About Avantage Reply
Established in 2004, Avantage Reply (a member firm of Reply) is a pan-European specialised management consultancy delivering change initiatives in the areas of Compliance, Finance, Risk and Treasury.

Website: www.avantagereply.com
**Giuseppe Frisoli**

Giuseppe Frisoli is a Senior Consultant at Avantage Reply with four years of experience in credit risk, Counterparty Credit Risk (CCR) and regulatory reporting. His activities have included European Central Bank short-term reporting, CCR Internal Model Method scope enlargement, and other topics related to Risk Weighted Asset and Credit Valuation Adjustment calculations and implementation of the EU Capital Requirements Regulation. His skills are in providing end-to-end integrated solutions aimed at bridging the gaps between regulatory requirements and IT architectures. He has recently been involved in regulatory reporting projects to develop tools allowing the efficient collection, integration and reconciliation of data and final feeding of dedicated templates and reporting procedures.

**Gabriele Alberto Mattiolo**

Gabriele Alberto Mattiolo is a Senior Consultant at Avantage Reply with a background in credit risk management and regulatory reporting. Since joining in 2014, his experience has been in defining, building and developing end-to-end solutions for regulatory challenges such as European Banking Authority group-wide stress tests, Internal Capital Adequacy Assessment Processes, and European Central Bank TRIM exercises.

**Paolo Fabris**

Paolo Fabris is a Partner at Avantage Reply with over 18 years of experience in financial services. His focus has been on regulatory projects and, in particular, on International Accounting Standard and International Financial Reporting Standard adoption in the banking system, individual and group financial reporting, market and credit risk management, Basel II and III adoption, and mergers and acquisitions. He is skilled at managing large complex projects with particular attention to regulatory aspects and requirements, and has led programmes involving business analysis, organisational change, regulatory compliance and internal auditing. His extensive experience in risk management spans all types of risk and a broad spectrum of financial products.
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**KEYWORDS**

**HDP**
- **High Default Portfolio**: Supervisory Benchmarking Portfolio composed of residential mortgages, Small/Medium Enterprise (SME) Retail, SME Corporate and other corporate

**LDP**
- **Low Default Portfolio**: Supervisory Benchmarking Portfolio composed of sovereigns, institutions and large corporate

**RWA*/**
- **Risk Weighted Asset** exposure amount that results from the application of a Probability of Default (PD) computed using a one-year/five-year Default Rate (PD*/**)

**SBP**
- **Supervisory Benchmarking Portfolio**: eXtensible Business Reporting Language module code identifying supervisory benchmarking by European Banking Authority taxonomy

**MORT**
- **Residential Mortgage Portfolio** for the 2016 supervisory benchmarking exercise (MORT0010 being the portfolio with the maximum level of data aggregation)

**CORP**
- **Corporate Other Portfolio** for the 2016 supervisory benchmarking exercise (CORP0007 being the portfolio with the maximum level of data aggregation)

**SMER**
- **SME Retail Portfolio** for the 2016 supervisory benchmarking exercise (SMER0008 being the portfolio with the maximum level of data aggregation)

**SMEC**
- **SME Corporate Portfolio** for the 2016 supervisory benchmarking exercise (SMEC0008 being the portfolio with the maximum level of data aggregation)
1. Abstract

"The poor performance of these models during the crisis, and the perception of unfairness and gaming of the rules that accompanied reports of wild differences in risk weighted assets at banks with supposedly similar portfolios have seriously dented the credibility of current regulatory approaches.

CHALLENGES FOR THE FUTURE OF EU BANKING - SPEECH BY ANDREA ENRIA, EBA CHAIRMAN (NOVEMBER 2014).

Following the European Banking Authority's (EBA's) 2014 stress test and recapitalisation exercise, a key question raised by EU regulators was:

Why are there differences between banks in capital requirements and regulatory parameters such as Probability of Default (PD) and Loss Given Default (LGD)?

While such differences are not necessarily a sign of inconsistency, substantial divergences may signal that the methodologies used for estimating risk parameters require further analysis.

The EBA and the European Central Bank (ECB) conducted parallel exercises with the aim of harmonising the practices of supervisors and banks and enhancing consistency in the process of validation of internal models.

In its supervisory benchmarking exercise, the EBA's focus, in accordance with Article 78 of the Capital Requirements Directive (CRD) 2013/36/EU IV, is to:
(a) regularly assess internal approaches applied by institutions in calculating own funds requirements and
(b) identify situations with significant Risk Weighted Asset (RWA) variability for the same type of exposure and potentially significant underestimations of capital requirements.
In February 2017, the ECB launched the executive phase of its Targeted Review of Internal Models (TRIM), aimed at: (a) detecting unwarranted variability in RWA across Internal Ratings Based (IRB) European institutions due to inappropriate modelling practices and (b) enhancing the credibility and confirming the adequacy and appropriateness of approved Pillar I internal models after necessary corrective actions³.

This White Paper provides a review of and outlook for the credit risk aspects of these two regulatory exercises. It discusses the requirements for the design of the process and IT architecture to support the exercises and the best practices that institutions need to adopt for them, given that regulatory requirements and industry practices are still evolving.

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2. Regulatory Framework

2.1 Introduction and Legal Background

After the financial crisis, European regulators acknowledged the need to address inconsistent calculation of RWA for equivalent portfolios. There was criticism in light of the original intent of Basel 2 Pillar I; the benefits in risk awareness to be gained by institutions through implementation of their own risk modelling frameworks conflicted with the high complexity of that implementation, the heterogeneous methodologies employed by them, and the limitations observed in the predictive capacity and reliability of the models.

A supervisory benchmarking exercise was undertaken by the EBA to study the differences in RWA at large EU banks. This exercise is part of the EBA’s programme of studies to investigate the extent of RWA differences relating to the characteristics of exposures, different credit risk management strategies, and supervisory and bank-specific modelling practices. The results of these studies were published in December 2013, June 2014 and March 2017 with respect to High Default Portfolios (HDPs), and in February 2013, August 2013 and July 2015 with respect to Low Default Portfolios (LDPs) (see Figure 1: Roadmap and Main Findings of the Review of Consistency of RWA – HDPs vs. LDPs). As shown in Figure 1, these investigations highlighted variations in Risk Weights (RWs), RWA and Expected Losses (ELs) for the same portfolio across the different institutions that took part.
Indexed Loan-To-Value (ILTV) is the main driver of RW variation. It is important to use a country-by-country approach in analysis, and therefore to empower Competent Authorities (CAs) to assess the internal approaches and different risk profiles in the banks’ portfolios.

DECEMBER 2013
RW, RWA and EL variation is driven by the definition of default, use of global IRB models for exposures located in different countries, and different practices in the estimation of the LGD parameter for defaulted and non-defaulted assets.

JUNE 2014
Indexed Loan-To-Value (ILTV) is the main driver of RW variation. It is important to use a country-by-country approach in analysis, and therefore to empower Competent Authorities (CAs) to assess the internal approaches and different risk profiles in the banks’ portfolios.

AUGUST 2013
RW, RWA and EL variation is driven by the large corporate and other corporate portfolios, which have wider dispersion in Global Charges (GCs) and RWs than the sovereign and institutional portfolios. This variation is partially due to differences in collateralisation and maturity.

MARCH 2017
There was an increase in Global Charge (GC)* variability compared to previous exercise results, but largely due to the same drivers: the proportions of defaulted assets, the proportions of non-EU exposures, and the portfolio mix.

APRIL 2013
Risk Weight (RW), RWA and EL divergence can be explained by simple effects: extension of IRB, Standardised Approach (SA) RWs, IRB portfolio mix and share of IRB defaulted assets. These effects are mainly driven by exposures in partial use and the treatment of defaulted assets.

FEBRUARY 2013
Risk Weight (RW), RWA and EL divergence can be explained by simple effects: extension of IRB, Standardised Approach (SA) RWs, IRB portfolio mix and share of IRB defaulted assets. These effects are mainly driven by exposures in partial use and the treatment of defaulted assets.

APRIL 2017
There are no results or official feedback yet. The focus was on: a) the inclusion or exclusion of specialised lending exposures in the LDPs, which was resolved by the publication of EBA Q&A 2017_3127, in which it is clearly stated they were not to be included in the scope of the exercise, and b) the LDP Validation Rules (VRs) published by the EBA and applied to attest to the quality of the deliverables.

April 2018
For the first time, the supervisory benchmarking will be performed for both HDPs and LDPs.

Low Default Portfolios

For the first time, the supervisory benchmarking will be performed for both HDPs and LDPs.

Figure 1: Roadmap and Main Findings of the Review of Consistency of RWA – HDPs vs. LDPs.
Source: Avantage Reply.

*The GC for IRB exposures is calculated as (12.5 * EL + RWA) / Exposure At Default (EAD) and provides information for both Expected and Unexpected Losses.
**ENHANCED DISCLOSURE**

Banks’ supervisory disclosure and transparency of RWA-related information should be enhanced.

**SUPPORT TO CAs**

On-going support to CAs in the implementation of new regulation (single rulebook) by promoting an exchange of experiences and supervisory interventions related to the validation and on-going supervisory monitoring of internal models, and promoting the identification and use of best practices.

**ADDITIONAL GUIDELINES**

Development of additional guidelines and potentially draft technical standards in order to address:
- Harmonisation of default definitions;
- PD model calibration;
- Model estimation of LGD for defaulted and non-defaulted assets;
- Clarification of or guidance for the treatment of defaulted assets;
- Guidance for the usage of global models for exposures located in multiple countries.

**SCOPE OF IRB APPROACH**

Some portfolios are not appropriate for internal models and for proper application of the IRBA, particularly LDPs and those where structural changes or new business initiatives are observed.

**RISK MANAGEMENT**

There should be stronger monitoring not only of internal models but also other requirements of the IRBA related to risk management of institutions, including in particular corporate governance, the use of risk estimation in internal risk management, and decision-making processes and stress testing.

**IT SOLUTIONS**

The EBA is moving to the standard of submitting data in XBRL format, which significantly reduces the associated operational risks arising from the conversion of data from other formats (Excel, XML, etc.) to XBRL. The implementation of the XBRL solution should lessen the burden for CAs in the long run.

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*Figure 2: Areas of Focus identified by the EBA after the First Years the first years of the Benchmarking Exercise (2013-2017).*

*Source: Avantage Reply.*

In addition to explaining the differences in the calculation of RWA, a harmonisation process is to define policy options for National Competent Authorities (NCAs) and the EBA (see Figure 2: Areas of Focus identified by the EBA after the First Years of the Benchmarking Exercise (2013-2017)). Figure 2 shows the EBA’s key points so far: a combination of new guidelines for credit risk, internal risk management and IT solutions.

The ECB’s TRIM provides further information about RWA variability; the factors investigated are those stemming from inappropriate modelling techniques or procedures, developed while taking advantage of the freedom granted by current regulations. As shown in Figure 3, a Europe-wide programme of on-site inspections has been set out, the mission of which is to survey a large sample of institutions allowed to use IRB models across 15 countries, assessing the reliability of their risk model frameworks.
During the preparation phase, the ECB and the NCAs prepared the TRIM Guide\(^4\), the official documentation defined to support the involved institutions up to the execution phase. The Guide encompasses:

- Compliance with regulatory requirements related to internal models and compilation of best-practice approaches to credit risk, market risk, counterparty credit risk, and general issues related to model governance; and
- The reduction of unwarranted variability in RWA as it relates to internal model outcomes.

In addition, intermediate releases of the Guide are expected to capture regulatory updates, on-site outcomes, and horizontal analysis of TRIM results. At the end of the exercise, the final Guide will be published to present the objectives to which the IRB framework within the EU will need to converge.

### 2.2 Dataset and assessment methodology

Institutions permitted to use internal credit or market risk approaches for the calculation of RWA/own funds requirements may participate in the supervisory benchmarking exercise according to the framework defined by the EBA.

The scope of application of the Supervisory Benchmarking Portfolio (SBP) is the portfolio under the IRB Approach (IRBA) (Advanced or Foundation) as approved by the Competent Authorities (CAs) and used for capital requirement purposes.
The benchmarking-specific data provides information on each institution’s actual exposure values and IRB parameters, broken down by their default status, whether they are in EU or non-EU countries, and portfolio.

This exercise has been carried out on two different tracks: HDPs and LDPs.

In general, the HDP dataset includes residential mortgage, Small/Medium Enterprise (SME) Retail (SMER), SME Corporate (SMEC), and other corporate portfolios (and does not include the remaining HDPs, such as credit card portfolios or consumer credits). The LDP dataset includes sovereigns, institutions, large corporate and large corporate sample (see Figure 4: Definition of Reporting Portfolios).

**SME CORPORATE**
IRB exposure class COREP = SMEC

**CORPORATE**
IRB exposure class COREP* = other corporate and total annual sales < €200 million, specialised lending excluded

**LARGE CORPORATE (LC) & LC SAMPLE**
IRB exposure class COREP = other corporate and total annual sales > €200 million

**SME RETAIL**
IRB exposure class COREP = SME other retail and SME secured by mortgages on immovable property

**MORTGAGES**
IRB exposure class COREP = retail secured by mortgages on immovable property – non-SME

**SOVEREIGNS**
IRB exposure class COREP = central government and central bank

**INSTITUTIONS**
IRB exposure class COREP = institution, other corporate or SMEC, and counterparty a bank or NACE code applied = 64.19

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* Common supervisory reporting requirements are specified by the EBA via the Implementing Technical Standard (ITS), which was adopted by the EU as Regulation 680/2014.

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5 The large corporate sample is a portfolio composed of a list of large corporate counterparties provided directly by the EBA.
The supervisory benchmarking exercise has several methodology specifics that are very different from other reporting exercises:

- **Default Rate (DR) for last year and last five years**: Ratio computed by using as numerator the observed new defaults for the last year and as denominator the existing stock amount of the non-defaulted assets one year before the reference date of the exercise. This measure is also reported as an exposure-weighted average of the DRs observed over the last five years.

- **Loss Rate (LR) for last year and last five years**: Ratio computed by using as numerator the sum of credit risk adjustments and write-offs for those exposures which were classified as defaulted exposures in the last year and as denominator the existing stock amount of the observed new defaults in the last year. This measure is also reported as an exposure-weighted average of the LRs observed over the last five years.

- **RWA*/**: Risk weighted exposure amount that results from the application at rating grade level of PD*/ rather than the original PD. PD*/ is the default probability based on the observed DR of the last year/five years for each rating grade that would allow the internal model to pass the test.

- **Hypothetical LGD senior unsecured without/with negative pledge**: The hypothetical own estimated LGD that would be applied by the institution to the counterparty for senior unsecured exposures without/with a negative pledge clause.

Supervisory benchmarking also requires information based on internal models, which could be considered a point of contact with the TRIM exercise. In fact, when the ECB Supervisory Board approved the launch of the TRIM, a set of questions was developed (based on the benchmarking dataset and guided by the centre of competence for Model Map and Prioritisation (MMP)).

The scope of the so-called “TRIM HDP/LDP MMP Questionnaire” is to collect additional qualitative and quantitative information related to internal models such as RWA, exposure class breakdown, Credit Conversion Factor (CCF), DR and LR.

With respect to TRIM, the topics in scope for the harmonisation exercise are defined by the regulator (and listed as references in Figure 5). Starting from these, the general (i.e., non-model related) topics of the assessment were set out, with the central role covered by internal governance and responsibilities, led by the management body and senior management, spanning the decision-making ownership of the material aspects of the model (i.e., all relevant policies related to the design and implementation of rating systems and application of the IRBA, all relevant risk management policies including those related to IT infrastructure and contingency planning, and the risk parameters of all rating systems used in internal risk management processes and in the calculation of own funds requirements), the periodic acquisition of internal reports on rating system performance, and a thorough understanding of the rating systems. Moreover, as an independent part of internal governance, the CRCU (Credit Risk Control Unit) is expected to show active involvement in the design or selection, implementation and validation of models used in the rating process, contribute to the rating system implementation, and oversee and supervise the models used in the rating process. Internal governance should be supported by the rating system information governance, the role of which is to document and register all rating system history in the institution’s model inventory.

With respect to internal audit, the assessment aims to verify whether this function is equipped with adequate resources and experienced, qualified personnel to undertake all relevant tasks, according to the size and degree of complexity of the institution’s business.

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6 A negative pledge clause states that the borrower or debt issuer will not pledge any of its assets to another party.

The necessary condition for the assessment’s validity is that internal audit is granted the prescribed independence from other functions and is free to conduct its mission of annual review of the rating systems, resulting in documented opinions about the development, performance and use of the rating systems, quality of input data and integrity of model outcomes, internal validation function, and process for calculating own funds.

A dedicated drill-down into the internal validation function is also required. As stated in the TRIM Guide: "In the context of rating systems, the term ‘validation’ encompasses a range of processes and activities that contribute to an assessment of whether ratings adequately differentiate risk, and whether estimates of risk components (such as probability of default (PD), loss given default (LGD) and credit conversion factor (CCF)) appropriately characterise the relevant aspects of risk." The unit under investigation needs to demonstrate the independence recommended by the regulator in conducting its mission, which, from a practical point of view, consists of ensuring an adequate quality of the rating systems beyond their compliance with the regulatory and business requirements. Institutions should be able to define their internal validation policies, and compile all procedures and methods to be set out to validate the accuracy, robustness and stability of the IRB framework. Best practices in this context involve tests and analyses that must be performed with at least annual frequency, such as back-testing to compare realised DRs with estimated PDs, discriminatory power of the model, analyses of representativeness, analyses of overrides, stability analyses and qualitative analyses, including assessing how legal or macroeconomic changes would impact the model estimates, the correctness of the model’s application within the institution’s portfolio, and the robustness of the assumptions of the rating assignment process. Benchmarking and data cleansing analyses should be performed on a periodic basis, while, at initial validation and following the introduction of material changes in the model, additional validation procedures such as a challenger’s replication of the model’s assumptions and development and tests on the quality of software code are expected. All the validation process results should be integral parts of the model lifecycle, and thus accessible to the senior management with responsibility for internal governance and the internal audit function.

In addition to the own funds requirement calculations, model metrics are expected to be embedded in internal policies applicable in further fields: "the use of risk parameters and their integration into internal policies and procedures is intended to continuously improve their accuracy and reliability." Most common uses of internal model results can be observed within the lending processes of banks in the phase of credit granting and renewal, asset pricing techniques, early warning systems definition, recovery process and Non-Performing Loan (NPL) management, provisioning mechanism and Internal Capital Adequacy Assessment Process (ICAAP). Risk parameters are expected to be used for the institution’s internal reporting and portfolio credit risk monitoring. For the model’s use in own funds requirement calculations, attention should be paid to the treatment of non-rated and outdated exposures: the general rule prescribes that exposures which are in neither roll-out nor Permanent Partial Use (PPU) cannot be treated under the Standardised Approach (SA). It is also possible that marginal portions of the bank’s portfolio may not be rated; for these, a monitoring process should be set up and a prudent approach applied. Any material change to a rating system should be guided by a dedicated policy, which should provide for a final impact assessment of the model variations, which results will be reported to the CAs for approval.

An independent unit should set up to manage a Data Quality Framework (DQF) to ensure data integrity from data entry to reporting, thus leading to continuous renewal and improvement of the data
quality process. It is expected that the quality checks cover all data dimensions, including completeness, accuracy, consistency, timeliness, uniqueness, validity and traceability for internal, external and pooled data. Reports on the assessment should be embedded in dashboards, where components exceeding the tolerance level are highlighted by means of visual elements such as traffic light systems and supported by findings and recommendations to address detected weaknesses or shortfalls. DQF outputs should be shared throughout the organisation and subject to an independent validation process. Data ownership and data quality roles and responsibilities, for both the business area and the IT unit, should be clearly established and documented throughout the entire IRB lifecycle. In support of the DQF, the IT function should be able to fully document the end-to-end technical process underlying the rating systems, compiling all the information about the relevant data sources, the map of datasets in use, the data Extract, Transform and Load (ETL) process and the associated workflows, and any technical and functional specifications referring to the IT infrastructure. A dedicated policy should be put in place to guide software releases, regulatory changes, model methodology changes, and changes in data scope.

In addition to the TRIM general matters of investigation, attention is paid to credit risk topics including PD, LGD and CCF estimates which are the objects of challenges by ECB inspectors during the on-site phase.

**Figure 5: TRIM General Topics Illustration.**

**Source:** Avantage Reply.
The compliance of an institution’s internal policies with data requirement standards for modelling purposes is verified; it is expected that a process vetting the accuracy, appropriateness and representativeness of both internal and external model input data is in place.

An institution’s own estimates of the risk parameters PD, LGD, conversion factor and EL shall incorporate all relevant data, information and methods. The estimates shall be derived using both historical experience and empirical evidence, and not based purely on judgemental considerations. The estimates shall be plausible and intuitive and shall be based on the material drivers of the respective risk parameters. The less data an institution has, the more conservative it shall be in its estimation.

CAPITAL REQUIREMENTS REGULATION, PART 3, TITLE II, CHAPTER 3, SECTION 6, SUB-SECTION 2, ARTICLE 179.

1. Taking into account all relevant risk drivers, model performance must be demonstrated in terms of discriminatory and predictive power, including with respect to sub-range of application portfolio.
2. The number of grades and pools must be adequate; obligor distribution is expected to be neither excessive nor too low within each grade and pool.
3. The obligor assignment within a pool should be made to ensure grade and pool homogeneity in terms of similarity of underlying risk.

The Institution should freely choose the grade of sensitivity of rating models for estimate variations stemming from changes in economic conditions, thus defining a preference for the migration of exposures across risk grades (less sensitive approach) rather than the change in the early default rates of each grade (more sensitive approach). Rating philosophy is expected not to vary over time and to be applied in the entire model context, from development to validation phase.

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Numerators and denominators of default rates are expected to be defined as referred to in Article 4(1) Point (78) of regulation (EU) No 575/2013: “One-year default rate means the ratio between the number of defaults occurred during a period that starts from one year prior to a date and the number of obligors assigned to this grade or pool one year prior to that date”.

Long-run average default rates are expected to be calculated as referred to in Article 180 of regulation (EU) No 575/2013, thus taking into account retail particularities - not retail exposures treatment.

Figure 6: TRIM – PD Topics of Investigation.
Source: Avantage Reply.
Taking into account all relevant risk drivers, model performance must be demonstrated in terms of **discriminatory and predictive power**, including with respect to sub-range of application portfolio. **Risk driver** choice is expected to cover both **transaction/obligor-related risk characteristics** (size, collateralisation, LTV, industrial sector, etc.), **institution-related factors** such as the presence of "bad credit institutions" within the **group and external factors** (legal framework, interest rates, recovery processes, etc.).

Institutions are expected to define a robust framework and dedicated policies for the **realised LGD calculation**, with a particular focus on the historical observation period, appropriate direct and indirect cost inclusion and discount rate application to both recoveries and costs in the economic loss computation.

With respect to EBA/CP/2016/21, the **observed average LGD** should be calculated "taking into account realised LGDs on all defaults observed in the historical observation period related to closed recovery processes." Furthermore "institutions should obtain the long-run average LGD by adjusting the observed average LGD taking into account the information related to incomplete recovery processes and the estimated future costs and recoveries on these exposures".

Institutions are expected to have in place a process in order to carry out LGD estimations appropriate for an economic downturn, leveraging both economic and credit indicators; in addition, estimates on expected loss best estimate and defaulted asset LGD need to be calculated.

The TRIM Guide also sets out which off-balance sheet (undrawn) items allow an institution’s own estimates of CCFs, as provided in the Capital Requirements Regulation (EU) No 575/2013 (CRR) Article 166, where the estimation and application conditions are listed along with the internal control systems expected to enable the immediate detection of deterioration in the credit quality of an obligor.

A cross-metric topic of investigation is the **Margin of Conservatism** (MoC) institutions are expected to apply in calculating their own estimates: all the model estimation errors are expected to be identified (and classified), quantified, monitored, reported and translated into conservative and appropriate adjustments. While deficiencies in model development, estimation and calibration are expected, the establishment of a framework of conservatism should provide a strong incentive to remove the sources of uncertainty and/or deficiencies by pursuing the most accurate models.
3. Report Outcomes

3.1 2016 High Default Portfolio (HDP) Exercise Results

In March 2017 the results of the 2016 supervisory HDP benchmarking exercise were published by the EBA. HDPs are composed of residential mortgage, SMER, SMEC and other corporate portfolios reported at the highest level of consolidation⁹. The reference date was 31 December 2015, and 114 institutions from 17 countries participated (covering, for the first time, the entire population of banks authorised to use credit risk internal models for calculating own funds requirements).

A first cross-EU assessment – portfolios in scope: Figure 8 shows the estimated share of the IRB institutions by EU Member State¹⁰ (see Figure 8: Share of IRB Institutions with Local Approval in the EU and Norway). Germany and the UK have the highest shares, which is probably due to the time and effort required to satisfy regulatory requirements and implement technical standards. Their assessment of the quality of the benchmarked models may be deeper, even where their figures deviate from the EU benchmark. Benchmarking data are not sent directly to the EBA, but to local regulators, who are responsible for a first assessment of the data quality and may require additional information about the data submitted. The Task Force on Supervisory Benchmarking (TFSB) also has a role in interviewing the banks that take part in the exercise to better understand the data.

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⁹ The consolidation view of the data is at holding group level, even if an institution has also fed the templates with data at the individual view level.
¹⁰ Adapted from an informal survey conducted by the EBA and published in the “Consultation paper on ITS and IRTS on benchmarking portfolios”.

It is also interesting to note the higher number of institutions involved in the exercise compared to the previous HDP benchmarking in 2013 (see Figure 9: Number of IRB Banking Groups by Home Country Participating in the Supervisory HDP Benchmarking Exercise – 2013 vs. 2016).

Figure 8: Share of IRB Institutions with Local Approval in the EU and Norway.
Source: Adapted from EBA analysis.

Higher participation means more data, composed as shown in Figure 10 (See Figure 10: Overview of Number of Institutions and Use of Regulatory Approaches by Portfolio for Calculating Own Funds Requirements\(^\text{11}\) – 2013 vs. 2016), which could result in an increase in the significance and representativeness of the exercise.

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\(^\text{11}\) Commission Implementing Regulation (EU) 2016/2070, OJ L 328, 21.12.2016 (Annex IV, Part II: Template Related Instructions, C 103 — Details on exposures in High Default Portfolio: the regulatory approach used for calculating own funds requirements shall be reported under the Foundation Internal Ratings Based (FIRB) approach only if exposures under this approach represent 50% or more of the IRB exposures to the counterparty. For residential mortgages, one bank applied the FIRB approach for corporate exposures, and part of the retail exposure secured by real estate was reported as the FIRB approach, because the exposures were actually assigned to a corporate customer due to a pooling approach. However, for calculation of own funds requirements, the exposures are correctly included in the Advanced Internal Ratings Based (AIRB) portfolio in Figure 13. For SMER, one bank incorrectly reported as being under the FIRB approach; however, for the overview of the number of banks, it is correctly considered as under the AIRB approach.
Figure 9: Number of IRB Banking Groups by Home Country Participating in the Supervisory HDP Benchmarking Exercise – 2013 vs. 2016.

Source: Matching an EBA Analysis with the List of Institutions Participating in the Supervisory Benchmarking Exercise.

### 2013 HDP Exercise

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### 2016 HDP Exercise

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</tbody>
</table>

Figure 10: Requirements – 2013 vs. 2016 Overview of Number of Institutions and Use of Regulatory Approaches by Portfolio for Calculating Own Funds.

Non-defaulted exposures - main findings from the cross-sectional approach: The cross-sectional approach 2016 HDP exercise enables an in-depth look at risk parameters and portfolios. For non-defaulted exposures, the RW ranges show significant variability by portfolio, for which the country of the institution could be a driver. Exposures in countries that recently experienced more stressed economic conditions generally have higher average RWs, as one would expect.

**Figure 11**: Overview of RW Variability by Portfolio for Country of Bank—2013 vs. 2016.

**Source**: Source: Adapted from a comparison between EBA Report of 2016 HDP exercise vs 2013 Report on SME and Residential mortgage.

*Corporate-Other exposure class is not part of the analysis because was not in scope of the 2013 exercise and no comparison is possible.*
Supervisory Benchmarking & TRIM
Report Outcomes

Figure 11 presents an analysis of RW at country level, comparing the 2013 and 2016 HDP exercise results and their three main portfolios/exposure classes:

- MORT0010 -- Portfolio ID with maximum level of data aggregation for residential mortgages;
- SMER0008 -- Portfolio ID with maximum level of data aggregation for SMER; and
- SMEC0008 -- Portfolio ID with maximum level of data aggregation for SMEC

(see Figure 11: Overview of RW Variability by Portfolio for Country of Bank– 2013 vs. 2016).

Across these charts, there appear to be patterns in the weighted averages. Ireland, Greece and Portugal are generally in the third quartile. Germany, Sweden and the Netherlands have EAD-weighted average RWs near the first quartile. In addition, the average cross-country RW is higher in 2016 than 2013.

The country pattern is less clear when analysing the drivers of differences for PD and LGD estimates, for which the variation seems to be caused more by bank practices and model segmentation for portfolios. (There are different scopes, as a bank may have multiple models for one portfolio in one country.)

In summary, it is difficult to disentangle the impact of any single component (e.g., country of the institution) on the estimates.

The higher variability of the recent RWs relative to the previous exercise could be linked to the greater participation of institutions in the 2016 exercise, and the differences in RWA between banks could be explained by differences in estimation practices (e.g., levels of conservatism, adjustments to reflect long-run averages, lengths of time series of data available and included in the calibration of the cycle, assumptions underlying recovery estimates, etc.), and not only by differences in portfolio risk.

Defaulted exposures – Another driver of the RW variability: The cross-sectional approach is based on non-defaulted exposures, but the report results related to defaulted exposures are also

**EBA Report Results: Degree of Acceptable Variability**

The CRR allows firms a degree of freedom in the selection of the data sources used, number of internal approaches developed, use of global vs. local models, number of rating grades or use of continuous scale, inclusion of open workout procedures for defaults, etc.

While an excessive heterogeneity in the observed own funds requirement and practice is not acceptable from a supervisory perspective, absolute convergence is not a desirable outcome either. In this regard, risk management techniques, practices and methodologies are evolving constantly, not only because of market developments but also because of new emerging risk management practices.

The EBA considers that the objective of ensuring consistency in RWA should be compatible with the introduction of new methodologies and practices. This does not necessarily imply that all new developments will be appropriate. Some new methodologies might produce an excessive reduction in capital requirements; one of the key objectives of introducing benchmarking exercises is to provide tools to assess the effect of new methodologies on capital.

However, it is also clear that these supervisory tools should not hinder the introduction of new best practices, even if this might produce some additional variability in RWA when adopted by some institutions. This caveat is fully consistent with the objective established in Article 78(5), where it is stated that CAs shall ensure that their decisions on the appropriateness of corrective actions must maintain the objectives of an internal approach and therefore must not: (a) lead to standardisation or preferred methods; (b) create wrong incentives; or (c) cause herd behaviour.

**Figure 12:** Over the EBA report Result.
**Source:** An extract from ‘Consultation Paper on RTS and ITS on Benchmarking Portfolios’.

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12 The distribution across countries is calculated based on all the reported observations (banks x countries).
interesting. The proportion of defaulted exposures is one of the main drivers of RW variability within each bank’s portfolio. The treatment of defaulted assets is heterogeneous among banks. On average, 6% of the total EAD for the HDPs is in default. 64% of the defaulted exposures come from the SMEC portfolio and residential mortgages (see Figure 13: Distributions of EAD for Defaulted Exposures by Portfolio).

Regarding the SMEC portfolio, the report result shows high RW differences among banks and a wide range in the proportion of defaulted exposures, indicating potential differences between the banks’ macroeconomic conditions, as well as their credit policies, risk profiles, investment strategies and workout processes.

For many participating banks, the contribution from defaulted exposures to RW variability is significant, and, in several cases, it represents a high proportion of the entire bank’s contribution. While the largest portion of defaulted exposures is related to the SMEC portfolio, it is most important to focus on the residential mortgage portfolio, due to the materiality of the exposures in terms of EAD, the possible underestimation of own funds requirements for the defaulted assets, and the number of situations (risk parameters and other indicators) in which a bank is an outlier when compared with its peers.

Figure 13: Distributions of EAD for Defaulted Exposures, by Portfolio. Source: EBA Report Results from the 2016 HDP exercise.
According to the 2016 EBA benchmarking report, residential mortgage portfolios and SMEC are the most important ones to keep under investigation due to the fact that in these clusters there are high levels of NPLs. This has become an important topic for Italian banks in recent years: At End-Of-Year (EOY) 2015, gross Non-Performing Exposures (NPEs) reached €341 billion, four times higher than 2008; about 58% of the total amount of NPEs, equal to €200 billion, is related to NPLs.

With respect to portfolio composition:
- Approximately half of total gross NPLs is represented by loans collateralised by real estate.
- The amount of net NPLs is largely covered by real estate collateral.
- Almost 80% of the loans are to SMEs and corporates, thus confirming that the increase in the stock of NPLs is strictly connected to the economic and financial crisis that hit the Italian economy in 2008.

The main challenge of the 2016 exercise and the impact analysis using the CET1 ratio: Section 2.2 described differences between the reporting figures in this exercise compared to previous ones.

RWA*/** based on PD*/** instead of the original regulatory PD is certainly the most innovative difference, and could be seen as a sort of stress testing and starting point for impact analysis on RWA and capital ratios under a specific scenario influenced by observed parameters. The Common Equity Tier 1 (CET1) ratio is the best means to investigate possible impacts of banks’ business strategies on capital.

The CET1 ratio impact analysis carried out in the EBA report is based on alternative higher RWA quantities (RWA* and RWA**) reported by the institutions during the 2016 exercise. As it is based on a specific definition of alternative risk parameters, only negative variations (i.e., reductions of the CET1 ratios) are considered.

The methodology applied compares the actual CET1 ratios with those recomputed using the RWA* and RWA**, and the observed DRs for the last year and the average of the last five years.

The example in Figure 15 shows the calculation of the impact on CET1 for a specific bank with a current CET1 ratio of 8% for a specific portfolio (e.g., residential mortgages), taking into account the RWA* provided by the bank.

The exposure-weighted average CET1 capital ratio in the sample as of December 2015 is 13.23%. The impact of the use of RWA* and RWA** on the CET1 capital ratio is –9 basis points (bps) and –17 bps, respectively, bringing the CET1 ratio down to 13.15% and 13.06%, respectively.

The possible impact of using the observed LRs (instead of the original LGDs) is not considered.

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13 The CET1 ratio is equal to a bank’s core equity capital divided by its total RWA, which indicates its financial strength. It is used by regulators and investors as a guide to how well a bank can withstand financial stress and remain solvent.
Example of CET1 impact analysis

**COREP data:**
CET1 = 8 €
Total RWA = 100 €

CET1 ratio = 8 / 100 = 8%

Residential mortgages (ITS – supervisory benchmarking data):
RWA residential mortgages = 25 €
RWA* residential mortgages = 40 €

**Impact on CET1 ratio** derived from residential mortgages:
CET1 ratio* = 8 / (100 – 25 + 40) = 6.96%
Impact (bps) = 6.96% – 8% = – 1.04% = – 104 bps

The necessary increase of CET1 capital to maintain the same CET1 ratios as before the estimated impact would be 1.04% * (100 – 25 + 40) = 1.2 €

Figure 15: An example of CET1 Impact Analysis.
Source: Example extracted from ‘EBA Report Results from the 2016 HDP exercise’.

What are the conclusions for EU banks? The supervisory benchmarking exercise is a new element in the range of EU reporting, and therefore it does not yet give clear-cut answers. This was the first exercise in which all the EU IRB institutions took part, and there are still data quality issues and necessary requirement enhancements, which will be addressed in the coming years.

While agreeing with the EBA’s opinion that it is difficult to form any definitive conclusion until such improvements are made, there are nonetheless some interesting preliminary insights to be drawn.

- **Cooperation between NCAs and banks:** The increased participation in the exercise suggests that a good strategy for institutions to improve the data quality of their submissions is to create strong communications with their NCAs in order to properly apply the Implementing Technical Standard (ITS) requirements. This is especially important in Germany and the UK, where the number of IRB banks is highest and the local regulator requires deeper investigations of the greater quantity of data.

- **The effect of the increase in the number of participants:** As was shown in Figure 11, the RW variability is generally higher in the 2016 exercise than the previous 2013 HDP one. This result might, at first glance, be interpreted as a worsening of the data quality of the sample, but it is understood to be due to drivers of heterogeneity such as the increasing number of participants (as was shown in Figure 9), the number of obligors/transactions that compose each portfolio, and the increase in the Foundation Internal Ratings Based (FIRB) portfolios. There are well known differences between the FIRB and Advanced Internal Ratings Based (AIRB) approaches which contribute to this variability (i.e., LGDs under the AIRB approach are...
generally lower than under the FIRB approach, and PDs for the FIRB approach are smaller than for the AIRB approach).

- **Country pattern and the tail of the EU financial crisis**: Analysing the results of the cross-sectional approach for non-defaulted exposures, it has been assumed that one possible explanation of the RW variability could be the 2011 European sovereign debt crisis. Countries that recently experienced more stressed economic conditions generally have (for all the benchmarking portfolios) higher average RWs, as one would expect. This explanation gains additional support from comparison between the DR and LR (observed data) and the PD and LGD (estimated data) broken down by portfolio category (see Figure 16: DR & LR vs. PD & LGD in IRB Portfolio (Ratio between Observed and Estimated Values)).

<table>
<thead>
<tr>
<th>Observed/Expected Ratios</th>
<th>SMER</th>
<th>SMEC</th>
<th>Other Corporate</th>
<th>Residential Mortgage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default Rate last year /PD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 = 1er quartile</td>
<td>0.22</td>
<td>0.32</td>
<td>0.22</td>
<td>0.39</td>
</tr>
<tr>
<td>Median</td>
<td>0.54</td>
<td>0.74</td>
<td>0.60</td>
<td>0.58</td>
</tr>
<tr>
<td>Q3=3rd quartile</td>
<td>0.75</td>
<td>1.05</td>
<td>1.11</td>
<td>0.78</td>
</tr>
<tr>
<td><strong>Default Rate last 5 years /PD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 = 1er quartile</td>
<td>0.27</td>
<td>0.56</td>
<td>0.25</td>
<td>0.49</td>
</tr>
<tr>
<td>Median</td>
<td>0.64</td>
<td>0.88</td>
<td>0.71</td>
<td>0.73</td>
</tr>
<tr>
<td>Q3=3rd quartile</td>
<td>0.99</td>
<td>1.47</td>
<td>1.27</td>
<td>1.13</td>
</tr>
<tr>
<td><strong>Loss Rate last year /LGD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 = 1er quartile</td>
<td>0.10</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Median</td>
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<td>0.25</td>
<td>0.16</td>
<td>0.34</td>
</tr>
<tr>
<td>Q3=3rd quartile</td>
<td>0.79</td>
<td>0.54</td>
<td>0.65</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Loss Rate last 5 years /LGD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 = 1er quartile</td>
<td>0.15</td>
<td>0.07</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Median</td>
<td>0.52</td>
<td>0.32</td>
<td>0.36</td>
<td>0.41</td>
</tr>
<tr>
<td>Q3=3rd quartile</td>
<td>0.85</td>
<td>0.66</td>
<td>0.72</td>
<td>0.79</td>
</tr>
</tbody>
</table>

*Figure 16: DR & LR vs. PD & LGD in IRB Portfolio (Ratio between Observed and Estimated Values).*

*Source:* ‘EBA Report Results from the 2016 HDP exercise’.
Looking at Figure 16, one can see that the PD interquartile range of the ratio between the DR and the PD is higher for the five-year average than for the last year; the larger time span seems to increase the difference between the estimations and observed values of the ratio. This could be explained by the fact that the last five years include economic downturns in many EU countries; the differences between PD estimations (at the end of 2015) and DRs may reflect macroeconomic developments affecting credit quality, the value of the collateral, and the uncertainty and volatility of some exposures (which is directly related to the uncertainty in the financial markets due to the European sovereign debt crisis).

The medians of the ratios between the LR and the LGD for both the last year and the five-year average are similar and well below 1 (i.e., the numerator is lower than the denominator). In general, the estimated values (LGDs) are higher than the LRs reported in recent years. This is consistent with the fact that the CRR requires LGDs to be reflective of downturn conditions. Finally, contrary to the evolution of the ratio between DRs and PDs, in which the variability decreased in the latest year, the LGD interquartile range for both the last year and the average of the last five years shows similar variability.

- **Residential mortgages are an important portfolio to monitor:** For CAs, the residential mortgage benchmarking portfolio is important to monitor because of its role in banks and the potential impact on RWA. CAs also consider that residential mortgage portfolios present the highest number of possible underestimations when using benchmarking values, for which there are no immediate justifications; comprehensive analyses are necessary and may lead to supervisory actions. Banks’ internal validations have not identified most of the potential underestimations, and so there are ongoing validations and audits of internal models (see Figure 17: CA Priority Level for Assessments).
For most of the CAs, underestimations are referred to the materiality of the exposures in terms of EAD, own funds requirements for the defaulted assets (e.g., doubts regarding the calculation of the LGD for defaulted exposures – the LGD in default – and the best estimate of EL models), and the number of situations (risk parameters and other indicators) in which a bank is an outlier as compared to its peers.

Another justification for higher attention dedicated to residential mortgages is that this portfolio has been the most impacted by the CET1** ratio simulation to explain the impact of the RWA**. The CET1 impact for the residential mortgage portfolio is –30 bps (as compared to the average for the whole portfolio sample of –17 bps).

In addition, considering the non-defaulted exposures the residential mortgage portfolio represents 62% of the HDP EAD.

### 3.2 TRIM Inspection Approach

Based on experience gained in supporting Avantage Reply clients during both the preparatory and on-site phases of TRIM assessment, as well as according to the best industry credit risk modelling practices, this section provides an overview of the TRIM inspection approach.

After an institution is informed by the ECB of the models under investigation but before the on-site phase takes place, a certain amount of time (typically weeks) is granted to the bank for it to collect the required data and documentation in order to allow an effective inspection. The institution is expected to organise an internal team involving representatives from all the model chain functions, from model governance to IT systems, covering the topics of investigation. With the on-site phase (which begins with the inspection
team’s arrival at the bank), the review of a selected internal model starts. As a preliminary step, several interviews take place to provide the inspectors with the model history, rationale, use and contributors (i.e., in terms of framework responsibilities and data ownership).

The inspectors have particularly focussed on the DQF and the data flows within an institution. To evaluate the soundness of the framework, the initial attention is on qualitative aspects. From a detailed investigation of the model-related functional and technical documentation, the inspection team assesses the adequacy of data governance, from the legacy systems feeding the RWA computation to Common REPorting (COREP), dwelling on the principles and technicalities underlying the internal definition of default. It is expected that all applications, systems, workflows and data sources for the selected IRB model are identified and detailed by means of updated data models and data dictionaries. Quantitative items are then tested in order to assess the quality of data used within the selected model. The inspection team is expected to directly access, analyse and reconcile the data in use for PD and LGD estimation purposes, testing the completeness, accuracy and consistency of PD and LGD historical data.

With respect to credit risk metrics under review, the preliminary step of the on-site phase consists of obtaining an initial view of model history, description and specific weaknesses for PD, LGD and CCF. To accomplish this, the inspection team, together with internal validation and internal audit, reviews relevant functional and technical documentation for each model, along with related evidence and reports.

Once a general understanding of the model is achieved, the review focusses on model structure and performance, following the points set out in the TRIM Guide and as were depicted in Figures 7 and 8. During this phase, the analyses are based on historical data underlying the model development and production data stemming from the model application collected within the bank’s IRB framework, to highlight any deviations from the principles that could translate into significant issues for the institution.
4. Next Steps

2017 Supervisory Benchmarking LDP Exercise

From the beginning of the literature on supervisory benchmarking and the IRBA, LDPs have played a particular role. Regulators were aware of the difficulty with internal models and the thorough investigations required by the benchmarking exercise with respect to LDPs.

The treatment of LDPs is one of the areas where the most significant discrepancies across institutions and jurisdictions have been identified. For PD and LGD figures, the very small number of observed defaults based on internal and external data makes reliable statistical modelling difficult. Thus the preliminary condition for a benchmarking exercise is missing. Despite this, an inclusive benchmarking exercise on LDPs was submitted by IRB banks to regulators in April 2017. The challenges of this exercise were:

- Proper identification of the portfolios - while there is broad agreement that exposures to central governments and central banks, as well as exposures to institutions, are LDPs, other LDPs are not as easy to classify on the basis of exposure class. Particular attention must be paid to the large corporates to be extracted from the corporate exposure class;
- Exclusion or inclusion of specialised lending exposures in LDPs;
- Strict respect for the LDP VRs published by the EBA in April 2017, which are mandatory to apply to attest to the quality of the deliverables and for respect of the conversion procedures in XBRL format.

Figure 18: 2017 LDP Exercise
Source: Avantage Reply.

4.1 2018 Supervisory Benchmarking Exercise

Future Challenges

Following the regulatory roadmap as presented in Figure 1, in April 2018 the submission of both HDP and LDP parts with complete feeding of the Annex III template is expected to take place for the first time.

In this 2018 benchmarking exercise, there will be some changes to the credit risk portfolios as necessary to keep them up to date. Template changes have already been announced in the 2018 ITS for Supervisory Benchmarking, which adds an RWA calculation template and provides for data submission following a new taxonomy.

Additional new challenges for institutions are shown in Figure 19 (see Figure 19: The Future of Benchmarking: Regulatory Boost vs. Internal Bank Practices – the Road to 2020).
The EBA has stated that supervisory benchmarking will be one of the main instruments of prudential supervision for the years to come. The ambitious target of this exercise can be understood through two drivers: the top-down regulatory boost to the IRB approach and the bottom-up bank strategies for best practices and integrated solutions to manage the future regulatory requirements.

- Clarifications on definition of default
- Clear rules for treatment of defaulted assets and multiple default exposures
- IRB vs. Standardised Approach
- Harmonisation process of the exposure classes
- Enhancement and review of RTS for supervisory benchmarking
- Clarifications on composition of corporate portfolio (HDP vs. LDP)
- Investigation of criteria for the different models that can be used
- Investigation of substitution approach
- Investigation of PD and LGD calibration

**KEY FINDINGS**

- Increased cooperation between institutions and NCAs in order to ensure high quality submissions
- Development of IT procedures and architectures able to ensure both coherence with ITS requirements and integration with other credit risk processes
- Development of a framework of checks and controls to ensure sufficient quality of the benchmarking data submission
- Strengthening of internal risk management processes: corporate governance, risk estimation, decision-making and stress testing
- Strengthening of model monitoring and scoring in order to be prepared to face future industry challenges

![Figure 19: The Future of Benchmarking: Regulatory Boost vs. Internal Bank Practices – the Road to 2020. Source: Avantage Reply.](image)

The supervisory benchmarking exercise is part of a larger plan of review and investigation of the IRBA.

- **IRBA vs. SA:** There will be an in-depth investigation of the IRBA to identify areas/portfolios where it cannot be used or where it may be used only if the rating system is sufficiently robust, the PPU\textsuperscript{14} approach (especially for the sovereign portfolio and in general for the LDP), the RWA computation under the IRBA vs. the SA\textsuperscript{15}, and the identification of incentives for institutions to move toward the IRBA.

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\textsuperscript{14} PPU under Article 150(1)(c) of the CRR, CAs may grant permission for institutions to apply the SA for exposures in non-significant business units as well as exposure classes or types of exposures that are immaterial in terms of size and perceived risk profile.

\textsuperscript{15} In the next supervisory benchmarking exercise, there could be a request to specify in Annex III the RWA amount calculated by applying the SA for credit risk to the exposures in scope.
• **Review of Regulatory Technical Standard (RTS):** There will be a review of the innovative tools to assess the effect of new methodologies on capital (the framework behind the RWA*). Capital ratios are the core measure of financial strength, and tools such as stress testing may benefit from improved starting points for important risk parameters provided by regular benchmarking exercises at the European level.

• **Risk infrastructure and tools:** It is strongly recommended that EU institutions use internal models to put in place IT solutions (data collection, reporting and analysis platforms) and simulation tools able to face the new regulatory challenges and reporting activities, based on high quality databases (DBs) and longtime horizons of data availability. A framework of checks strictly related to the validation rules of the taxonomy under which the data are submitted would be required to avoid quality issues (and it is expected that in the next EBA benchmarking exercise the dataset will be subject to 1600 eXtensible Business Reporting Language (XBRL) validation rules and additional plausibility checks).

• **Internal Risk Management of IRBA:** The monitoring activities put in place by the CRCU, internal audit and the management body will be increasingly important. The focus here will be to further develop and improve a series of internal measures to ensure that models are subject to control. The aim will also be to provide reasonable assurance to management of the achievement of the regulatory objectives.

Finally, it is important to stress that all the investigations, analysis and additional rules are expected to enhance the transparency of the IRBA and RWA calculation. However, it should be clear that even if the benchmarking exercise was designed to evaluate variability in the RW measures and potential underestimation of capital requirements by institutions, the IRB revision and benchmarking initiatives do not have the goal of increasing the overall level of capital requirements, but rather of strengthening the IRB framework and the associated EU rules.

Related to the previous four points, future developments for the supervisory benchmarking exercise may emerge, and banks should be ready to face new topics. Some items on the regulatory agenda for the next several years[^16] which are closely related to the benchmarking exercise are the following: Investigation and definition of criteria behind the different internal models used by the institutions in order to restore confidence in them.

The Basel Committee is close to finalising the last changes to international standards, aimed at addressing the excessive and unjustified variability in risk weighted assets (RWAs) calculated via banks’ internal models.

The EBA has been amongst the first to identify the need for regulatory repair in this area. We published five reports assessing the problem and identifying the main drivers of RWAs variability and we defined a roadmap to address the main issues. We also started to conduct regular benchmarking exercises, aimed at identifying outliers in the calculations of RWAs via internal models and triggering supervisory follow-up actions. We are now close to completing this repair action and keen that the Basel Committee finalises its package addressing the remaining issues that we have not directly tackled. [...] I believe the priority now is to close the reform process and eliminate the regulatory uncertainty as soon as possible.

[^16]: Activity n° 25 relating to the consistency of RWA as part of the EBA 2017-2020 work programme.

2016 EBA ANNUAL REPORT - SPEECH BY ANDREA ENRIA, EBA CHAIRMAN (JUNE 2017).
4.2 TRIM Results: RWA Variability and Basel IV

While it is difficult to identify what will happen following the formal closure of TRIM activities (which have currently only just begun), the following are likely to occur.

- **Unexplained RWA variability reduction**: Despite the opinion of some sceptical insiders, the regulatory aim of reducing unexplained RWA variability related to internal model outcomes will not necessarily translate into indiscriminately stronger own funds requirements for the whole industry. The expectation, suggested also by the thorough approach to the on-site phase, is that only in the case of divergences from the underlying legal framework and best practices will there be consequences at institution level.

- **Basel IV implications**: On the other hand, following the benchmarking exercises on the overall bank sample, it cannot be excluded that harmonisation of different practices within the banks’ IRB frameworks will be promoted, resulting in a more standardised framework. This leads to a further conclusion that, despite the disclosed purpose of the ECB, the TRIM exercise could be intended as a parallel route on the road map toward the new Basel IV framework, implying the introduction of more stringent regulatory requirements and an increase of the average RW on certain portfolios.

Only the final release of the TRIM Guide will disclose the real impact of this extensive exercise.
5. How Avantage Reply Can Help

Avantage Reply has developed strong experience and deep understanding of the regulatory challenges which major EU institutions face. Assisting many clients with end-to-end solutions, Avantage Reply has skills in the development of tools that meet ECB and EBA requirements.

Based on its work for one of the largest Global Systemically Important Banks (GSIBs) in Europe, Avantage Reply can attest that, for regulatory reporting exercises such as benchmarking and TRIM, the most important part is not just the implementation of an infrastructure able to collect properly filtered data from banks’ credit risk DBs and process it to feed the dedicated templates or reporting procedures. The real challenges are the following.

- From a risk management point of view, be ready for the wave of convergence and standardisation that will impact the EU in data exchange, data collection, regulatory reporting, and optimisation and standardisation of the processes for governance, programmes and project management.

- From an organisational point of view, be reactive to on-demand requests for data analysis and elaboration and document collection.

- From an IT point of view, ensure that the risk infrastructure has sufficient flexibility to satisfy future requirements and change requests from new Questions and Answers (Q&As) or ITS/RTS enhancements.

Figure 20 shows the challenges faced in supporting clients in the TRIM and benchmarking exercise and the solutions/services proposed to overcome them (see Figure 20: Supervisory Benchmarking & TRIM: Avantage Reply Offering).

**Figure 20: Supervisory Benchmarking & TRIM: Avantage Reply Offering.**

**Source:** Avantage Reply.
6. Appendix

I. Case Study: EBA Benchmarking IT Architecture

Flow Chart

Nearly two years ago, Avantage Reply undertook a supervisory benchmarking project to support a client in finding the best way to meet the EBA regulatory reporting requirements. After thorough study of the RTS and ITS, it became clear that, due to the complexity of the exercise, there was no better way to approach it than to build a centralised (at holding level) and structured framework supported by the development of a dedicated IT platform.

Avantage Reply started building the framework for the 2016 HDP exercise, and this year enhanced the IT design to cover the 2017 LDP submission as well.

Here are four steps describing the solution:

1. The **Master table** collects and transforms all the input data, which is retrieved mainly from the bank’s credit risk management tool.
2. The figures with high complexity in the calculation (DR, LR and Hypothetical LGD senior unsecured) are treated separately in dedicated calculation steps/entities.
3. A **dedicated simulation tool** is used for the RWA*/** calculation.
4. The **XBRL taxonomy** is already included in the IT architecture.

**Figure 21: EBA Benchmarking IT Architecture.**

*Source: Avantage Reply.*
2. ITS on Supervisory Reporting and XBRL focus

The previous discussion has been about the reporting figures required in the supervisory benchmarking exercise but without showing in detail how the Annex III template for credit risk reporting is composed. In this section, the template structure is briefly described (see Figure 22: Overview of Annex III Template), along with the XBRL taxonomy and format.

Annex III is composed of different sheets:
- C 101.00 and C 102.00 are filled in for the LDP;
- C 103.00 is filled for the HDP; and
- C 105.01/02/03 are filled for both the Low and High Default Portfolios.

Common figures in the different templates (PD, EAD, LGD, RWA, etc.) must be computed following the same rule/logic. C 101.00 and C 102.00 are strictly linked together because the first one is composed of a list of large corporate counterparties which is also part of the portfolios in the second. At the same time, C 105.01 must contain only information related to those models which are relevant for the portfolios listed in C 102.00 (LDP) or C 103.00 (HDP).

Figure 22: Overview of Annex III Template.
Starting from the 2016 HDP exercise, the taxonomy used for the data submission and the XBRL framework in general has become an important topic.

XBRL is the technical format chosen by the EBA for data submission in the supervisory reporting scope.

The regulatory reporting process based on the XBRL taxonomy is composed of two major parts:

- **Data Point Model (DPM):** the set of rules to be followed to perform the data conversion (composed of dictionary and table layout).
- **Validation Rules (VRs):** checks to validate the data quality (from a technical point of view) of the deliverable.

After the conclusion of the exercise, the EBA conducted a peer review to better understand the procedures and processes related to supervisory reporting. Figure 23 shows CAs’ responses to the following request: *Please name the submission format (e.g., the EBA’s XBRL taxonomy) that is used to collect data from institutions.*

<table>
<thead>
<tr>
<th>Submission Format</th>
<th># of CAs</th>
<th>List of CAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only EBA-XBRL taxonomy</td>
<td>13</td>
<td>BE, DK, ECB, FR, IS, LI, LT, LU, LV, PT, SE, UK – PRA, UK – FCA</td>
</tr>
<tr>
<td>EBA-XBRL taxonomy and other formats</td>
<td>4</td>
<td>EE, ES2, FI, NO</td>
</tr>
<tr>
<td>National XBRL taxonomy</td>
<td>4</td>
<td>DE, ES – BdE, IE, PL</td>
</tr>
<tr>
<td>National specific formats</td>
<td>7</td>
<td>AT, CZ, HR – CNB, HU, IT, NL, SI</td>
</tr>
<tr>
<td>Excel</td>
<td>8</td>
<td>BG, CY, EL, HR – HANFA, MT, RO – ASF, RO – NBR, SK</td>
</tr>
</tbody>
</table>

**Figure 23:** Overview of NCA Submission Format.  
**Source:** Peer review of the ITS on Supervisory reporting requirements (February 2017).

It is worth noting that the format for submissions from CAs to the ECB in the sequential approach is the EBA-XBRL taxonomy. Starting from the 2017 LDP exercise, the EBA-XBRL format has been made mandatory for data submission to reducing the operational risks associated with the conversion from other formats (Excel, eXtensive Markup Language (XML), etc.).
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