives information on the LGD associated with SME exposures.

SME 12 monitors the share of SME exposures in default in total SME exposures. It gives information on the relative importance of defaulted SME exposures among SME exposures, overall and by country. This indicator may be compared with the same value for other classes or across banks, as calculated in indicator AQT 11. It can also be computed for SME corporate, SME retail and SME secured by real estate.

SME 13 monitors the annual growth of defaulted SME exposures during the period. It gives information on the development (increases or decreases) of defaulted SME exposures, independent from their level.

SME 14 refers to the SME dependency on credit protection. It can be compared to the same values of all exposures as calculated in AQT 14. Only totals can be used due to the flow of amounts across exposure classes for reporting purposes, as based on CRM. This figure captures only credit protection that leads to the reduction in exposure value. CRM reduce the credit risk of an exposure or exposures via the substitution of exposures. It covers unfunded credit protection (guarantees, derivatives) and funded credit protection (e.g. financial collateral).

I.9.4. Further methodological issues and potential ways to address them

The CRR uses the term SMEs in two contexts. According to the first one, in order to be eligible for the retail exposure class, one of the conditions is that an exposure has to be an exposure to an SME (or one or more natural persons) in both the SA and the IRB approach, in accordance with Article 123 and Article 147 (CRR). The definition of SMEs is not specified for this purpose. However, the relevant reporting instructions[11] state that for the identification of SMEs for the purposes of the articles of the CRR (other than Article 501), institutions may apply their own definition of SMEs using the Commission Recommendation 2003/361/CE of 6 May 2003 only as guidance.

In the second context, CRD IV/CRR has introduced a deduction in the capital requirements for exposures to SME exposures through the application of an SME supporting factor equal to 0.7619. To be subject to the SME supporting factor, SMEs are identified using the Commission Recommendation 2003/361/EC of 6 May 2003, applying only the turnover criterion (turnover should not exceed EUR 50 million). In addition, the exposures should be included in 'retail', 'corporate' or 'secured by mortgages on IP exposure classes and the amount owed should not exceed EUR 1.5 million, in accordance with Article 501 of the CRR.

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[11] The EBA Single Rulebook Q&A 2013_27

I.10 Sovereign risk indicators

I.10.1 List of risk indicators and DRATs

Table 10: List of Sovereign risk indicators and DRATs

Number	Name	Number	Name
SVR 1	General government treated as financial assets held for trading to total general government exposures	**SVR 19**	Share of exposures to Central Governments in total sovereign exposures
SVR 2	General government designated at fair value through Profit and Loss to total general government exposures	**SVR 20**	Share of exposures to Regional Governments or local authorities in total sovereign exposures
SVR 3	General government treated at fair value through other comprehensive income to total general government exposures	**SVR 21**	Share of exposures to Public Sector entities in total sovereign exposures
SVR 4	General government treated at amortised cost to total general government exposures	**SVR 22**	Share of exposures to International Organisations in total sovereign exposures
SVR 5	General government exposures treated in other accounting portfolios including non-trading and nGAAP to total general government exposures	**SVR 23**	Share of exposures to Other General Government exposures in total sovereign exposures
SVR 9	Stage 1 Sovereign financial assets at amortised cost in as a percentage of total	**SVR 24**	Share of exposures under Credit Risk Framework in total sovereign exposures
SVR 10	Stage 2 Sovereign financial assets at amortised cost as a percentage of total 1	**SVR 25**	Share of exposures under Market Risk Framework in total sovereign exposures
SVR 11	Stage 3 Sovereign financial assets at amortised cost as a percentage of total	**SVR 26**	Percentage of General Governments Loans and Advances and Debt Securities to Total Loans and Advances and Debt Securities
SVR 12	Ratio of impairment and accumulated negative changes in fair value due to credit risk to gross carrying amount for sovereign exposures	**SVR 27**	Share of sovereign off-balance sheet exposures
SVR 13	Share of exposures with a maturity < 1 year in total sovereign exposures	**SVR 28**	Coverage ratio of sovereign exposures

SVR 14	Share of exposures with a maturity of 1 to 2 years in total sovereign exposures	SVR 29	Share of Sovereign Exposures of Total Assets
SVR 15	Share of exposures with a maturity of 2 to 3 years in total sovereign exposures	SVR 30	Share of Sovereign Exposures to Country X of Total Sovereign Exposures
SVR 16	Share of exposures with a maturity of 3 to 5 years in total sovereign exposures	SVR 31	Share of Sovereign Exposures to Country X of Total Assets
SVR 17	Share of exposures with a maturity of 5 to 10 years in total sovereign exposures	SVR 32	Ratio of Sovereign Exposures to Total Capital
SVR 18	Share of exposures with a maturity > 10 years in total sovereign exposures		

I.10.2. Introduction

The purpose of sovereign risk indicators is to monitor sovereign exposures and identify pockets of risks stemming from these exposures. Sovereign risk refers to the probability that the government defaults to its obligations. The indicators provide a profiling of the sovereign exposures, namely by the where these exposures are booked, maturity, stages and sectorial breakdown.

I.10.3 Description of the relevant risk indicators

The set of SVRs are mainly sourced from COREP (C 33) as well as FINREP templates. Thirty two risk indicators have been identified that may be used to assess the Sovereign exposures and risks undertaken by the banks.

The indicators are bundled into six main categories:

1) SVR 01 – SVR 08 show the distribution by accounting method of exposures to sovereign entities (in respect to the total exposure.

2) SVR 09 – SVR 12 analyse the stages of all sovereign exposures as a percentage of the total.

3) SVR 13 – SVR 18 provide a breakdown of the maturity profile of sovereign exposures.

4) SVR 19 – SVR 26 provide a sectorial breakdown of the sovereign exposures.

5) In addition, indicator SVR 27 describes the off-balance sheet weight for sovereign exposures, and SVR 28 gives a broad measure of the cost of holding these exposures.

6) Lastly, SVR 29 – SVR 32 provide a risk measure of the sovereign exposures. In particular, they give a measure of the sovereign exposures in relation to total assets and total

capital, as well as the share of per country sovereign exposures in relation to total sovereign exposures.

Part II. Other methodological issues for the compilation of risk indicators

The second part of this Guide is devoted to relevant methodological issues that could affect the intrinsic analysis extracted from the different indicators or should at least be taken into consideration when using these for analytical purposes.

II.1 Scope of the data

When analysing risk indicators, it is important to be aware of three facts that might not be directly observed, but can severely impact computed indicators and the economic meaning from the values they assume: (i) the **valuation methods** according to which the information is collected, (ii) the changes in the **reporting sample** when the indicator refers to an aggregation of reporting institutions, and (iii) the **level of consolidation**.

Despite the fact that, at a first glance, these issues seem to be totally unrelated, they all have an important feature in common: they are usually hidden behind the data and are often not adequately explained.

II.1.1. Accounting standards

FINREP has been developed based on accounting standards in order to achieve reliable data by aligning supervisory reporting of financial information with accounting standards. In general, the financial institutions have to submit financial information in accordance with the accounting standards applied in their annual accounts (IFRS under Regulation (EC) No 1606/2002 or national GAAPs).

For financial information, the ITS on supervisory reporting includes reporting templates both for IFRS and for national GAAP. Specific national GAAP reporting templates harmonise the reporting of financial institutions under these accounting standards, while respecting the differences between national GAAPs and vis-à-vis IFRS.

The reporting in accordance with the applicable accounting standards means that, despite harmonised reporting formats and instructions, differences in the applicable accounting standards prevent full harmonisation of the data collected from financial institutions. These differences between national GAAPs have an ex-ante impact as they require that reporting requirements be designed to suit the specific features of the national GAAPs, and an ex-post effect regarding data availability and comparability between national GAAP data and with IFRS FINREP data. Where a national GAAP is defined as IFRS-related, the national GAAP reporting may provide information that

is more comparable to IFRS than to other national GAAPs. Thus, an explicit understanding of the respective national GAAPs is necessary for analytical purposes.

Although the final aim of this manual is to define standard set of risk indicators, both for IFRS and for national GAAP, in some specific cases the risk indicators are only applicable for financial institutions applying IFRS, as indicated in the List of Risk Indicators and DRATS available at the EBA website.

In any case, differences in accounting standards shall be borne in mind when comparing risk indicators stemming from countries with different accounting standards or financial institutions of the same country applying different accounting standards.
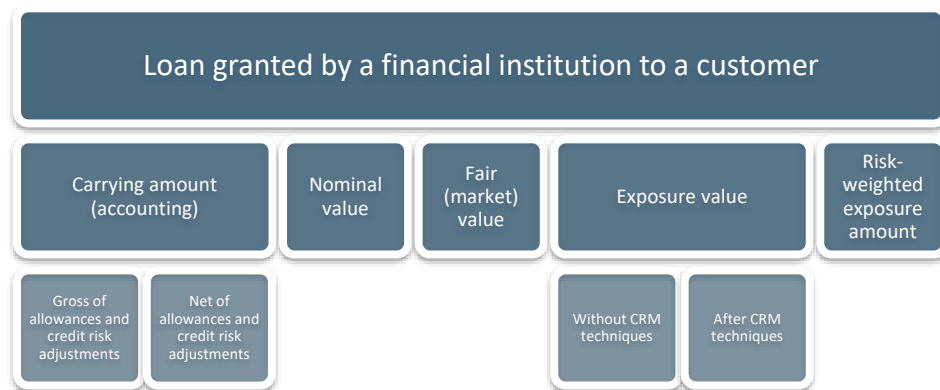
II.1.2. Valuation methods

The supervisory data reported by financial institutions, can be calculated according to different methods. These different approaches could have an effect on the reported figures themselves. For example, a loan granted by a credit institution to a customer can be reported under the ITS on supervisory reporting, at a **nominal value**, amortised **cost** or **fair value,** then with or without allowances, provisions and credit risk adjustments, as a risk exposure amounts or as an exposure value for instance (see Table 10). Even with such a stylised approach and without entering further levels of granularity, it becomes apparent that there are **seven different methods of measuring the same loan**.

When the valuation method used for the collection of a given data point is not adequately expressed, there is a risk that the information could be misinterpreted by users, as they will not be able to understand how the reported amount is calculated and what this implies in terms of substance. Further to the above-mentioned loan example, even within the domain of accounting information, it is not the same to report a loan with or without allowances and provisions.

Moreover, in order to ensure an adequate level of quality, it is also required that components of an indicator include only granular data points using consistent valuation[12] methods. The use of more than one valuation method may significantly hamper the relevant indicator's ability to provide meaningful information. In other words, mixing cost-based and fair-value-based amounts in the context of the same building component for an indicator, e.g. numerator or denominator, may severely distort the content of this particular data point.

Table 11: Different methods of measuring the same loan

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[12] The same is valid for accounting frameworks in the specific case of financial information, as the aggregation of information prepared under different accounting frameworks generates more noise than added value.

Loan granted by a financial institution to a customer

Carrying amount (accounting)		Nominal value	Fair (market) value	Exposure value		Risk-weighted exposure amount
Gross of allowances and credit risk adjustments	Net of allowances and credit risk adjustments			Without CRM techniques	After CRM techniques	

The indicators presented in this Guide will not be affected by limitations laid down in the previous paragraphs, as they always stem from a distinctive EU-wide harmonised reporting framework (FINREP and COREP templates), where valuation methods are clearly defined and used in a distinguished manner. This is certainly one of the benefits the implementation of the EBA ITS on supervisory reporting brings to the field of supervisory reporting.

In any case, such differences in valuation methods shall be borne in mind when comparing indicators stemming from different reporting frameworks – for example, carrying amounts in FINREP against exposure values in COREP, where underlying valuations are usually different.

II.1.3. Composition of the sample

The composition of the sample is particularly important when performing a time series analysis. In particular, as the indicators refer to an aggregation of several reporting institutions, it is especially important to keep track of all the possible changes occurred in the underlying data. This attention ensures that variations throughout different periods accurately reflect the evolution of the indicators and that they are not contaminated by changes such as institutions' mergers or acquisitions in the underlying reporting sample. The indicators reflect the evolution of institutions despite changes such as institutions' mergers or acquisitions in the underlying reporting sample.

In an ideal world, the answer to such a change in data would be to adjust the indicators values to the new sample each time, by adding or removing the occurrence. Nonetheless, this option entails continuous work in changing the time series, which may, ultimately, end up hampering the overall quality of the underlying data. Furthermore, when the time series comprises a significant number of observations, the task becomes certainly burdensome. An intermediate solution is to consider two values for each observation: the first from the current period and one from the previous one. In this case, the volume of the information collected doubles, but, on the other hand, it is ensured that period-to-period variations reflect the actual evolution of this indicator.

A more pragmatic approach is to define strict criterion for the entry and exit of the reporting sample. In this way, every change in it is adequately documented and shared with information's users. In such cases, the quality of the information is not of the maximum possible level, but the record of additions and removals in the sample serves as a warning tool when looking at the time evolution of a given indicator.

This is the solution implemented by the EBA to disseminate information on EU's largest banks, as established by Decision EBA/DC/130.[13] Article 3 of this Decision describes the entry and exit criteria for the sample, which have the clear objective of providing as much stability as possible to the sample of reporting institutions contributing to the computation of these risk indicators and DRATs. Institutions are required to leave the sample once the criteria set out in **Article 3 over 3 consecutive years** have not been fulfilled. The 3 consecutive year's condition exists to avoid those cases where an institution close to the entry threshold continuously enters and exits the sample. For the purpose of full transparency and accountability, the composition and evolution of the sample of reporting banks is published and periodically updated on the EBA website.[14]

II.1.4. Level of consolidation and reporting requirements

In most cases, the ITS on supervisory reporting requires reporting both on an individual entity level and on a consolidated level. Consequently, there are different levels of consolidation to be applied when it comes to the submission of the information. If not known by the analyst and especially when aggregating reporting institutions, these levels of consolidation may hinder the quality and accuracy of the analysis. The following paragraphs briefly describe these issues.

The scope of consolidation in prudential regulation (CRD IV/CRR) is not the same as in accounting (financial reporting). In broad terms, while the latter includes all entities, regardless of their activities, under the control of the parent entity, the provisions in CRD IV/CRR exclude three groups of entities from the scope of consolidation: (i) **insurance corporations and other financial institutions**; (ii) **non-financial corporations**; and (iii) **entities not material in size for the group as a whole**. While these three groups of institutions are not expected to be core activities of any reporting institution, sometimes they give rise to non-negligible differences between the values reported in the accounting and in the supervisory domain. Thus, the ITS on supervisory reporting requires use of the prudential scope of consolidation for financial information as well.

FINREP templates F 17.01, F 17.02 and F 17.03 provide an overview of the size of these differences. In these templates the amounts are reported according to the accounting scope of consolidation. Although most of these differences are not expected to be significant, there are a number of causes where it can significantly change the final figures.

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[13] Decision EBA/DC/2015/130

[14] List of reporting institutions to EBA

Furthermore, the current structure of the EU banking system is one where there are numerous large cross-border banks with activities in many EU countries. In each country, these activities are usually organised with a parent and different subsidiaries, so there is a consolidated group in that country. Under the provisions of the ITS on supervisory reporting, with the notable exception of liquidity reporting,[15] not only the ultimate parent in the EU should submit consolidated information but also the intermediate parent the institution may have in any other EU country.

Therefore, when aggregating this information across countries, it may lead to double counting, as the same group (activities of the consolidated group in a given country) are reported twice: (i) **within the ultimate consolidated group**, and (ii) **within the consolidated group at country level**. The stylised example, in Table 12 below, aims at illustrating this point.

Table 12: Consolidation levels
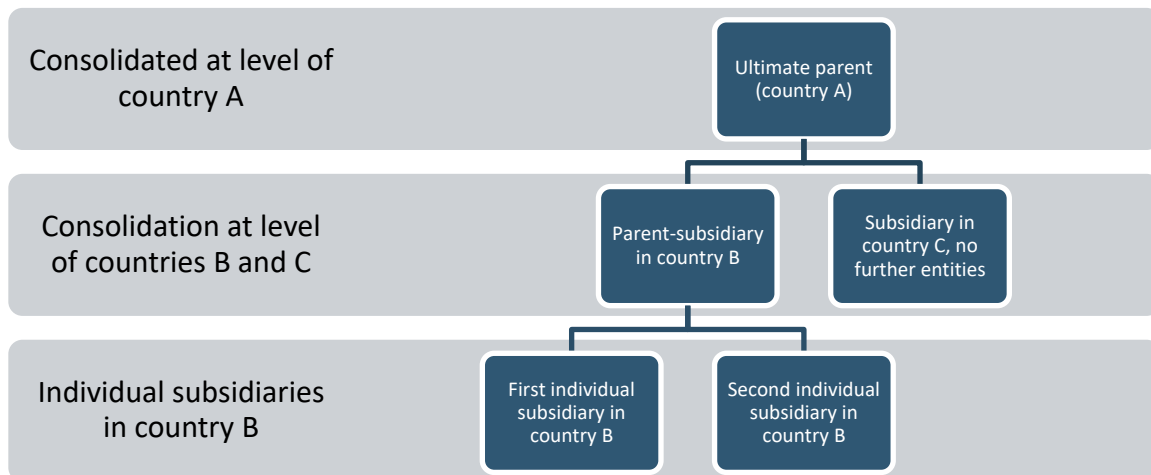
From the above example, the individual subsidiaries in country B are considered twice at the consolidated level, as they are part of the consolidated group reported in country B (itself a sub-consolidated level) and also of the ultimate consolidated group located in country A.

When the information for countries A and B is aggregated for the EU, the EBA removes the double counting of the individual subsidiaries. In reality, the structure of most EU banks is far more complex than the one shown in Table 12, as there are many other layers and relationships across countries and, in some cases, more than one parent institution for a given country. Nonetheless, the example outlined above should raise awareness among users of supervisory data and the limitations this could bring to their analysis.

II.1.5. Data quality assurance procedures

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[15] According to the ITS on supervisory reporting, liquidity information shall only be submitted at the individual level and at the level of the ultimate parent institution in the EU.

Computing risk indicators requires a significant amount of good quality and reliable data. In this sense, conducting rigorous consistency and quality checks for all the building components of a risk indicator is of paramount importance. A failure to identify potential problems during the data collection phase may result in transmitting these errors to the individual risk indicators and thus hamper analysis, confusing or misleading potential users.

In order to ensure the data quality, a well-established framework of rules is desirable. To that end, the EBA, in cooperation with the other competent authorities, has established a well-defined data quality framework in order to ensure that the reported data is of adequate quality in the context of the EBA's ITS on supervisory reporting and when issues are spotted, there is a clear follow-up process.

In brief, the ITS data quality assurance framework relies on a two-step process. In the first place, ITS data submissions have to conform to a set of validation rules. Usually, these are linear checks that ensure the consistency of the reported data. For example, a typical validation rule will check whether reported subtotals add up to the figure reported as the total for a particular economic concept. The failure to meet validation will either block the relevant data submission or trigger a warning message for the reporter. Most of these validation rules are embedded in the XBRL taxonomies, which are not necessarily mandatory for institutions reporting to national competent authorities (NCAs); however, they are mandatory for secondary reporting, i.e. for competent authorities (i.e. the ECB and NCAs not under the SSM) when reporting to the EBA.

In the second stage, a new set of tests are performed by the EBA competent authorities. In fact, the EBA – together with the competent authorities – is in charge of conducting completeness checks to ensure that the expected number of items has been submitted in a timely and complete manner, and other quality and plausibility checks to ensure that the reported items do not contain any outliers or implausible values. In the event that a discrepancy is identified, reporting institutions will be contacted and requested to review the values or justify them.

II.2 Negative values in numerators and denominators of ratios

From a mathematical perspective, the numerators and denominators of certain ratios are constructed in such a way that they can show both positive and negative values. This is particularly common for ratios that include net income items, which obviously are more prone to different business cycles and increased volatility. Therefore, the possible combinations in a ratio where positive or negative signs could get involved are illustrated as follows.

Table 13: Possible signs combination in a ratio

Numerator	Denominator	Ratio
Positive	Positive	Positive
Positive	Negative	Negative
Negative	Positive	Negative
Negative	Negative	Positive

While the first three combinations do not pose any methodological issues, the fourth combination, i.e. both a negative numerator and denominator, will produce a positive indicator that could be potentially quite misleading (see Box 2 for a stylised, illustrative example).

Indeed, ignoring this issue could lead to seriously misleading results. For example, in those cases where the reporting institution is precisely performing worse (with both variables in the indicator taking negative values), the calculated value of the ratio would place it together with 'normal performers', i.e. those with positive values, potentially even amongst the best performers across the sample of institutions.

With the above in mind, three alternative actions can be considered:

- **Dropping out the reporting institutions for which both numerators and denominators are negative from computing ratios.** While this alternative would ensure that positive values of KRIs actually reflect positive performance of the underlying reporting institutions, this would hamper the analysis, as the sample would not contain all the reporting institutions, excluding, precisely, those that are probably in a weaker position and therefore deserving closer attention by micro prudential and macro prudential supervisors. If these ratios are further aggregated by country, the effects of this choice would be amplified. In other words, **following this alternative would provide a partial and probably overly optimistic view**;

- **Compute the ratio by using absolute values**. This option would remove the impact that the signs of the numerator and denominator have on the signed value taken by the computed ratio. However, this is actually its main drawback, as the distinction between positive and negative values of the indicator is of the utmost relevance. The adoption of this alternative **would imply a relevant loss in the analytical value of the ratio itself, given that gains and losses would be treated equally**;

- **Artificially transforming the value of the ratios**. This solution would group those entities with a **negative numerator and denominator** together with those that only have one of them flagged as negative. The advantages of this approach are that the sample would remain the same and the users of the data would be assured that positive values certainly reflect positive performances. The only concern with the proposal is that it obliges one to adjust ex-post the values reported, a task which requires resources and manual intervention and may lead to man-made errors.

In summary, the **third option seems to be the most appropriate**. The first option, which is followed by the EBA, can also be pursued by allocating a -100% to the ratio or by setting the value of the ratio to be the minimum of the sample considered. These two solutions, though, imply that the amended data would not show any direct relationship with what the relevant institution has reported,[16] so they are less preferable in that sense.

Box 2. An illustrative stylised example of the methodological concerns when numerators and denominators of a ratio take positive and negative values.

In order to illustrate the discussion in this section, it may be useful to look at a stylised example to better understand the effect that negative numerators and denominators in a ratio can have when analysing the information.

Let us suppose the following values of the numerators and denominators of a ratio (Figure 1) on a sample of reporting institutions. Green values show positive values for numerator and denominator, which would generate a positive ratio. In the case of red and orange values, the ratio would have a negative sign, as they have either the numerator or the denominator with negative sign. Finally, those items in blue would have a positive ratio from having a negative numerator and denominator. The values of these ratios are sorted in Figure 2.

**Figure 1: Plotted values of numerators and denominators**   **Figure 2: Sorted values of the resulted ratios**
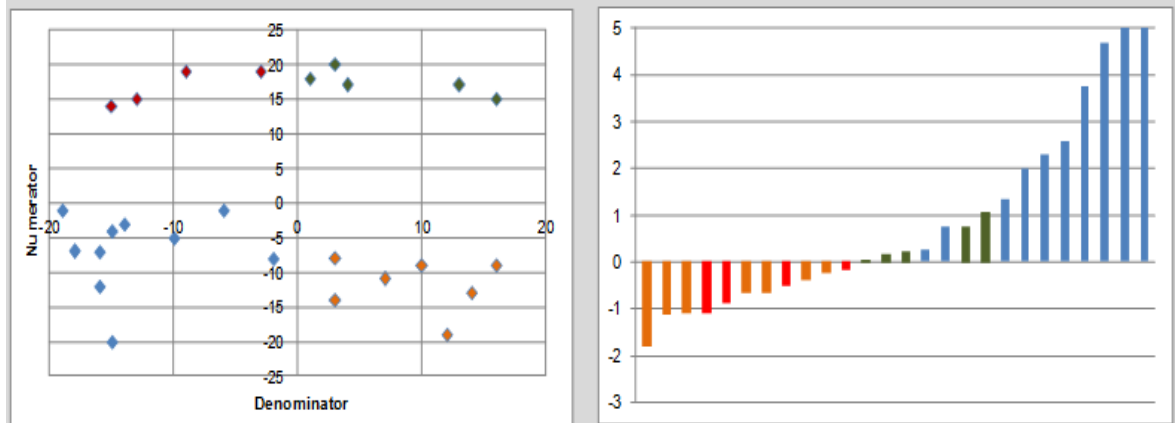
In this case, those data points with negative numerators and denominators are the ones placed in the top positions of the ratio. If we translate this situation to a ratio which, for example, has as numerators and denominators net gains or losses, these institutions would be perceived as the 'best performers', while the reality is that they are the 'worst performers'. Therefore, it is necessary to ex-post work on the calculated values of these ratios to avoid this kind of issue, as it may have negative consequences for our analysis.

The most suitable option would be to change the sign of those ratios with the negative numerator and denominator into negative, in order to not have positive ratios that could provide the wrong picture. If that is implemented in our stylised example, the results would be as in Figure 3.

Figure 3: Values of hypothetical ratios with artificial changes in the sign
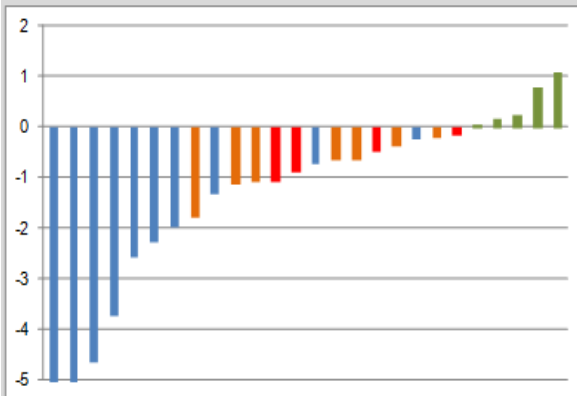
For illustration purposes, Figures 4 and 5 depict how the different values of the risk indicators would look in this example if the alternatives of allocating the minimum value and -100% to those ratios with a negative numerator and denominator were adopted. As can be observed, such solutions would entail a significant loss of analytical power of the values reported.

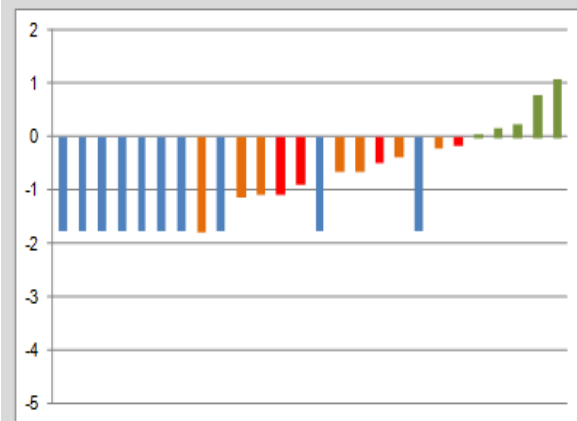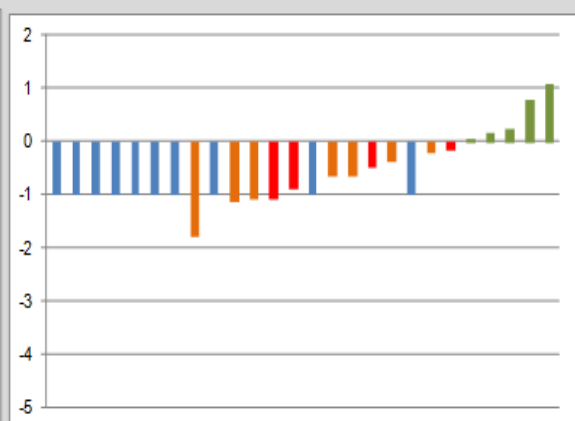**Figure 4: Values of hypothetical ratios with allocation to the minimum value**

Figure 5: Values of hypothetical ratios with allocation to -100%

II.3 Using statistical measures (averages, percentiles, and standard deviations)

The indicators presented are commonly published and used in an aggregated form. In other words, they do not cover just one institution but several of them – for example, those used in the context of the EBA Risk Dashboard. However, different types of aggregation can be carried out, such as by country, by size or by nature of the underlying reporting institutions, and others. In all these cases, the analytical power of a given indicator is not fully applied if only one observation is used from the relevant sample, whether this is an average, median or a weighted average.

The simply use of averages may hide potential outliers. In particular, from a prudential point of view, the interest is not often on the average of the institutions included in the sample, but on the possible outliers which may exist. In a similar vein, simple averages do not take into account the relative importance of institutions; for instance, in the specific case of a sample composed of banks of different sizes, the smallest bank may have the same weight in the determination of the average than the largest bank in the sample. Thus, it is necessary to complement the value of the indicator with additional statistical measures that may provide additional information. The following paragraphs aim at describing, in brief, some of the most common statistical measures.

A first option is to use weighted averages. The use of weighted averages aims at considering the relative weight of each individual institution in the sample in the calculation of the value of a certain indicator. The relative weight is calculated by referencing an external variable (e.g. total assets), which is expected to provide a solid estimation of the weight of each institution in the sample. Therefore, with the use of weighted averages, larger institutions count more than smaller institutions and the final value of the indicator may have a bias towards this set of institutions, hiding those smaller institutions from view. This is illustrated in the theoretical example below, where larger institutions take the lowest values.

Table 14: Signs in the calculation of growth rates between two different values

Value of indicator	External variable
8.25	90
11.50	70
6	140
9.75	45
7.25	80
9.5	60
7.5	110
Simple average:	8.54
Weighted average:	8.07

Weighted averages are always used in the context of the EBA risk indicators' aggregates.

This analysis can be enriched by using dispersion measures. With regard to the dispersion of values of an indicator, as selected by each reporting institution in the sample, the most basic statistical measure used is the standard deviation - which measures the distance from the observation of a given institution to the average. **Low values** of the standard deviation point to a **concentration around the average**, whereas **high values** of the standard deviation indicate a **wide range** of values (see, for example, Chart 6 below, where the standard deviation of the red dots would be higher than that of the blue dotes, while both have the same average). In that sense, it must be noted that the standard deviation does not provide any further information on how the individual observations are placed in relation to the average, so that values above and below the average are treated the same.

Figure 6: Relative positions of values in relation to the sample's standard deviation
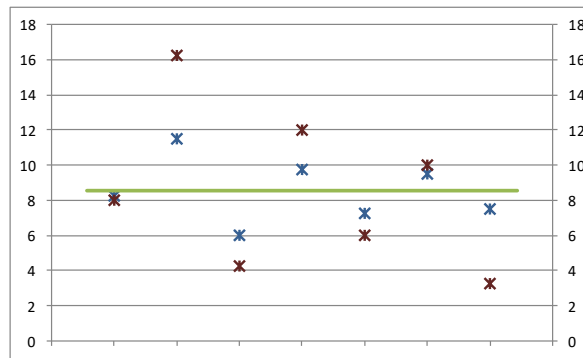
To overcome this limitation, it is possible to use percentiles. This measure allows the users to better understand the range of values taken by the individual reporting institutions. The percentile X represents the value that takes the observation that represent up to X of the total sample. For example, the percentile 10 represents the value of the indicator taken by the individual observation that includes 10% of the sample. The most common percentiles used are the quartiles (25%, 50% and 75%). Maximum and minimum amounts are widely used as well. Applying percentiles helps the user to recognize the concentration of values taken by a given indicator and the potential existence of outliers. For example, if the third quartile is situated very far from the average, it may indicate that most of the values across the distribution for a particular indicator are above the average and that there are a reduced number of observations well below the average that determine the final value of the average.

Chart 7 depicts the quartiles of two series, and it can be observed how the second series has a wider interquartile range than the first.

Figure 7: Comparison of the interquartile ranges from two hypothetical samples

Source: The EBA risk dashboard
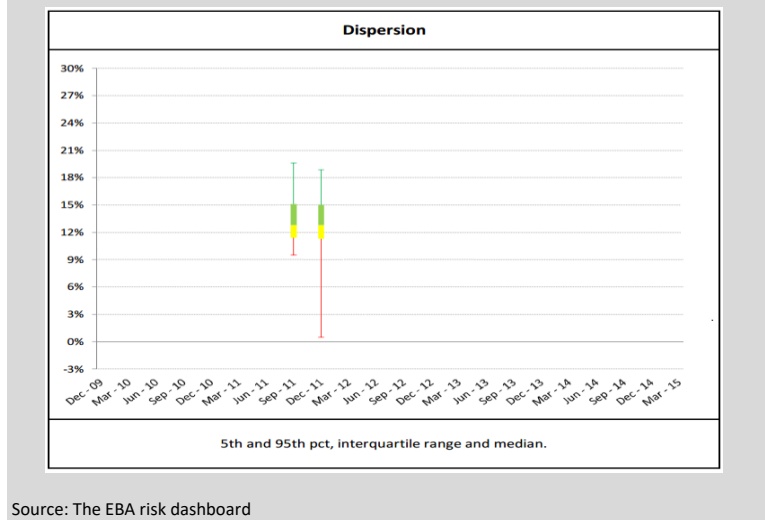
The 50% percentile, i.e. the median, represents the value that cuts the sample into two halves, one with values above the median and the second with values below. If we continue with our example in the previous paragraphs, the previous two series have an average of 8.54, whereas they have a median of 8.25 and 8 respectively. That broadly indicates that both series have more observations under the average than above the average, but the latter observations are more distant from the average value than the former.

Finally, in a different domain, a statistical measure that may be used for assessing concentration is the Herfindahl index. This index is primarily used to assess the competition and concentration in a given industry by looking at the relative importance of the firms involved. If 'S' represents the market share of each firm in the industry, expressed as a percentage, the Herfindahl index can be calculated as follows:

$$H = \sum_{i=1}^{N} S_i^2$$

Here, N is the number of firms in the industry. Increases in the Herfindahl index generally indicate a decrease in competition (increase in concentration), whereas decreases indicate a reduction in concentration (i.e. a competitive industry with no dominant players). When 'S' is expressed as a percentage (e.g. 0.1), the Herfindahl index ranges from 1/N to 1.

In order to transform the Herfindahl index to a range between [0,1], the normalised Herfindahl index (H*) is introduced, which can be calculated as follows:

$$H^* = \frac{(H - 1/N)}{1 - 1/N}$$

Here, H is the Herfindahl index as calculated above. It is rather straightforward to extend the use of the Herfindahl index to other fields, especially to the area of concentration risk. For example, in the case of exposures in different countries, the Herfindahl index can be used to assess whether the exposures of a certain institution are concentrated to a reduced number of countries or not. It can also provide interesting comparative information for those banks more active on a cross-national basis.

For example, let us assume the following exposures of three reporting institutions towards a small set of countries.

Table 15: Herfindahl indices

	Reporting institution X		Reporting institution Y		Reporting institution Z	
	Exposure	[0,1]	Exposure	[0,1]	Exposure	[0,1]
Country A	50	0.5	5	0.05	80	0.8
Country B	10	0.1	20	0.2	20	0.2
Country C	5	0.05		0		0
Country D	25	0.25	25	0.25		0
Country E		0	20	0.2		0
Country F	10	0.1	30	0.3		0
Total exposures	100	1	100	1	100	1
Normalised Herfindahl index	**0.202 (20.2%)**		**0.082 (8.2%)**		**0.616 (61.6%)**	

The Herfindahl index of the third reporting institution is significantly higher than the other two, as it concentrates its activities in only two countries. Similarly, the second reporting institution has the lowest value of the index, as its exposures appear to be more diversified among the countries.

In addition to the measurement of concentration of exposures in certain countries, the Herfindahl index can be used in other areas within the ITS on supervisory reporting, such as concentration of exposures across exposure classes, sectors of the counterpart and currencies.

II.4 Reporting by currency in the ITS liquidity templates

The framework for the reporting of **liquidity templates** (LCR, NSFR) is defined in Article 415 of the CRR, Articles 15 and 16 of the ITS on supervisory reporting, and Annexes XII and XIII of the latter.

In accordance with Article 415(2) (a and b) of the Regulation (EU) No 575/2013 (CRR), an institution shall separately report items in Article 415(1) to the competent authorities when it has aggregate liabilities in a currency different from the reporting currency (under paragraph 1) amounting to or exceeding 5% of the institution's or the single liquidity subgroup's total liabilities or a significant

branch in accordance with Article 51 of Directive 2013/36/EU in a host Member State. In other words, institutions shall report separately for all significant currencies. In practice, this implies that the reporting template must be filled separately for each significant currency.

However, the liquidity report misses some relevant pieces of information. For instance, what is missed in the current reporting requirements for liquidity is the reporting of positions in the reporting currency, which should be part of the requirements not only for the sake of completeness, but also for analytical reasons. Therefore, any analysis by currency of the liquidity risk of a given institution would miss precisely the most relevant currency: **the reporting currency**.

The only data available in the reporting currency already incorporates all other significant currencies. In fact, the reporting currency already incorporates all other significant currencies, which, in the case of large cross-border institutions, is expected to be important in absolute terms. Analogously, any analysis by currency that is based on aggregated data (for example, liquidity risks from USD positions by EU banks) will not be complete, as it would exclude those cases where the currency is a reporting currency of an institution that also reports other significant currencies.

The existence of reporting thresholds also hampers data analysis. Similarly to other parts of the ITS on supervisory reporting, where there are thresholds, the introduction of the **5% threshold in the definition of significant currencies** must be considered when carrying out any analysis of the data. Any analysis by currency shall be aware of the fact that when that currency is not significant for a number of banks, it is not reported. In other words, information on a given currency is only reported when it reaches the minimum threshold for it to be considered as significant.

This approach excludes positions of marginal importance, for the bank's balance sheet, but also has the potential to trigger adverse consequences. These risks are mainly related to the evolution of exchange rates, high risk of assets or liabilities held in that currency. To sum up, the reporting threshold prevents a full coverage of each currency to be reported, a fact that, in some extreme cases, may lead to the omission of some important facts (for example, many institutions with small but risky exposures towards a given currency).

II.5 The use of flow data in risk indicators – what is really meant?

The use of flows, instead of positions, may create challenges when calculating the risk indicators and in the subsequent analysis of the results. For many risk indicators, it is common that the numerator, the denominator or both express a concept that extends over a period of time (flow), rather than the static situation of an item at a point in time (stock). In such cases, and especially when the underlying data is submitted with a higher frequency than annually, the question that

may arise is which period of time is this flow intended to cover. In other words, when an indicator is referring to flows over a period, it is not clear when that period starts and how the underlying data should be computed.

Financial indicators are especially affected by this time dimension. For instance, when computing the 'Return on Equity' (RoE), defined as the ratio between the net profit of the period and the equity of the reporting institution, the net profit covers cumulative net profit during the financial year. This results in different calculation periods for each reference date according to the methodology used for its collection. In fact, this is particularly the case for financial reporting, whereas other prudential reporting often requires non-cumulative flows for each quarter of the calendar year.

For the calculation of such indicators, and in order to annualise flow data, EBA uses the extrapolation approach. This methodology has some drawbacks such as the assumption that the information behaves consistently and that it can be extrapolated for the whole year, and that negative values could potentially increase the forecast error in extrapolating flows based solely on one or two quarters. Nevertheless, this methodology seems to be the most appropriate in the field of supervisory reporting and returns the most coherent results for various analyses.

In order to replicate this approach, the amounts for each quarter are extrapolated on a year-to-date (YTD) basis, over a period covering 12 months. This means that, on an YTD basis, amounts for Q1 would be multiplied by four, the second quarter by two, and the third quarter by four thirds. The main drawback of this option, as mentioned, is that from a methodological standpoint, it assumes the information behaves consistently across all quarters of the year and that it can be extrapolated for the entire year. While this can be the case for the YTD data of the third quarter, which covers 9 of the 12 months of the year, this assumption becomes more dubious for the data in the first quarter, which only covers 3 months, and which may give an estimated value for the whole year that is quite far from the real observed one 9 months later. Furthermore, negative values (i.e. a net loss) could potentially increase the forecast error in extrapolating flows based on one or two quarters.

Box I – Other alternative approaches to calculate indicators using flow data

There are obviously other three alternatives to calculate indicators based on flow information. The next paragraphs describe other acceptable methodologies that can be adopted, when underlying information is reported on a quarterly basis.

1. Only use the amounts of the quarter. For this case, the flow information for quarterly reported data would cover 3 months, irrespective of whether it is the first, second, third or fourth quarter of the year. Despite the consistency this solution introduces in the indicators' compilation, as all the quarters would contain amounts purely generated during 3 months. One possible reason for this stems from the fact that some important charges in the profit or loss account (where all the items are reported as accumulated flows) are made in the last quarter of the year; therefore, under this approach, indicators for the fourth quarter would depart from the values reported in the previous quarters, showing a strong seasonality over the years. Calculating flow-based indicators for each

quarter would be justified when analysis is focusing on the latest trends or on the activities during a quarter – for example, when analysing an individual bank's trading income or impairments.

2. Consider the last four quarters (moving year). In this case, the natural year is not followed and all the observations cover the period of the last 12 months. That would mean, for example, that for Q1, data from Q2, Q3 and Q4 of the previous year would also be considered. Such a solution ensures consistency across observations, as all of them would cover periods of the same length (12 months), and it would avoid the seasonality of the previous alternative. Nonetheless, although sound from a methodological point of view, this option implies that the link between the natural and the accounting (which often coincides with the natural) year is broken, so it is not very widely used in the domain of supervisory statistics. This approach would be preferred for sector-wide computations, where it is important to have comparable data.

3. Compute the data on a year-to-date (YTD) basis. This is the solution adopted in the ITS on supervisory financial reporting (see Article 2(2)) and reinforced by Q&A 126 and 619, in which FINREP is concerned. In this case, data of the first quarter would cover 3 months, data of the second quarter 6 months, data of the third quarter 9 months and data of the fourth quarter 12 months. At the end of the natural year, in the period covering 12 months, the counter would start again and the first quarter would cover 3 months and so on. In spite of the inconsistency in the duration of the period covered by the flows, this alternative is widely used in supervisory reporting.

In the following, the example of the RoE demonstrates the key differences of these four alternatives.

Table 16: RoE ratio based on different flow measures

	Q1	Q2	Q3	Q4
Net profit for the period				
1. Extrapolation of YTD	Q1 x 4	(Q1 + Q2) x 2	(Q1 + Q2 + Q3) x 4/3	Q4 + Q3 + Q2 + Q1
2. Amounts generated in the quarter	Q1	Q2	Q3	Q4
3. Last four quarters (moving year)	Q1 + Q4t-1 + Q3t-1 + Q2t-1	Q2 + Q1 + Q4t-1 + Q3t-1	Q3 + Q2 + Q1 + Q4t-1	Q4 + Q3 + Q2 + Q1
4. YTD basis	Q1	Q2 + Q1	Q3 + Q2 + Q1	Q4 + Q3 + Q2 + Q1
Equity	As of 31 March	As of 30 June	As of 30 September	As of 31 December

Assuming a net profit in each quarter of 200, 150, 250 and 50 (and 200, 150 and 50 for the second, third and fourth quarters of the previous year), and a total equity of 1 000 constant during the year, the return of equity according to the four alternatives would take the following values.

Table 17: Numerical representation of table

	Q1	Q2	Q3	Q4
Net profit for the period				
1. Extrapolation of YTD	200 x 4 = 800	(200 + 150) x 2 = 700	(200 + 150 + 250) x 4/3 = 800	50 + 250 + 150 + 200 = 650
2. Amounts generated in the quarter	200	150	250	50
3. Last four quarters (moving year)	200 + 50 + 150 + 200 = 600	150 + 200 + 50 + 150 = 550	250 + 150 + 200 + 50 = 650	50 + 250 + 150 + 200 = 650
4. YTD basis	200	150 + 200 = 350	250 + 150 + 200 = 600	50 + 250 + 150 + 200 = 650
Equity	1 000	1 000	1 000	1 000
RoE				
1. Extrapolation of YTD	0.80	0.70	0.80	0.65
2. Amounts generated in the quarter	0.20	0.15	0.25	0.05
3. Last four quarters (moving year)	0.60	0.55	0.65	0.65
4. YTD basis	0.20	0.35	0.60	0.65

From this basic numerical example, it can be seen how the method considering only amounts generated in the quarter produces indicator values much lower than those generated by the other three methodologies, as the other approaches cover a period of 12 months. It is also worth noting how the moving year, the YTD basis and the extrapolation of YTD converge to the same value at the end of the fourth quarter, but following a different path in the previous quarters. While the calculation of the "last four quarters in a moving year" provides the most stable range of values, the incremental component embedded in the YTD basis is clearly seen, as is the highest volatility in the values taken when extrapolating the YTD data to the full natural year.

Finally, besides the need to annualise the flow data to estimate the numerator, one also needs to normalize the denominator. Due to their volatility, many financial indicators are also adjusted using an average value between two periods. This is the case for the RoE, where the denominator (Equity) should be calculated as an average between the last year-end period and the current quarter. For instance, to estimate the RoE for a second quarter the following formula applies:

(1) $$RoE_{Q2,Year_t} = \frac{(Profit\ or\ loss_{\ Q1,Year_t} + Profit\ or\ loss_{Q2,Year_t}) \times 2}{(Total\ equity_{Q4,Year_{t-1}} + Total\ equity_{Q2,Year_t})\big/2}$$

It is understood, that all methodologies have advantages and disadvantages in calculating the indicators. The decision of which methodology should be used therefore depends on the purpose of the analysis, and it should take into account which indicator is being considered. The stylised example used in this section has outlined how the choice between the four calculation methods can have an important impact on the values serving as input to the indicator under analysis; in a way, it shows that the analysis itself may change depending on which alternative is finally taken. The use of YTD data, also when annualised to the full year, is the most suitable in the field of supervisory reporting, and thus the **one used by the EBA when computing relevant risk indicators**.

II.6 The 'follow-the-money' approach

The understanding of firms' business models and the risk embedded is a key challenge for supervisory authorities[17]. A starting point is a detailed analysis of companies' financial statements and reports to obtain a deeper understanding of the drivers of revenues and trends that are developing in the firm. Also, to determine whether these patterns are consistent with the firm's stated risk appetite and are sustainable. This 'follow-the-money' approach enables supervisors to focus on the main businesses whose failure would cause problems for the firm; as compared to other business units whose failure could have no or little impact on the firm performance.

Nowadays, the most common practices focus their analysis in financial risks; however, this analysis can be extended to other possible causes of failure. All supervisory authorities focus on the main financial risks (such as credit, market, etc.) by improving their already existing models, but this in-depth analysis may lead to a lack of vision regarding the whole risk of the firm. On the other hand, supervisory authorities could have a clearer vision about the risk drivers embedded in the risk of the firm and could increase the effectiveness of their activity by directing their efforts towards the specific area whose failure might cause problems for the company. This 'follow-the-money' proposal starts from a very common financial formula – return on equity (RoE) – in order to understand the drivers of revenues and to determine where the relevant risks are.

The starting point to assess the firm's business model and the risk embedded in it is the RoE formula, which makes clear the main sources of capital yield:

$$\text{RoE} = NoP/Asset \times Asset/Equity \times EbT/NoP \times NP/EbT$$

Here

$NoP / Asset$ = Net operating profit/Total leverage ratio exposures =

= ***Net asset yield contribution***

$Asset/Equity$ = Total leverage ratio exposures/T1 capital =

= ***1/Leverage contribution***

EbT/NoP = Profit or loss before tax/Net operating profit =

= **Non-operating incomes or expenses contribution**

NP/EbT = Net profit/Profit or (-) loss before tax =

= Tax effect on the capital yield =

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[17] See also: http://www.financialstabilityboard.org/publications/r_101101.pdf.

= **1 – Tax rate**

According to this formula, one can assume that the results of the bank's business model is based on internal factors that are managed by the firm, such as **asset** and financial structure, or on **external factors not managed** by the firm and which may depend on one-time factors that are unlikely to occur in the future, or contingent on factors such as **fiscal policy**. Obviously, the main part of the capital yield should be the asset yield contribution but, in financial intermediaries, leverage is often a key driver of capital yield.

This approach enables us to analyse the return on investment. More important, these indicators can be broken down in information available in the report and therefore combining different pieces of information to understand the main drivers of the business models risks. Before moving forward, it is worth recapping the abbreviations that will be used later in the discussion on the return on investment. Some of them have already been used for the analysis of RoE and are disclosed in Table 17 below.

Table 18: Building components of the RoE ratio

AdE	Administrative expenses	Loanb	Loan to banks
AdV	Added value = Operating income - Administrative cost (without staff expenses)	Loanp	Loan to private
BankB	Banking book	NetFop	Net financial other operations
Depb	Banking deposits	NetH	Net financial hedging
Depp	Private deposits	NetT	Net trading
EbT	Earnings before tax	NetTrP	Net trading profit
Equity	Own funds	NI	Net interest
FiA	Financial asset	NIF	Net interest and fee
FiAo	Financial other asset	NoP	Net operating profit
FiL	Financial liabilities	OpI	Operating income
InE	Interest expenses	OpP	Operating profit
InEb	Interest expense from bank	RWA	Risk-weighted asset
InEp	Interest expenses from private	RWAcr	Credit risk-weighted asset
InEs	Interest expenses from securities	RWAmr	Market risk-weighted asset
InIb	Interest income from banks	Sec	Securities
InIbb	Interest income from banking book	StaffE	Staff expenses
InIo	Interest income from other	TrB	Trading book
InIp	Interest income from private		

To that end, the firm's core business should be analysed using a step-by-step approach, taking the return on investment as the starting point.

First step:

$$RoI = OpP/Asset \times NoP/OpP$$

Here

$$OpP \; / \; Asset \quad = \text{Asset performance}$$

$$NoP \; / \; OpP \quad = \text{Weight of risk}$$

Second step:

$$OpP \; / \; Asset = OpI/Asset \times OpP/OpI$$

Here

$$OpI \; / \; Asset \quad = \text{Banking activity performance}$$

$$OpP \; / \; OpI \quad = \text{Bank's efficiency level}$$

Third step:

$$OpI/_{Asset} = \frac{NI}{FiA} \times \frac{FiA}{Asset} \times NIF/NI \times OpI/NIF$$

Here

$$NI/FiA \quad = \text{Banking activity}$$

$$FiA/Asset \quad = \text{Share of financial asset of total asset}$$

$$NIF/NI \quad = \text{Component fee}$$

$$OpI/NIF \quad = \text{Trading performance}$$

The third step shows the contribution of different banking business activities: banking, services and trading. In this case, the banking activity is proxied by the formula:

$$NI \; / \; FiA = InI/FiA - (InE/FiL \times FiL/FiA)$$

It could be useful to further analyse how this margin is determined. Below there are some examples of how this stream of analysis can be pursued more in depth.

Income analysis: contribution of different portfolios to the interest income.

$$InI \; / \; FiA \\ = (InIb/Loanb \times Loanb/FiA) + (InIp/Loanp \times Loanp/FiA) + (InIo/FiAo \\ \times FiAo/FiA)$$

Funding analysis: the cost of different liabilities that are used for funding.

$InE\ /\ FiL$
$= (InEb/Depb \times Depb/FiL) + (InEp/Depp \times Depp/FiL) + (InEs/Sec \times Sec/FiL)$

Trading performance analysis: the main drivers for the trading performance ($OpI|NIF$) are:

$NetT/OpI$ = Contribution of trading activity

$NetH/OpI$ = Contribution of hedging activity

$NetFop/OpI$ = Contribution of financial operations other than trading and hedging

After analysing the main sources of income, the analysis may continue with the second driver of the asset performance: the efficiency of the bank. The starting formula, taken from step 2 above, is: OpP/OpI

The level of bank efficiency mainly depends on two factors:

Structural efficiency $AdE/Asset$

Staff efficiency $StaffE/AdE$

Usually, the expense for the staff is a key element of the bank's costs, so it could be useful to verify the level of staff efficiency in the different funding bank's activities and performance.

Funding activities:

Deposits $Depp/N°\ emp$

Securities $Sec/N°\ emp$

Fund management $FM/N°\ emp$

Performance:

Income $OpI/N°\ emp$

Cost $AdE/N°\ emp$

Value added $AdV/N°\ emp$

In order to verify the bank's productivity, there are two indicators that can be used:

Staff unit cost $StaffE/N°\ emp$

Profit per employee $OpP/N°\ emp$

Furthermore, for the bank's core business, a risk-adjusted return analysis should be performed. At this stage, it is considered that the banking book reflects the bank's core business. The starting point for this analysis would be:

$$InIbb/BanB = InIbb/RWAcr \times RWAcr/BanB$$

Here

$InIbb/RWAcr$ = Risk-adjusted return on asset

$RWAcr/BanB$ = Risk management effect

A similar analysis can be carried out on the trading book:

$$NetTrP/TrB = NetTrP/RWAm\,r \times RWAmr/TrB$$

Here

$NetTrP/RWAmr$ = Risk-adjusted return on asset

$RWAmr/TrB$ = Risk management effect

Last but not least, banking activities typically rely heavily on leverage, which may be risky if used at an extreme level. According to the Basel and European CRR/CRD IV frameworks, the level of a bank's own funds is related to the RWA (or risk exposure amounts as in CRR/CRD IV terminology), so it could be useful to verify how much of the leverage depends on the management effect.

$$Asset/Equity = Asset/RWA \times RWA/Equity$$

Here

$Asset/RWA$ = Risk management effect

$RWA/Equity$ = Leverage risk adjustments

To sum up, the analysis hereby presented is based on the profit and loss account of a given institution, and aims at determining the main drivers therein. Among others, these drivers can derive from the core activities of the institution (banking book) or from its trading activities (trading book). In parallel, this approach pays special attention to the efficiency and productivity of an institution, a domain usually scarcely assessed. Therefore, in order to carry out this analysis, several indicators (as set out in Table 18 below) must be compiled. Out of this set, the main indicators (the first layer) are included under the PFTs section (I.4 of this Guide).

Table 19: Building components of the 'follow-the-money' approach

Number	Formula	Name
PFT 21	*NP/Equity*	Return on equity

PFT 17	*NoP∕Asset*	Return on investments
PFT 18	*Asset∕Equity*	Leverage
PFT 19	*EbIT∕NoP*	Non-operating earnings
PFT 20	*NP∕EbIT*	Tax effect
	OpP∕Asset	Operating profit to total asset
	NoP∕OpP	Net operating profit as % of operating profit
	OpI∕Asset	Operating income to total asset
	OpP∕OpI	Operating profit as % of operating income
	NI/FiA	Net interest to financial asset
	FiA/Asset	Financial asset as % of total asset
	NIF∕NI	Net interest and fee as % of net interest
	OpI∕NIF	Operating income to net interest and fee
	InI∕FiA	Interest income to financial asset
	InE∕FiL	Interest expenses to financial liabilities
	FiL∕FiA	Financial liabilities to financial asset
	INIb∕Loanb	Interest income from credit institutions to credit institutions loan
	Loanb∕FiA	Credit institutions loan as % of total financial asset
	InIp∕Loanp	Interest income from corporate to corporate loan
	Loanp∕FiA	Corporate loan as % of total financial asset
	InIo∕FiAo	Interest income from other to other loan
	FiAo∕FiA	Other financial asset as % of total financial asset
	InE∕FiL	Interest expenses to financial liabilities
	InEb∕Depb	Banking interest expenses to banking deposit
	Depb∕FiL	Banking deposit as % of total financial asset
	InEp∕Depp	Corporate interest expenses to corporate deposit
	Depp∕FiL	Corporate deposit as % of total financial asset
	InEs/Sec	Securities' interest expenses
	Sec∕FiL	Securities as % of total financial asset
	NetT∕OpI	Net trading as % of operating income
	NetH∕OpI	Net hedging as % of operating income
	NetFop∕OpI	Net other financial operations as % of operating income
	AdE∕Asset	Administrative expenses to total asset
PFT 1	*StaffE∕AdE*	Staff expenses as % of total administrative expenses

Depp/N° emp	Corporate deposit to number of employees
Sec/N° emp	Securities to number of employees
FM/N° emp	Fund management to number of employees
OpI/N° emp	Operating income to number of employees
AdE/N° emp	Administrative expenses to number of employees
AdV/N° emp	Added value to number of employees
StaffE/N° emp	Total staff expenses to number of employees
OpP/N° emp	Operating profit to number of employees
InIbb⁄BanB	Interest income from banking book to banking book
InIbb⁄RWAcr	Interest income from banking book to credit risk-weighted asset
RWAcr/BanB	Credit risk-weighted asset to banking book
NetTrP⁄TrB	Net trading profit to trading book
NetTrP⁄RWAmr	Net trading profit to market risk-weighted asset
RWAmr/TrB	Market risk-weighted asset
Asset⁄RWA	Total asset to risk-weighted asset
RWA⁄Equity	Risk-weighted asset to equity

II.7 Peer group analysis

In line with the discussion in previous sections II.1 and II.2, the risk indicators presented in this Guide may be used over an aggregation of reporting institutions. At this point, how reporting institutions are combined together becomes important and it is where the concept of the 'peer group' arises.

Peer group analysis (PGA) can be defined as the process of comparing an institution to its peers (peer group). A peer group is a set of entities that share **similar characteristics** on the basis of analytically relevant criteria. PGA has been used to compare the performance or positioning of an institution to its competitors, for investment selection, stock valuation, fraud detection, executive compensation, clustering analysis, and so on.

PGA can also be extended to assess how a particular strategy or change in market conditions might affect the position of an institution compared to its peers, which is known as peer group risk (PGR). Ultimately, this means introducing sensitivity analysis to PGA. In either PGA or PGR, the introduction of the temporal dimension adds more power and insight to the analysis.

The definition of 'peer group' depends on the purpose of the study, and will have an important impact on the analysis performed. Once the objective of the study is clear, a target set of dimensions can be chosen to slice and dice the data to select the peers, and the wide variety of risk indicators within each group can be used to compare a specific institution to the group or the group to population averages.

A wide variety of peer groups can be created by combining different data dimensions, and descriptive statistics can be calculated to examine the dispersion and concentration of institutions within the group. The creation of customised peer groups and PGA can be greatly facilitated by data available in a flexible IT infrastructure, one which could allow users to slice and dice data across several dimensions and automatically generate statistics and trend analysis. In this context, the facts (risk indicators) could potentially become dimensions, generally after a bucketing on the risk indicator has been performed. Though the main data source would be risk indicators generated from regulatory returns, the addition of external information, either available internally to Competent Authorities or from market sources, would only enrich the analysis and extracted insights.

There are several methodologies for choosing peers, some of which are:

1. **Data model:** this method compares the mean, median and variance (as well as potentially other statistical measures) of each variable for potential groups. The peer group's mean and median for the different risk indicators would ideally be close to the target institution's values and the variation close to zero;

2. **Cluster analysis:** it is a statistical technique that identifies entities sharing similar features in a multidimensional environment by minimising a measure of distance among the risk indicators evaluated;

3. **Threshold approach:** it uses thresholds on data to narrow the population and find a set of peers. Thresholds are usually selected arbitrarily and can consist of a set of rules rather than a single value point;

4. **User defined:** the user directly decides the peers to whom they will be compared.

The number of peers within a group required to provide a meaningful analysis varies from author to author, some stating that groups should be comprised of 10-12 members while others limiting the size to 10-30. Ultimately, the size of the group would depend on the objective of the PGA and the available dimensions in the dataset to generate groups of similar characteristics.

Once the groups have been defined, we can start comparing the different risk metrics within the group and across groups. It is common to use intragroup (e.g. top 5-10 average or best in class) or population averages to compare the different institutions and to look at the evolution of measures over time. Averages here may mean weighted averages, trimmed averages (where x% of the top and bottom observations have been removed) or a combination of both. By comparing the evolution of these indicators, it may be possible to identify outliers in the group, diverging/converging trends that can indicate changes in the risk profile of the entity within the group, and even transitions to other groups. All these signs are worthy of investigation.

Risk metrics or performance metrics would correspond to the list of risk indicators, calculated at the appropriate aggregation level determined by the dimensions used to generate the peer groups. Thus, for example, it is not the same to aggregate values at a country level as to aggregate the input values and then calculate the indicator, the latter being preferred to the former. When a risk indicator is used as a dimension, it generally loses its relevance as a risk measure.

Some useful dimensions that could be used to create peer groups are:

- **Asset size:** this variable has extensively been used to define the systemic importance of an institution and its impact on the local economy. Though not the only variable used, we could reuse here the readily available classifications of systemically important financial institutions or any other classification elaborated;

- **Business lines:** retail (deposit-taking) banks, commercial banks, and mortgage banks;

- **Type of ownership:** public-government controlled entities, privately owned banks, and bailed-out entities;

- **Country and currency dimensions**;

- **Portfolio:** residential Buy to let (BTL), Credit Risk Exposures, Standardised Approach (SA), Internal ratings-based (IRB), credit cards, car loans, loan and advances, debt securities, securitisations, and so on;

- **External ratings:** in this category, we can also consider the impact and probability risk ratings to be developed by the ECB in combination with traditional ratings from Standard & Poors, Fitch and Moody's;

- **Strategy:** although a more difficult topic to classify, institutions could be classified depending on their business strategy or business model. As this is generally focused on the asset side, attention should also be given to the liability side in terms of their funding strategies.

Clearly, this is not an exhaustive list, but it helps to understand the concept of a dimension.

An issue that one should be aware of is the level of aggregation at which the PGA is conducted. Analysis on an individual institutional level provides more granularities and a better understanding of the evolution and differences with peers, especially if the user has knowledge on the entities from some sort of supervisory engagement. However, this provides information on specific institutions and confidentiality limitations may apply. In these situations, aggregation of the data is required to ensure that individual information cannot be derived from the information available, and the outputs are suitable for external publication.

Although PGA is a useful tool that is widely used in business and finance, it is not free of risks and limitations that the user should be aware of:

1. Compare like with like: the main objective when defining peer groups is to ensure that participants in each group are approximately similar so that we can compare like with like. This may be a difficult task as peer selection may change depending on the dimensions or methodology used, and it is not always clear what is the right set of dimensions (and hierarchy) and some of these can be difficult to identify or measure. Because of the difficulty to identify or measure, strategies, business models or investment objectives are usually not taken into account when selecting groups, leading to poor peer selections;

2. Poor metric definitions: if the metrics are not well defined, there might be inconsistencies in the calculation and uncertainty from the analyst on how to interpret the data. As the new set of risk indicators is well defined based on the XBRL taxonomy, this risk is minimal in our context;

3. Annualising data: this may falsely represent performance, especially when institutions realise a one-time or seasonal source of income that will not reoccur over time;

4. Survivorship bias: this happens when institutions close their business or merge and, therefore, are no longer in the universe of entities. As the surviving institutions may present better performance results or be bigger in size, averages may be upwardly biased. The composition of the universe is also affected by institutions coming in and out of the reporting requirements as they fulfil or fail to fulfil the conditions to be in the sample;

5. Singular benchmark for decision-making: when PGA is used in decision-making, actions based on what peers have done rather than on an institution's own merits may lead to wrong decisions. In addition, this could lead to a bias for the status quo, as the entity may lean towards avoiding changes to stay similar to its peers. It is also important to understand the underlying reasons for the trends or performance changes we see in the PGA, and why they have been better or worse. Similar strategies in different institutions do not necessarily produce the same outputs and it is important to understand the reasons why they worked or did not work before implementing them for another entity within the group. Furthermore, it is relevant to notice that data aggregation would make it more difficult to gain insights over the underlying reasons of an issue or the problem may pass unnoticed after the aggregation;

6. Materiality: it is difficult to estimate the threshold beyond which divergences from the institution's peers become an issue too big to ignore and below which they are movements from the normal course of business.