2013

Interim Results Update of the EBA Review of the Consistency of Risk-Weighted Assets

European Banking Authority (EBA)

EBA Report
05 August 2013

Interim results update of the EBA review of the consistency of risk-weighted assets

- Low default portfolio analysis

External report

Interim results update (LDP)

Table of contents

List of figures

Abbreviations

AIRB	Advanced Internal Rating System Based Approach
BCBS	Basel Committee on Banking Supervision
CCF	credit conversion factor
CRD	Capital Requirement Directive
CRR	Capital Requirement Regulation
EAD	exposure at default
EBA	European Banking Authority
ECAI	external credit assessment institution
EL	expected losses
EU	European Union
FIRB	Foundation Internal Rating System Based Approach
GC	global charge
GDP	gross domestic product
HPE	Hypothetical portfolio exercise
IRB	internal ratings-based
IRBA	Internal Rating System Based Approach
ISG	Impact Study Group
LDP	low default portfolio
LGD	loss given default
NSA	National Supervisory Authority
PD	probability of default
PiT	point in time

RM	residential mortgage
R-O	roll-out
RW	risk weight(RWA/EAD)
RWA	risk-weighted asset
SA	Standardised Approach
SIG BB	Standard Implementation Group Banking Book
SMEs	small and medium-sized enterprises
S&P	Standard and Poor's
TCOR	Task Force on Consistency of Outcomes in Risk Weighted Assets
TTC	through the cycle

Executive summary

This report outlines the results of the second stage European Banking Authority (EBA) work on banking book exposures. This second stage focuses on central governments, credit institutions and large corporate, which we generically refer to as the low default portfolios (LDP), as they contain relatively few defaults.

Hypothetical Portfolio Exercise on Low Default Portfolios

In relation to LDPs, the EBA carried out a hypothetical portfolio exercise (HPE) in the second half of 2012 involving 35 banks (using the IRB Approach for at least one of their low default portfolios) from 13 European Union (EU) countries.

The exercise was designed to allow a direct comparison of the Internal Ratings-Based (IRB parameters PD (probability of default) and LGD (loss given default) and resulting risk weights on a set of identical real common counterparties, assuming that the exposures are senior and unsecured loans (hypothetical exposures). Participating banks have also been asked to report the actual risk weights and expected losses in percentage applied to the same set of counterparties (real exposures). With a comparative analysis between hypothetical and real portfolio exposures, we try to examine the impact of the maturity and credit risk mitigation.

To enable a better understanding of the main issues for the banks in the development and maintenance of the internal models, qualitative information was gathered through a questionnaire and interviews with a subsample of 12 banks.

Top-down analysis on the wholesale exposures

An additional data collection on the banks' total wholesale portfolio (sovereign, institutions, large corporate and other corporate portfolios), including risk weights, expected losses and information on LGD, credit conversion factor (CCF) and maturity parameters by regulatory approach and by exposure/facility type, allowed the EBA to perform a top-down analysis on this portfolio.

We have used for the wholesale portfolio a similar top-down methodology that the one used in the first interim report ([1]) on the banking book portfolio.

As in the first interim report, we see a significant variation in the risk weights (RW) and expected losses (EL) among the banks in the sample for the wholesale portfolio. The average global charge (GC) ([2]) is 53% with a standard deviation of 25% and the average risk weights is 35% with a standard deviation of 12%.

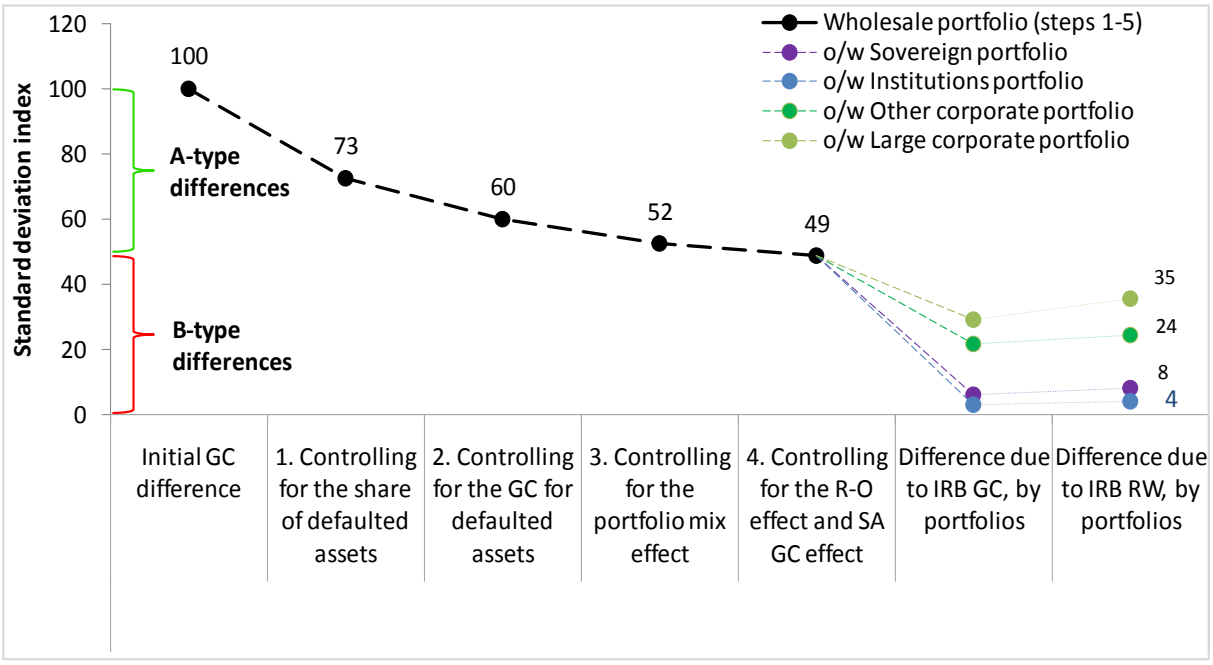
([1]) See http://eba.europa.eu/-/eba-interim-report-on-the-consistency-of-risk-weighted-assets-in-the-banking-book.

([2]) The global charge is defined as [RWA plus 12.5 times expected loss] divided by the exposure at default (EAD).

In line with the findings of the previous report, key drivers in explaining the differences for the wholesale exposures are the share of defaulted assets, the portfolio mix ([3]), the share of partial use of the Standardised Approach (permanent and roll-out, R-O) and the global charge for exposures under the Standardised Approach (SA). After controlling for such effects, the residual variation is driven by differences in the inherent credit risk of the banks' IRB exposures (e.g. portfolio-specific risk within an exposure class) and possible discrepancies in supervisory and bank practices.

Figure 1 disaggregates variations in GC into key drivers. A standard deviation index (that rescales the sample standard deviation to 100) is used to provide a measure of the variation.

Figure 1: Decomposition of the standard deviation index (basis 100 for the initial situation) for the wholesale portfolio



Data source: EBA exercise.

The variation in the wholesale GC and RW is largely driven by the large corporate and other corporate portfolios, i.e., although they account for about half of the overall amount, they have a wider dispersion in the GCs and RW than the sovereign and institutions portfolios. This high impact is notably due to the heterogeneity in the share of defaulted assets and the associated average GC per bank; 8 out of 22 banks apply an Advanced Internal Rating System Based Approach (AIRB) RW of 0 % for corporate portfolio (see Figure 11). Such variation appears driven by varied approaches, albeit potentially consistent with the Capital Requirement Directive (CRD), in the different countries and/or different banks' approach to capturing downturn conditions. Furthermore, the regulatory approach (Foundation Internal Rating System Based Approach (FIRB), AIRB, SA) ([4]) applied to defaulted assets matters.

A quantification of the drivers explaining the remaining differences is challenging because of the multiple potential drivers which reflects also the bank individual processes, the business models, the

([3]) By 'different portfolio mix' is meant the different share of wholesale exposures (i.e. some banks may have a larger proportion of sovereign exposures than others).

([4]) For an appropriate comparison between the IRB and the SA global charge on defaulted assets,the amount of provisions for partial use exposures should be taken into account.

experience of the bank as intended by the Basel II framework. Using a hypothetical portfolio exercise allow us however to make some progress.

Results for the Hypothetical Portfolio Exercise

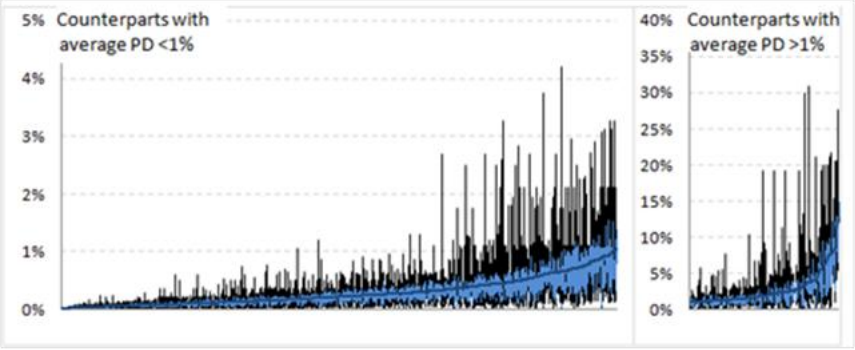
The benchmarking analyses conducted on the hypothetical portfolio shows some banks with relatively low RW for one or two exposure types, but rarely for all three portfolios (central governments, credit institutions and large corporate). We also found that differences in the collateralisation and maturity can partly explain RW differences at the bank level.
Nevertheless, the HPE sample may not be fully representative of the overall LDP of each bank; therefore the results of the HPE exercise should be interpreted with care

It seems that some compensation effect occurs between PD and unsecured senior LGD (relatively low PDs are combined with relatively high LGDs and vice versa), thus balancing RW differences to some extent. We also found that differences in the maturity can partly explain risk weight differences for central government exposures. For the credit institution exposures, a low AIRB RW can often be observed in combination with low LGD parameters, whereas a high AIRB RW, in general, comes along with high PD parameters.

Harmonisation of collateral levels does not seem to reduce the dispersion in risk weights across the complete sample of IRB banks, but increases dispersion among AIRB banks for credit institutions portfolio, as banks with higher hypothetical senior unsecured LGD output may have higher level of collateralization.

In the majority of cases, the reported own estimates LGD parameters for the hypothetical portfolio are not very differentiated for unsecured senior exposures. Values are often very close to the regulatory one for FIRB (45 %) for credit institutions and large corporate portfolios. There are a few AIRB banks, however, with a more complex approach that tries to differentiate the LGD parameter. Those banks show a significant dispersion of the parameter values applied (ranging, in some cases, from close to zero to as high as 100 %).
As is illustrated in Figure 2, we also observed a significant variation in the absolute PD values applied to the same counterparties for the different LDPs.

Figure 2: Large corporate, dispersion of the hypothetical PD parameters by counterparty



PD in y-axis, counterparties in x-axis, minimum of four PDs reported by counterparty, the dark blue line being the average, light blue representing the interquartile spread (25–75 %) and the whisker the minimum/maximum range. Defaulted exposures are excluded.

Data source: EBA exercise.

Qualitative modelling aspects

Some qualitative information was collected to enable a comparison of modelling practices across the participating banks, including information on master scales, default definition, calibration approaches, floors and rating updates procedures.

As expected, the bilateral interviews have confirmed **data limitations** (either internal or external) and banks' difficulties in calibrating and also regularly assessing the PD and LGD models for the LDP exposures. The small number of defaults in the LDP makes reliable statistical modelling difficult. Therefore, expert judgement and the individual bank experience play a bigger role for these portfolios than other portfolios.

The banks make use of very **different rating grades scales** (number of grades and PD levels), which leads to observable PD differences. Furthermore, there are significant deviations in how the institutions map their internal PD grades to the external ratings of the most important external credit assessment institutions (ECAIs).

Different frequency in the customer information and rating updates seems to drive some of the remaining RWA variations across banks.

The regulatory risk weights may differ from the internal practice of a bank, because of add-on required by the national competent authority (floors and Pillar I or Pillar II add-ons). We also found potential **discrepancies in the reporting practices of banks** in the HPE which can explain partly some RWA variation across banks (e.g. inclusion of partial or of total secured exposures when reporting secured exposures).

There is a wide range of practices for the **definition of default**, with differences in the way of computation and in the criteria used, and no consensus on the use of materiality thresholds. We identified also some differences in the computation of the default rate, which can come from either the numerator or the denominator.

Thematic reviews on maturity and CCF parameters (EAD)

Ad hoc thematic reviews conducted in the past and more recently for corporate exposures, complemented by the ad hoc data collected in the LDP exercise for other wholesale exposures (see Figure 4), have highlighted the existence of potential material variation in the risk weights caused by **different bank and supervisory practices for the computation of the maturity parameter and own estimates CCF**.

Conclusions and policy options

The study confirmed the existence of a variation in the RWs and expected losses among banks. Some sources of variation have been clearly identified and are expected in any regime based on internal models; some of them were already well known and have been documented, others have been confirmed and some need further analyses. Still some discrepancies might be reduced by harmonisation across banks and countries.

The EBA will continue to investigate risk-weighted assets (RWA) within its programme of studies. On-going work on disclosure will be a feature of this work. In addition, the analysis above confirms that, even in assessing the same counterparties, some practical differences emerge in supervisory and bank practices. Therefore, on-going sharing of information, and cross-fertilisation of good practices, will help to improve consistency in the implementation of Regulations going forward.

In the medium term, many sources of variation will in any case be addressed by the development of regulatory and implementing technical standards related to the use by institutions of the IRB Approach for the calculation of RWA, as envisaged already by the Capital Requirement Regulation (CRR) and CRD4.

The following suggestions for policy options should be seen as **potential directions for future work** to be considered by the national competent authority and the EBA. **They should not be seen as comprehensive, or as pre-empting any specific policy measures.**
The following four main areas of work have been identified.

1) Enhanced supervisory disclosure and transparency by the banks about RWA-related information. Examples: publication on a regular basis of statistics of RWs, EL, observed default and loss rates by country/portfolio; promoting enhancement of banks' disclosure according to harmonised definitions and templates to achieve greater consistency and comparability.
A first limited exercise will be incorporated into the EBA transparency exercise that will take place in late 2013[5] and a more comprehensive one thereafter.

2) Ongoing support to national competent authorities in the implementation of the upcoming new regulation (single rulebook) by promoting an exchange of experiences and supervisory interventions related to the validation and ongoing supervisory monitoring of internal models and promoting the identification and use of good practice including through joint work in colleges; encourage a more rigorous and comprehensive model validation process in banks by promoting the identification and sharing of best practice.

3) More formally, the development of additional guidelines and draft technical standards that specifically address the LDP issues.
Examples where additional clarity is needed: treatment of defaulted exposures, conservatism or cyclical effects, partial use of the Standardised Approach (permanent and roll-out), exemptions from the one-year maturity floor, requirements related to estimation of IRB parameters, use of external data, LDP scope and design, and calibration rating scales.

4) Benchmarks or constraints on IRB parameter estimates. For example, supervisory benchmarks for risk parameters could be created from the data collected through this study and similar future work (see Article 78 of the new CRD4 on supervisory benchmarking exercise). Other options could include

[5] See http://www.eba.europa.eu/-/eba-recommends-supervisors-to-conduct-asset-quality-reviews-and-adjusts-the-next-eu-wide-stress-test-timeline

the creation of floors for certain parameters (such as LGD), or fixed values of such parameters for certain classes of assets.

1. Introduction

This report presents the results of a study of the differences in risk-weighted assets (RWAs) in low-default portfolios (LDPs) across large EU banks. LDPs consist of central governments portfolios, credit institutions portfolios and large corporate portfolios, as these portfolios contain relatively few defaults. The study is part of the European Banking Authority's (EBA's) programme of studies that investigates the extent of RWA differences and the drivers of these differences across banks at the levels of both portfolios and counterparties ([6]). Drivers could relate to differences in the characteristics of the exposures themselves or of credit risk management strategies between banks, or to differences in supervisory practices and banks' modelling practices.

Under this programme, EBA first conducted a top-down study of the aggregated data of banks' total exposures. The preliminary results, published in February 2013, suggested that about half of the global charge (GC) dispersion between internal ratings-based (IRB) banks at the aggregate level is driven by differences in the extent of the use of the standardised approach (SA: roll-out or permanent partial use effect) and the SA risk weights (RWs) applied, the portfolio mix effect (relative shares of the exposure classes in the banks' total credit portfolios) and the shares of defaulted assets in their total credit portfolio. These drivers are referred to as A-type drivers. Because of data constraints, the first top-down study could not go more into detail and control for other drivers (B-type drivers), such as differences in the inherent credit risk of the exposures within portfolios, in the use of credit risk mitigation, in the banks' credit business and modelling practices and in the supervisory model assessment practices.

To investigate RWA differences and their drivers at portfolio type level, the EBA is conducting two bottom-up studies, one for the LDPs, consisting of central governments, credit institutions and large corporate portfolios, and the other for residential mortgages (RMs) and small and medium-sized enterprises (SMEs). This second interim report presents the results of the LDP study. The results of the RM and SME study are expected by the end of the year ([7]).

Thirty-five banks (using the IRB Approach for at least one of their LDPs) across 13 EU countries participated in the LDP study. The study consists of two benchmark analyses: a hypothetical portfolio exercise (HPE) and a new top-down study. The most challenging part of comparative RWA studies is to distinguish the influences of risk-based drivers and practice-based drivers. For statistical models, such as for mortgages and SMEs, historic data on defaulted exposures are an important source of information on the portfolio risk. Central governments, credit institutions and large corporate portfolio exposures, however, show so few defaults that historic data are of limited use when it comes to distinguishing between portfolio credit risks. Instead, for these LDPs, an HPE can be performed

([6]) The EBA has established the Task Force on Consistency of Outcomes in Risk Weighted Assets (TCOR) with members from the EBA and European national supervisory authorities (NSAs) to perform the analysis.

([7]) Other parts of the programme are a Trading Book exercise, a study of RWA disclosure practices and an investigation of supervisory and banks' practices.

comparing IRB parameters and RWs for identical counterparties to which the participating banks have real exposures. This allows a direct PD comparison. The HPE assumes that the exposures are senior unsecured loans (regardless of the nature of the actual exposures) to allow a direct comparison of loss given default (LGD).This way, the exposures are as comparable as possible with respect to their credit risk.

The HPE for the LDP was first developed by the Basel Committee on Banking Supervision (BCBS) ([8]). The EBA closely followed the BCBS design, but added more European counterparties to the BCBS list, to make it more representative of the European market ([9]).

The banks were requested to provide their own probability of default (PD) and senior unsecured LGD for those counterparties included in the list on which they had an actual exposure and/or a valid rating at the reference date of 30 June 2012.Participating banks were also asked to report the actual RWs and expected losses (EL) in percentage applied to the same set of counterparties (real exposures). With a comparative analysis between hypothetical and real portfolio exposures, we examine the impact of the maturity and credit risk mitigation.

In addition to information on the HPE sample, banks were asked to provide information for the bank's total LDP portfolios, including LGD by type of eligible collateral, maturity by type of facility(such as undrawn lending committed/uncommitted and letter of credit) and credit conversion factors (CCFs) by type of exposure (such as on-balance sheet, off-balance sheet and exposures to derivatives).Further, to investigate differences in banks' modelling practices, all banks were asked to fill in a qualitative questionnaire. Moreover, interviews were carried out with a subsample of 12 banks.

With the new information on portfolio level gathered in this exercise, the EBA performed a top-down analysis on the wholesale portfolio (sovereign, institutions, large corporate and other corporate). The method used in this second part of the LDP studies is similar to the one used and explained in the top-down study on the banks' total credit portfolio and explained in the first interim report of this programme. This method disentangles the GC contributions of the different A-type drivers as difference in share of defaulted exposure, GC related to defaulted exposure, different relative shares of exposure classes (portfolio mix), the share of partial use of the SA[10] (permanent and roll-out) and difference in the GC for exposures under SA.

Since the HPE sample is not fully representative of the portfolios of the individual banks, the results of the HPE exercise may not be transferable to the total portfolios and should, therefore, be interpreted with care.

Please note that the scope of the portfolio under investigation varies across the studies. The definitions are provided in the table below and are used throughout the report. The scheme in Figure 4 provides an illustration of the different scopes used for this report.

([8]) The Standards Implementation Group on Banking Book (SIG BB) was mandated by the BSBS to perform this task.

([9]) The EBA list contained 55 central governments, 91 credit institutions and 1 999 large corporate.

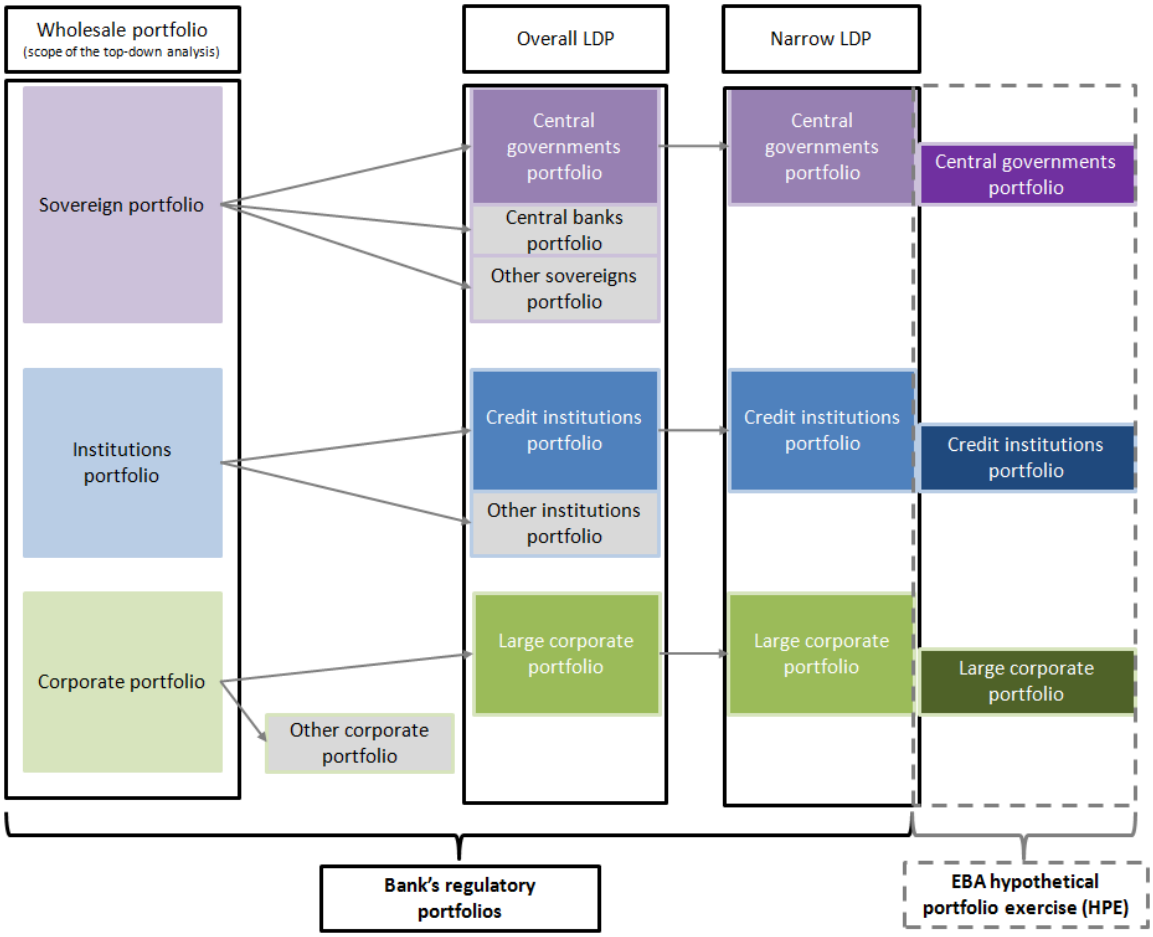
[10] Difference in the portion of exposure classes treated under SA and IRB approaches.

Figure 3: Definitions of the portfolios perimeter

Portfolio	Definition
Sovereign portfolio	Central governments[11], central banks and other sovereign[12] portfolios
Institutions portfolio	Credit institutions[13] and other financial institutions[14] portfolios
Corporate portfolio	Large corporate[15] and other corporate[16] portfolios
Wholesale portfolio	Sovereign portfolio, institutions portfolio and corporate portfolio
Overall low-default portfolio	Sovereign portfolio, institutions portfolio and large corporate portfolio
Narrow low-default portfolio	Central governments portfolio, credit institutions portfolio and large corporate portfolio
EBA hypothetical portfolio (HPE)	Selected sample of counterparty names of the narrow low-default portfolio

([11]) Claims and contingent claims on central governments as defined by Articles 79 and 86 of Directive 2006/48/EC.
([12]) Exposures to regional governments, local authorities or public sector entities which are treated as exposures to central governments.
([13]) Claims or contingent claims on 'credit institutions' as defined in Article 4 of Directive 2006/48/EC.
([14]) Other financial institutions, such as insurance companies and pension funds.
([15]) Claims or contingent claims on corporate included in the corporate regulatory portfolio with total assets/turnover less than EUR 50 million.
([16]) It includes the corporate SMEs but not the retail SMEs.

Figure 4: Scheme of the different perimeters analysed in the LDP study



The portfolio composition of the participating banks is presented in section 2. The top-down exercise is discussed in section 3 and the HPE in section 4. Section 5 identifies areas where the study has found considerable differences in modelling practices across banks. The report ends with the conclusion in section 6.

2. Portfolio composition of the participating banks

This section describes several aspects of the sample of 35 participating banks. First, it presents their relative use of the Standardised Approach (SA), Foundation Internal Ratings-Based Approach (FIRB) and Advanced Internal Ratings-Based Approach (AIRB) (subsection 2.1). Second, it describes the relative shares of the portfolio types, subportfolios and HPE sample in their total portfolio (subsection 2.2). Third, it describes the distribution of RWAs in the portfolio types, subportfolios and HPE sample across the sample of banks (subsection 2.3). Subsection 2.4 discusses the representativeness of the exposures in the HPE sample for the subportfolios from which the exposures were extracted.

2.1 Use of regulatory approaches

The banks in the sample use the IRB Approach for at least one of their LDPs (this was a sample selection criterion). Most banks do not use the IRB Approach for all their exposures and tend to apply

an approach consistently for a given portfolio type. However, some banks use different approaches within the same portfolio type. Partial use of the SA within a portfolio seems to be connected to specific products or subsidiaries in host countries.

For each of the portfolios and regulatory approaches, we counted the banks that use the approach for more than half of the exposure at default (EAD) of their portfolio (the dominant approach for this portfolio). The results listed in Figure 5 show that, for the central governments portfolio, 23 out of the 35 banks predominantly use the SA, probably making use of the CRD carve-out for the treatment of domestic sovereign exposures denominated and financed in local currency. However, 11 banks predominantly use internal approaches for the central government exposures. For credit institutions and large corporate, most banks predominantly use an IRB Approach. The division of dominant use between FIRB and AIRB is equal for the credit institutions portfolio, but for large corporate about two-thirds of the banks use the AIRB.

Figure 5: Dominant use of regulatory approaches by banks per portfolio

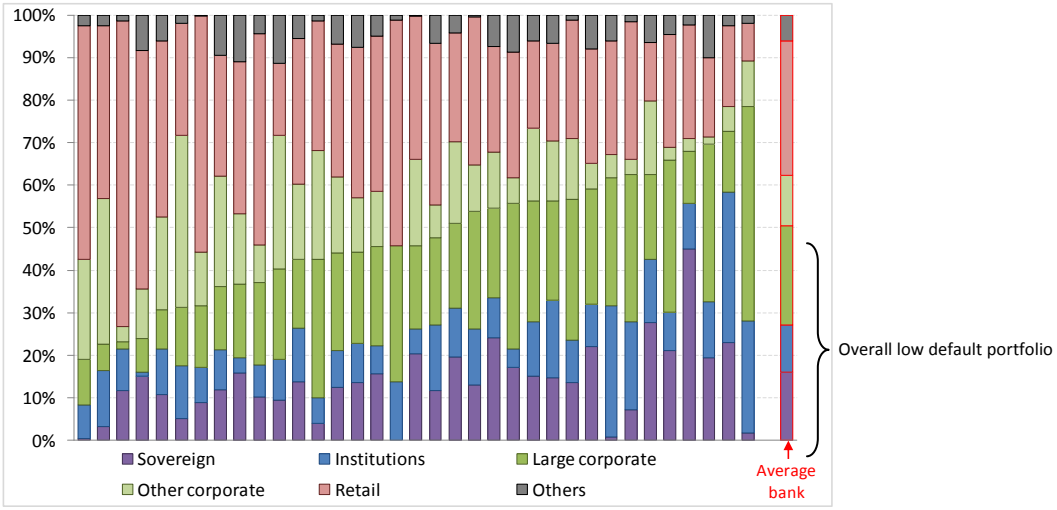
Number of banks by regulatory approaches and by portfolio, EAD				
Bank's low default portfolios	Mainly following an approach (> 50 % of EAD under a specific regulatory approach)			No dominant approach followed (< 50 % of EAD under a specific approach)
	SA	FIRB	AIRB	
Central governments	23	3	8	1
Credit institutions	9	12	14	0
Large corporate	2	11	21	1

Data source: EBA exercise.

2.2 Portfolio composition of the participating banks

When interpreting the findings of this report, it is important to bear in mind the representativeness of the LDP and the exposures in the HPE exercise for the banks' total credit portfolios. Figure 6 shows the relative EAD-weighted shares of the different portfolio types for the 35 banks in the sample based on supervisory data (Impact Study Group; ISG) as of 30 June 2012. The share of the overall LDP (sovereign, institutions, large corporate) differs considerably between banks (from less than 20 % to almost 80 %) and averages 50 % (see the column outlined in red to the far right of the figure).

Figure 6: Portion of the overall LDP within the total credit exposures of the banks, non-defaulted and defaulted exposures

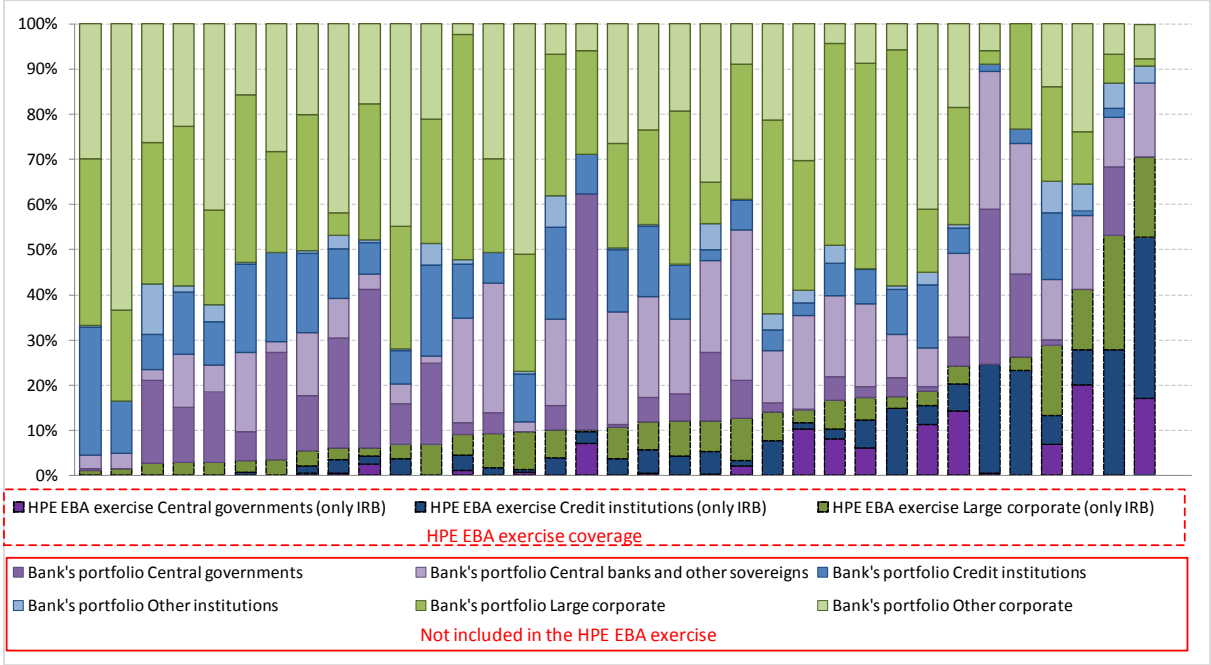


Data source: supervisory data (ISG) as of 30 June 2012, EBA exercise for the proportion of large corporate within corporate portfolio.

The banks are ordered by their share of overall low default portfolio.

Figure 7 provides a further breakdown of the banks' overall LDPs. It distinguishes between the subportfolios that were identified in Figure 4. As in Figure 4 the darkest shades, of purple, blue and green, depict the shares of the banks' central governments, credit institutions and large corporate exposures, respectively that are included in the HPE and treated under IRB. The banks are ranked according to their total share of HPE exposures (treated under IRB) across the three portfolio types (lowest on the left). This share (the HPE coverage) differs widely between banks, from as low as 2 % to as high as 70 %, with the median at about 10 %.

Figure 7: Repartition of the wholesale portfolio exposures and coverage of the EBA HPE exercise



Data source: EBA exercise.

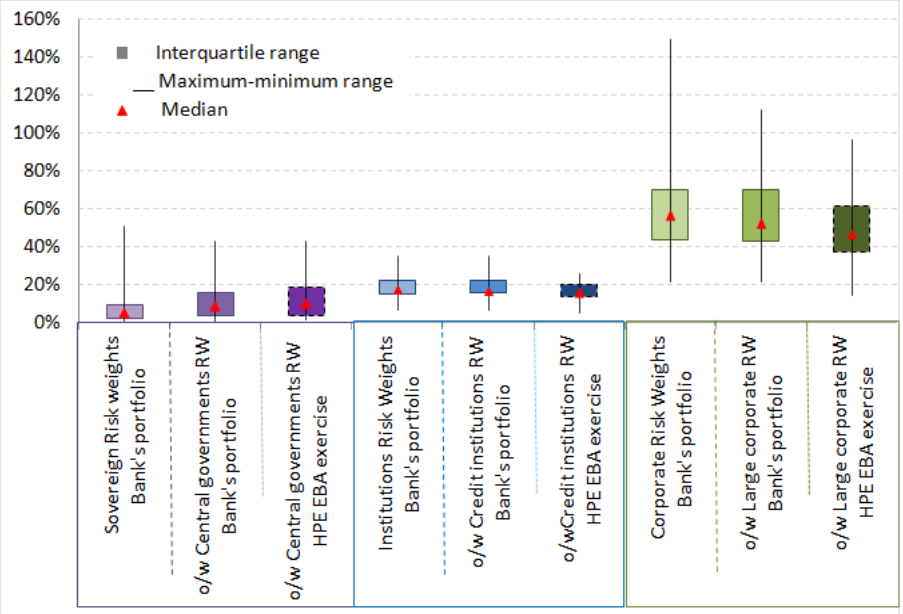
The banks are ordered by the coverage of the HPE EBA exercise for the narrow LDP (central governments, credit institutions and large corporate).

2.3 Representativeness of HPE exposures regarding average RW

This subsection compares the distribution of average IRB RWs for the sample of banks per portfolio and subportfolio (see Figure 8). It provides a notion of the representativeness of the exposures included in the HPE sample for the banks' portfolios and subportfolios. The definition of (sub)portfolios and use of colours are given in Figure 4. The figure shows that the dispersion of banks' average IRB RWs is higher for corporate than for sovereign and institutions exposures. The dispersion in the HPE sample is most similar to the total (sub)portfolio dispersion from which it was extracted for credit institutions, with rather similar median and range. For the central government exposures, the HPE sample has a higher median and interquartile dispersion than the total central governments subportfolio. The difference is not large in terms of percentage points, but is relevant in relative terms (+15 % for the median and +18 % for the interquartile range).

The average RWs for the corporate HPE sample have a lower mean and interquartile range than the total large corporate portfolio. This can be explained by the fact that the largest corporates are included in the HPE sample and they tend to have lower RWs than smaller corporates.

Figure 8: IRB bank-average RWs distribution for bank's portfolio and HPE EBA exercise[17], non-defaulted exposures



Data source: EBA exercise.

2.4 Representativeness of the HPE sample for the banks' subportfolios

Subsection 2.2 has shown that the representation of the HPE sample in terms of EAD coverage may be small (median10 %). Further, since the list of counterparties included in the HPE was not selected randomly, it is important to check the representativeness for the full portfolio. Subsection 2.3 shows that the average RWs for central governments in the HPE are higher (in relative terms) than those for the full central governments portfolio. For the large corporate, the HPE sample apparently includes counterparties with relatively low credit risks compared with the other large corporate in the total subportfolio.

Since the HPE sample is not fully representative of the portfolios from which it was drawn, the results of the HPE exercise may not hold for the total portfolios and should, therefore, be interpreted with care.

3. Top-down approach applied at wholesale portfolio level

As a first step in our analysis, we apply a top-down approach to determine and evaluate the drivers behind RWA differences across banks. We analyse the wholesale portfolios (sovereign, institutions and corporate portfolio) for a sample of 35 banks ([18]). The top-down interim report published in February 2013 applied a similar approach on a different dataset, namely the overall banking book portfolio and a different sample of 89 banks.

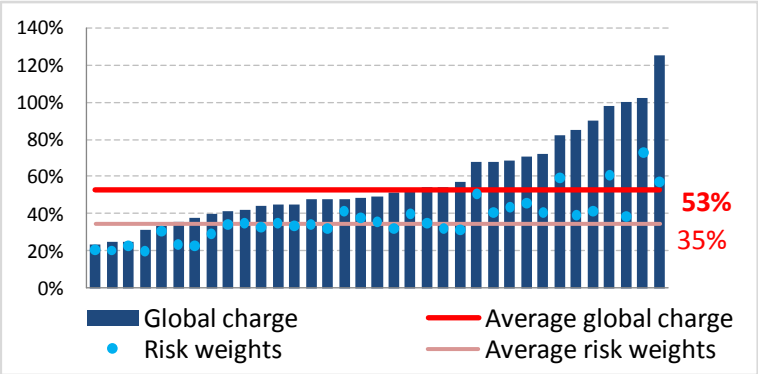
([17]) Real exposures data are used (regulatory PD, regulatory LGD and regulatory maturity).
([18]) Thanks to an additional data collection in the context of the HPE.

The following subsections describe the sample (subsection 3.1) and the top-down approach of the analysis (subsection 3.2) and, finally, the results (subsection 3.3).

3.1 Description of the sample

The 35 banks in the sample show GC ([19]) ranging from 20 % to over 120 % for the wholesale portfolio. The average RW per bank varies from 20 % to almost 80 %. Moreover, it seems that the GC/RW ratio tends to decrease with higher levels of GC. This means that the expected loss rate seems to have a higher impact on the GC than on the RW (i.e. the unexpected loss rate).

Figure 9: GC and RW, defaulted and non-defaulted exposure on the wholesale portfolio



Data source: EBA exercise.

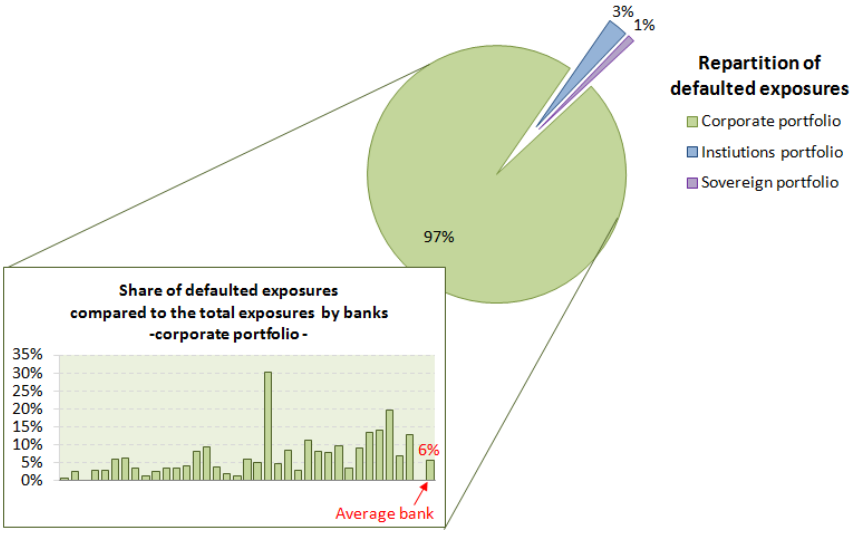
The banks are ordered by their GC level.

Defaulted exposures

Different levels of the expected loss among banks result from, among others, the difference in their share of defaulted assets. Within the wholesale portfolios, most of the defaulted assets are located in the corporate portfolio (see Figure 10). The discrepancy among the sample is, however, very high in this portfolio, with the share of defaulted exposures ranging from 0.6 % to 30 %.

([19]) The GC ratio takes into account the regulatory charges, related to both unexpected losses (from the Standardised and IRB Approaches) and EL calculated from the regulatory parameters estimated under the IRB Approach. The EL can be very relevant for explaining the differences in banks' regulatory requirements, mainly because of the stock of defaulted assets. The possible drawback of this ratio is the comparison between SA and IRB, so we incorporate the EL under IRB, a concept that does not exist (at least explicitly) under SA.

Figure 10: Defaulted exposures on the wholesale portfolio and focus on the corporate portfolio



Data source: EBA exercise.

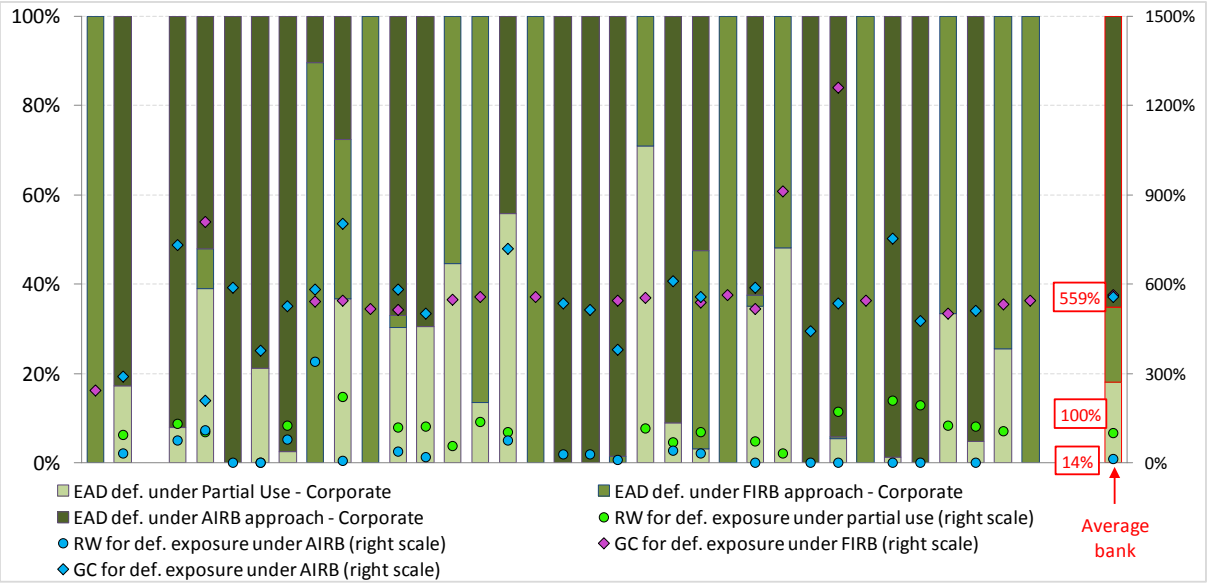
The banks are ordered by their GC level (see Figure 16).

For defaulted exposures in the corporate portfolio, the discrepancy in terms of RW and GC is very high among banks (see Figure 11). Under the AIRB Approach, eight banks have RWs equal to zero, compared with a sample average of 14 %. The sample average for defaulted exposures under the SA is 100 %. The AIRB GC ranges between 211 % and 805 % (average approximately 559 %), most of the GC being due to the EL. The FIRB GCs show similar divergences (average of 559 % within a range from 244 % to 1 260 % ([20])).

Moreover, 20 % of defaulted exposures in the corporate portfolio, on average, fall into the SA (partial use) (see Figure 11).

([20]) Assuming the RW is 0 %, an expected loss rate of 100 % corresponds to a GC of 1 250 % (GC = RW + 12.5 * EL/EAD).

Figure 11: GC, RW and EAD by regulatory approach for the defaulted exposures on the corporate portfolio



Data source: EBA exercise.

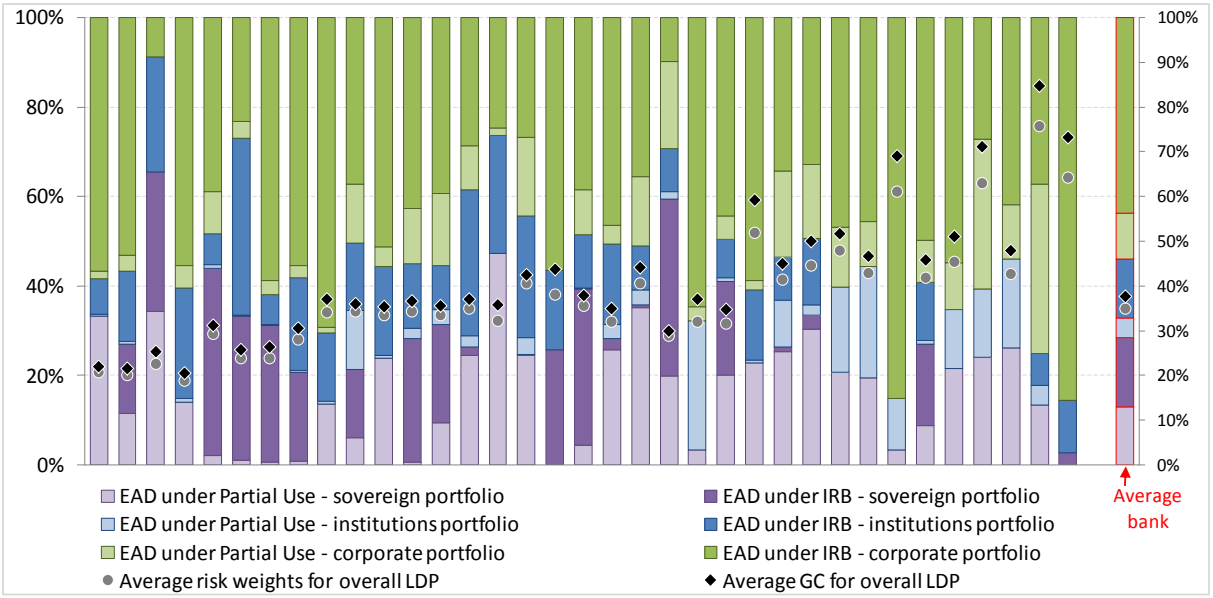
The banks are ordered by their GC level (see Figure 16).

Non-defaulted exposures

Most of the banks in the sample have some of the non-defaulted exposures in the wholesale portfolio under the SA (see Figure 12). However, the partial use concerns only 10 % of these exposures, in contrast to the 20 % partial use for the defaulted exposures (on corporate portfolio).

GC and RW levels vary remarkably. So does the difference between GC and RW within each bank across the sample. The latter indicates that the relation EL/EAD is very heterogeneous among banks, which may be partly due to different cycle effects.

Figure 12: Share of roll-out and partial use of the SA, average RW and GC for the non-defaulted exposures on the wholesale portfolio

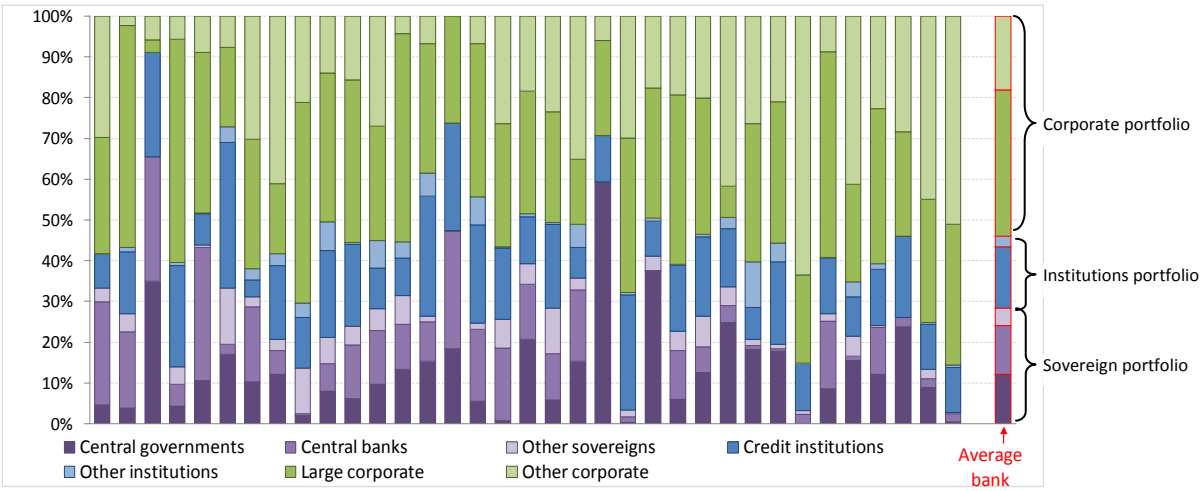


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

Within the wholesale portfolio, the portfolio mix is quite different among banks (see Figure 13). The corporate portfolio represents more than 50 % of the wholesale portfolio on average, and ranges from 10 % to 90 % across banks. The share of exposures to central government within the sovereign portfolio differs considerably across banks. It makes up the total of the sovereign portfolio for one bank whereas for another the central governments exposure is close to zero. Corporate and the institutions portfolio shares also vary considerably.

Figure 13: Portfolio mix on the wholesale portfolio, non-defaulted exposures only



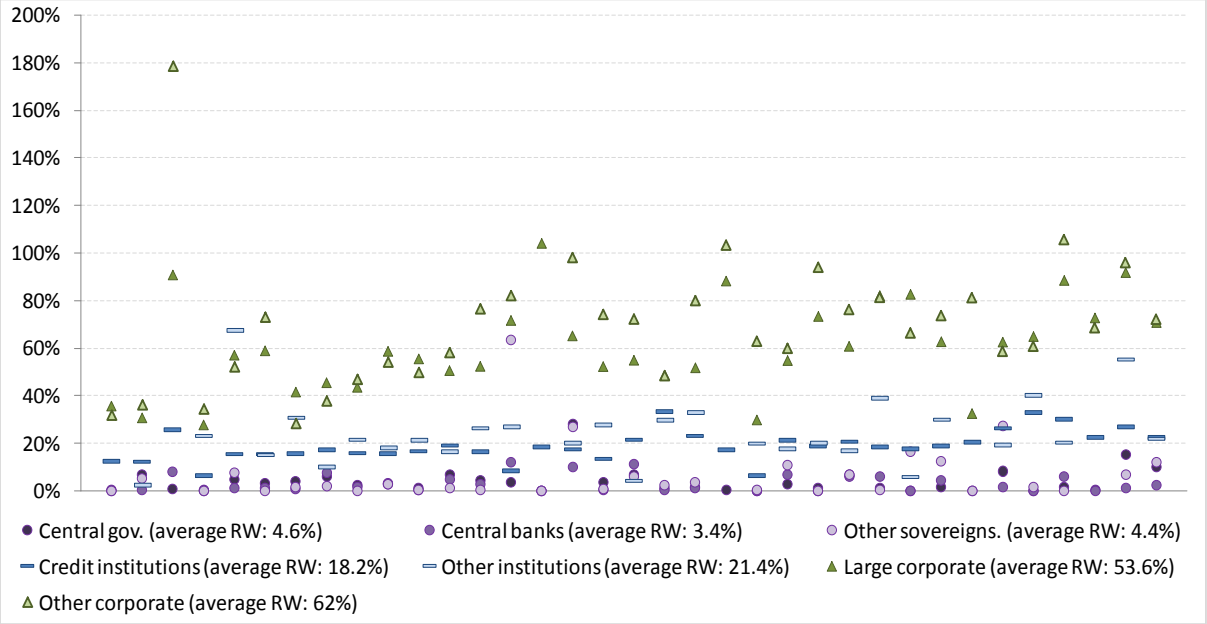
Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

The remarkable differences among average RW related to each portfolio and subportfolio (see Figure 14) show that the portfolio mix is important for understanding the variability of wholesale portfolio RWs in the sample. RWs are much higher for corporate than for institutions, and at the lowest for sovereign.

At subportfolio level for corporate, RWs are higher for other corporate than for large corporate (62 % versus 54 % on average). The average subportfolio differences are less important within the institutions and sovereign portfolios.

Figure 14: Average RW (IRB and SA) by subportfolios, non-defaulted exposures only



Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

3.2 Top-down approach

The rationale is the same as in the first EBA interim report. Differences in GC are classified as those stemming from structure and composition (which, as mentioned in the previous interim report of February 2013, are called A-type differences) and those related to IRB risk parameters (called B-type differences).

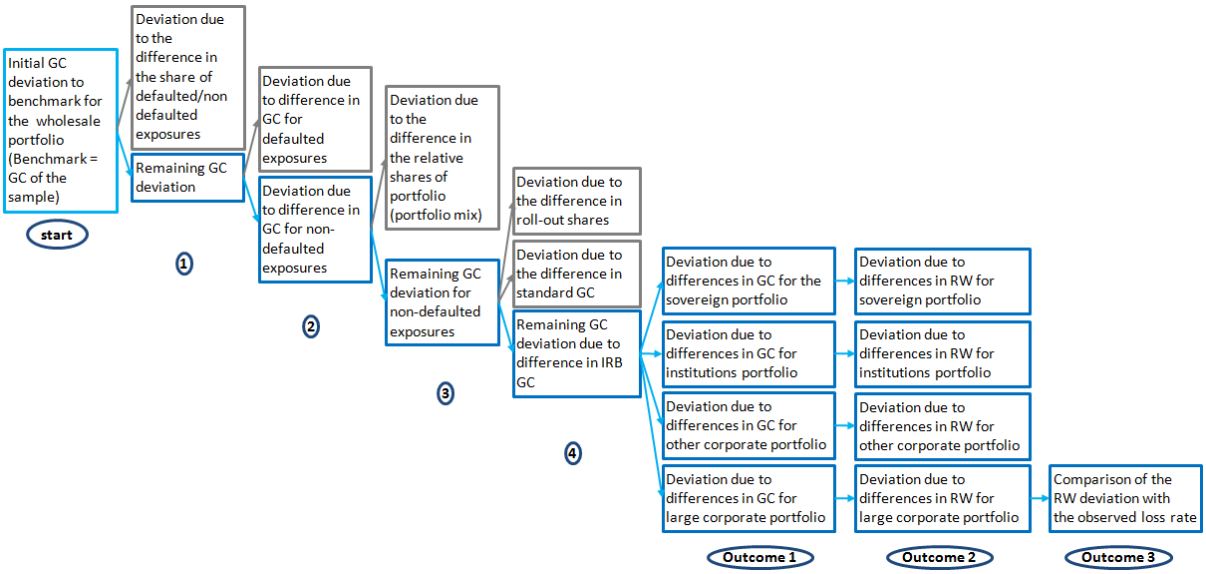
The top-down approach allows the detection of A-type differences in GC across the banks in the sample and, by doing so, isolates the B-type differences. The A-type differences are driven by:

- different share of defaulted exposure;
- different GC related to defaulted exposure;
- different relative shares of exposure classes ('portfolio mix effect');
- different shares of partial use of the SA (called roll-out, or R-O, effect);
- different SA GC by portfolio ('SA GC effect').

The remaining differences for non-defaulted IRB assets, the so-called B-type differences are caused by idiosyncratic variations in the riskiness within an exposures class for non-defaulted IRB assets, credit risk mitigation (i.e. the business and risk strategy of the banks) and the IRB risk parameters estimation (e.g. bank and supervisory practices).

In the top-down approach performed on the wholesale portfolio ([21]), each bank's initial GC deviation from the benchmark (EAD-weighted average) GC is broken down successively in order to identify the drivers of A-type differences: the share of defaulted assets, the global charge due to defaulted assets, the portfolio mix, the R-O share and the GC for exposures under the SA (see Figure 15). Each successive breakdown controls for a certain driver of A-type differences ([22]). After isolating all A-type differences, we are able to identify the B-type GC, i.e. those due to IRB estimation, by each LDP and each bank. The outcome 1 represents the remaining GC differences for each exposure class; the outcome 2 is the result for the remaining RW differences ([23]).

Figure 15: Breakdown of the initial GC deviation on the LDP



The order of the successive breakdown differs from the first EBA interim report, as it has been adjusted to maximise the use of detailed information at the portfolio level (e.g. the detail about the breakdown of defaulted assets by regulatory approach allow a more precise and separate estimation of the B-type differences for non-defaulted IRB assets).

For more details on the breakdown process of the top-down analysis, see Annex II.

3.3 Results of the top-down analysis

The GC at wholesale portfolio deviates considerably from average GC across banks in a range from approximately –30 percentage points to +70 percentage points (see Figure 16 and Figure 9). The GC

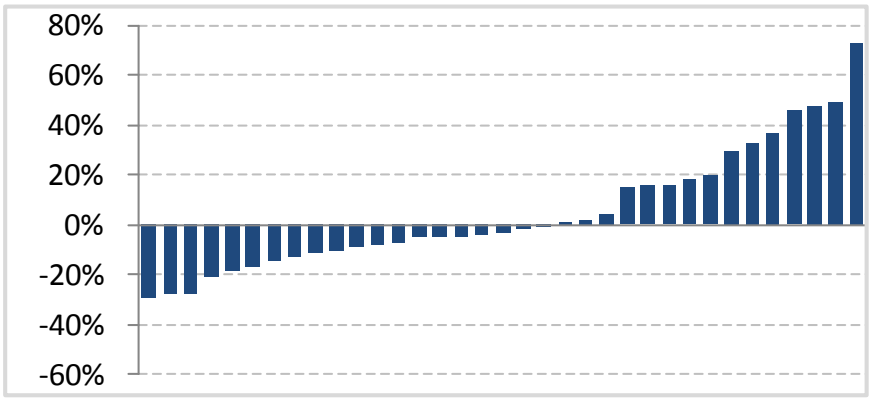
([21]) We did not use the LDP parameter, as information on defaulted exposures was available only at the wholesale portfolios level (sovereign, institutions and corporate portfolios).

([22]) If a bank has exposures in only two 'sets' (e.g. defaulted and non-defaulted exposures, sovereign and corporate exposures or R-O and non-R-O exposures), then the total GC of this bank may be broken down as $GC=q_1GC_1+q_2GC_2$, where GC_i is the GC for 'portfolio sets' i and q_i is the share of 'portfolio set' i in terms of exposure ($q_i = EAD_i/EADtotal$). By comparing each bank's breakdown with the benchmark (average breakdown for the sample), the top-down approach enables us to detect each bank's discrepancy from the benchmark in terms of this breakdown.

([23]) We have applied the top-down methodology for the GC and the RW. For the latter, we have extended the same methodology only to the RW component.

standard deviation is 24.6 %. As the expected loss has a major impact on the GC calculation, the GC is influenced greatly by the share of defaulted assets in the portfolios.

Figure 16: Initial GC deviation for the wholesale portfolio (defaulted and non-defaulted exposures)



Data source: EBA exercise.

The banks are ordered by their GC level.

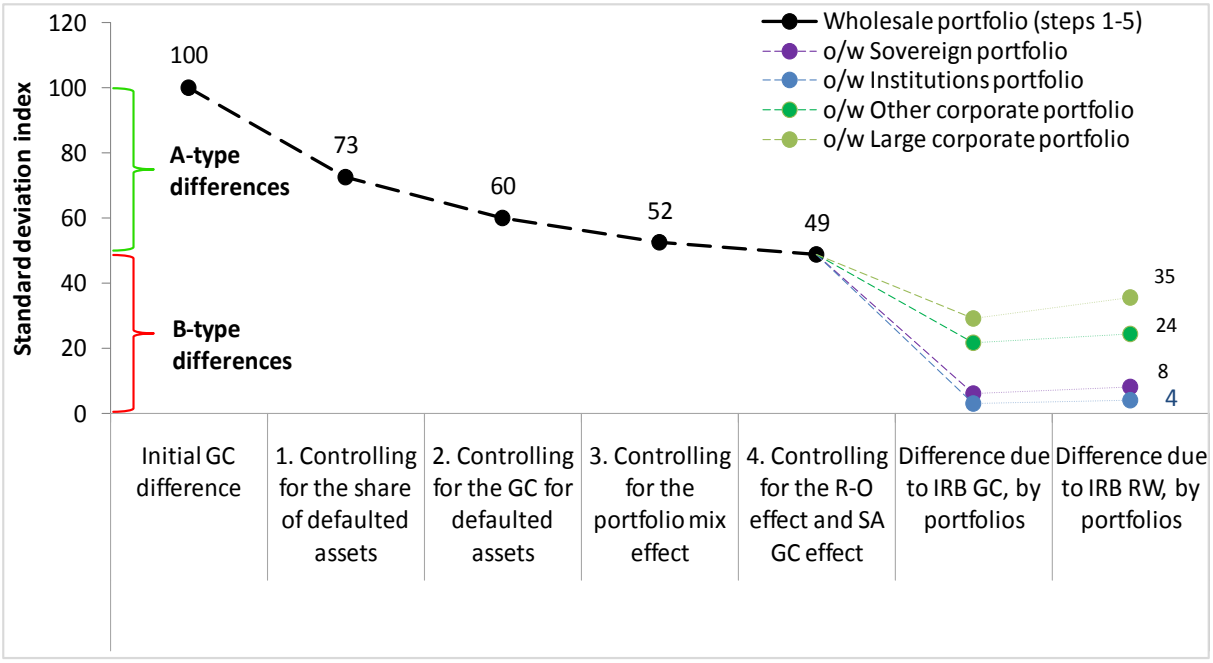
The initial GC standard deviation of 24.6 % is set at 100 to create a standard deviation index ([24]), enabling its evolution through the successive break-downs described in Figure 15 and Annex II to be observed.

After controlling for A-type drivers, the remaining GC deviation on non-defaulted assets due to B-type drivers equals 49% (see Figure 17). In other words, A-type differences explain approximately 50 % of GC differences on the wholesale portfolio in the sample. This result is in line with that of the first interim report for the banking book portfolio and a larger sample of banks ([25]).

([24]) In the first EBA interim report, we used the 95th-5th range evolution to control the dispersion in risk weights for the 89 banks of the sample. Because in the LDP exercise the sample is limited to 35 banks, we have preferred to use the standard deviation index as measure of deviation. The results are robust irrespective of the deviation measure.

([25]) In the first interim report a similar methodology was used on a different sample and data source, i.e. supervisory dataset (ISG).

Figure 17: Decomposition of the standard deviation index (basis 100 for the initial situation) for the wholesale portfolio ([26])

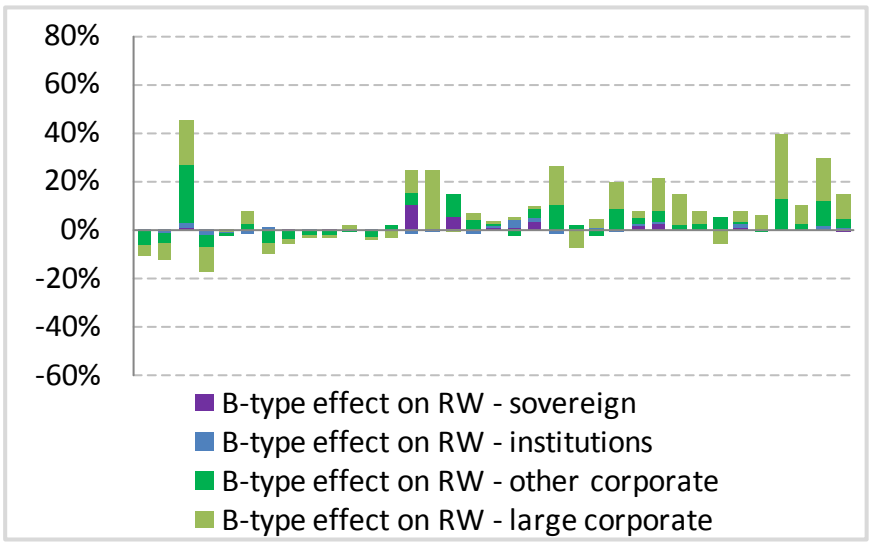


Data source: EBA exercise.

The remaining IRB RW deviations are mostly found on the large corporate portfolio (see last step in Figure 17 for aggregate sample results and Figure 18 for results across banks). IRB RW deviations on the large corporate portfolio are over 5% in absolute terms for 18 banks, compared with 10 banks on the other corporate portfolio and one bank on the sovereign portfolio. On the institutions portfolio, IRB RW deviation is very low across banks.

([26]) For outcomes 1 and 2, the results are expressed for each exposure class compared to the initial GC standard deviation calculated on the wholesale portfolio. The standard deviation indexes in each outcome are not additive as they are standard deviation.

Figure 18: Outcome 2: remaining IRB RW deviation by portfolios, non-defaulted exposure only

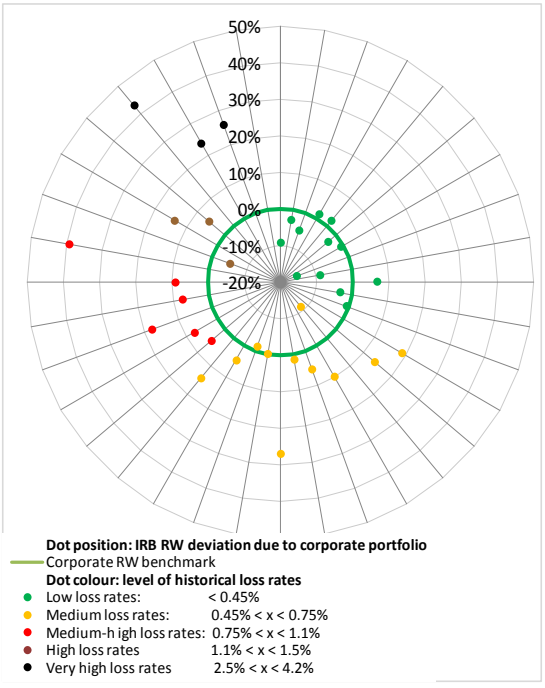


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

As most of the IRB RW differences are found on the corporate portfolio, we analyse to what extent banks' IRB RW on this portfolio are in line with their historical loss rates ([27]) (i.e. average loss rates for the corporate portfolio).

Figure 19: IRB RW deviation due to the corporate portfolio (large and other corporate) compared with the level of historical loss rates at June 2012



Data source: EBA exercise, EBA recapitalisation exercise.

The banks are ordered by their level of historical loss rates.

([27]) EAD weighted average of December 2009, 2010, 2011 and June 2012 loss rates, defined as the annual default rates factor for the impairment flow rate on newly defaulted assets.

Figure 19 shows that the banks with lower remaining IRB RWs on the corporate portfolio (negative deviation from the benchmark) generally have lower loss rates (green dots inside the green circle). Conversely, banks with higher IRB RWs tend to have higher historical loss rates (red and black dots close to the outside circle).

Nevertheless, for some banks, relatively low IRB RWs are coupled with relative high historical loss rates (non-green dots within the green circle), or *vice versa* (green dots outside the green circle). Those situations should be investigated at bank level to ensure that the level of IRB RW is consistent with the level of loss rates experienced. Therefore, the top-down analysis is complemented by a more in-depth study on the IRB parameters (some of the B-type RW differences consisting of a specific collection exercise on a hypothetical portfolio, LGD and maturity parameters, and credit conversion factors).

4. Hypothetical portfolio exercise (HPE) findings

The purpose of the HPE exercise is to investigate the B-type differences remaining in Figure 18 after the top-down approach (outcome 2 in Figure 17).
In subsection 4.1, we present the analysis framework for the HPE exercise. Then, the results are provided for the central governments portfolio in subsection 4.2, for the credit institutions portfolio in subsection 4.3 and for the large corporate portfolio in subsection 4.4. Finally, we draw some conclusions in subsection 4.5.

4.1 Presentation of the HPE exercise

The purpose of the exercise was to compare banks' IRB parameters for a common set of exposures.

The exercise was "hypothetical" in the sense that the nominal exposure amount was not specified, and in most cases the exposure type was specified as senior unsecured, regardless of the actual exposure type a bank might normally have. However, participating banks were instructed to provide risk parameters only if they actually had exposure to that specific obligor, either on- or off-balance-sheet, which helped ensure that the responses reliably reflect estimates the participants actually use to calculate RWAs.

The list of borrowers and exposures – the composition of the hypothetical portfolio – was constructed with a view to achieve a high degree of overlap among participating banks. For the purpose the original SIGBB HPE sample ([28]) was complemented for the 3 different low default portfolios by adding some additional European counterparts identified among common large exposures reported by the participating banks in the national credit registers or suggested by the national competent authorities.

A little more than half of corporate names analysed had an active rating from either Standard & Poor's, Moody's or Fitch as of October 2012; of the rated obligors, of which one fifth are below investment grade.

([28])http://www.bis.org/press/p130705.htm

In order to ensure robust comparison between banks, the analysis is carried out on a predefined set of real common counterparties but excluding those where at least one bank reported a default or where fewer than four banks reported parameters for the same counterparty. We were, therefore, able to use in the analyses 46 counterparties for the central governments portfolio, 91 counterparties for the credit institution portfolio and 856 counterparties for the large corporate portfolio ([29]).

The overlap in the hypothetical portfolio generally was very good for the sovereign and bank asset classes, and, as expected, a little less for the corporate asset class. However, we observe overall a fairly high degree of overlap for this asset class, especially when judging from the experience of prior bottom-up portfolio exercises.

The exercise allowed a direct comparison of the Internal Ratings-Based (IRB) parameters PD (Probability of Default) and LGD (Loss Given Default), and resulting risk weights on a set of identical real common counterparties assuming the exposures are senior and unsecured loans (hypothetical exposures). Participating banks have also been asked to report the actual risk weights and expected losses applied to the same set of counterparties (real exposures).
The comparison of the hypothetical parameters and the actual LGD and maturity ([30]) parameters used for the regulatory calculation of RWA was aimed at identifying the possible impacts of credit risk mitigation and maturity differences in explaining the observed RW variation.

We have conducted analyses on the set of identical real common counterparties using either the hypothetical parameters or the actual parameters used for the regulatory calculation of RW:

1. The hypothetical parameters are a senior unsecured LGD, the actual PD and an assigned 2.5-year maturity.

2. The actual parameters used for the regulatory calculation of RW are the LGD taking into account the level of collateralisation of the exposure, the actual PD and the maturity calculated with the advanced approach or the foundation maturity, depending on the approach followed by the bank.

The RW deviation of each bank regarding a benchmark was used in order to try to assess its possible level of conservatism regarding its peers. The benchmark used was the median of the RW assigned by the banks for the same counterparties. For each bank and each of its counterparties, we computed the deviation from the benchmark ([31]). We then summarise the findings for each bank by computing the simple average deviation for all its counterparties ([32]).

([29]) The original dataset included 55 names for the central governments portfolio, including three defaults and six counterparties with fewer than four common obligors; 91 names for the credit institutions portfolio, including none in default and none with fewer than four common obligors; and 1 999 names for the large corporate portfolio, including 30 defaults and 1 113 counterparties with fewer than four common obligors.

([30]) The actual LGD and maturity are not reported in the HPE dataset. They have been recalculated based on the reported PD, EL and RW. Thus the recalculated LGD can be influenced by collateralisation and exposure types.

([31]) By doing so, we control for the different compositions of portfolio between banks as they are compared only for the counterpart that they have in common.

([32]) The choice of the statistic to summarise the results is a key assumption. The simple average was chosen to represent the overall deviation from benchmark; the findings are consistent with the use of the median. However, the findings would have been slightly different with other statistics, such as interquartile range or minimum–maximum range (the EAD weighted average was not possible as we did not know the EAD by counterparty), etc.

However, since the analyses are based on a limited number of observations and banks (especially for the central government portfolio) with different levels of coverage for each bank and is based on various assumptions and simplifications (simple average deviation, hypothetical parameters etc.); these results should be considered as preliminary and should be interpreted carefully.

This approach was repeated using alternatively actual parameters and hypothetical ones, in order to try to isolate the impact of each individual parameter on the bank's average RW deviation with respect to the benchmark.

Figure 20, Figure 22 and Figure 24 synthesise the banks' results for the three narrow LDPs (the central governments, the credit institutions and the large corporate portfolios, respectively).

The left-hand graphs in Figure 20, Figure 22 and Figure 24 show the banks' RW deviation results with respect to the benchmark when computing the risk weights in three different cases:

(1)The brown squares indicate the actual banks' RW deviations when using the banks' actual regulatory PD, LGD and maturity parameters.

(2)The pink circles indicate the banks' RW deviations when controlling for the maturity differences across banks (use of banks' actual regulatory PD and LGD but with a fixed 2.5-year maturity).

(3)The red crosses indicate the banks' RW deviations when only the banks' regulatory PD parameter was used, while the other parameters were the hypothetical ones: hypothetical unsecured LGD and fixed 2.5-year maturity.

While case (1) shows the bank's initial actual RW deviation with respect to the benchmark for each LDP portfolio separately, using their actual PD, LGD and maturity regulatory parameters, the variation between case (1) and case (2) can be used to assess the part of those banks' deviation that could be linked to their different actual maturity profiles. Finally, the difference between case (2) and case (3) can be used to assess the part of the banks' deviation that could be linked to the impact of their level of collateralisation, unfunded protection or type of exposures, as reflected in the LGD reported by banks (in (1) and (2) we use the real exposure to the counterparty whereas in (3) we use a senior unsecured loan).

In order to try to assess whether the PD or the LGD parameters mainly drive the RW variations across banks, two additional computations were performed: the computation of the banks' RW deviations from the benchmark with a benchmark PD, and the computation of the banks' RW deviations from the benchmark with a benchmark LGD. The benchmark was the median PD and LGD used by the banks for the same counterparties.

Replacing alternatively the bank's PD by the PD benchmark (median PD of the other banks) and the bank's LGD by the LGD benchmark (median LGD of the other banks) we obtain:

(3.1) the banks' RW deviations linked to the difference between their LGD and the LGD benchmarks: impact due to LGD only (when the bank is under AIRB Approach only ([33])), using benchmark PD, hypothetical unsecured LGD and 2.5-year fixed maturity;

(3.2) the banks' RW deviations linked to the difference between their PD and the PD benchmarks: impact due to PD only, using actual PD, benchmark unsecured LGD and 2.5-year fixed maturity.

The results are shown in the right-hand figures in Figure 20, in Figure 22and in Figure 24.

For example, a red square at –0.3 means that, on average, the bank is lower than the benchmark RW (median RW of the other banks) by 30 percentage points. Consequently, if the median of the others' RW (benchmark) is 45 %, the average risk weight of the bank is 15 %.

4.2 Hypothetical portfolio exercise for the central governments portfolio

The left-hand graph in Figure 20 shows that, for the central governments portfolio, the maturity may have a large impact in explaining the RW deviation from the benchmark for a couple of banks, with a reduction of roughly 20 percentage points.

For other banks, step (3) seems to explain also a large part of the RW deviation from the benchmark. As this portfolio is usually not collateralised, the impact is mainly due to the type of exposures to central governments; some banks have exposures with credit export guarantees, implying a lower LGD, or exposures that are denominated in the local currency (transfer risk), and thus benefit from a lower LGD than the standard unsecured LGD assigned to the country.

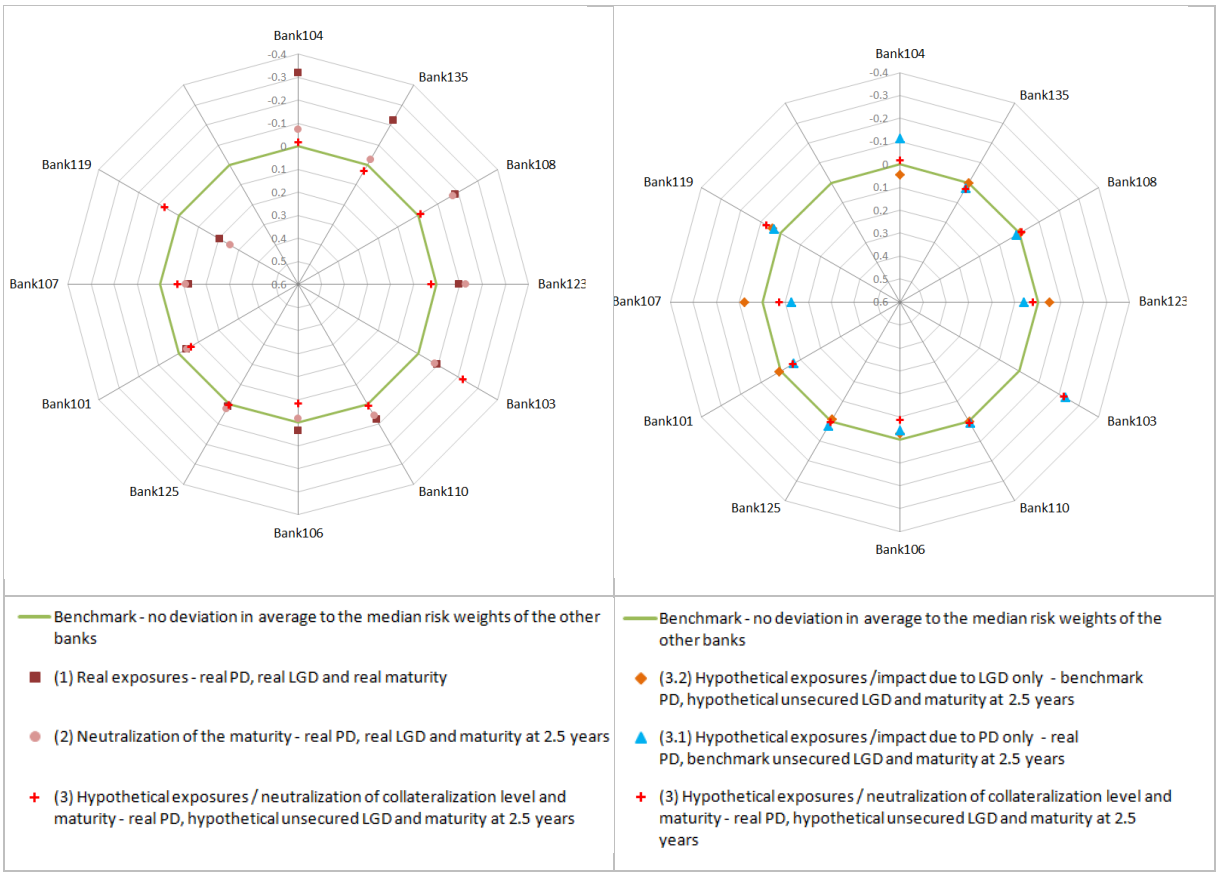
In the right-hand graph, the impact of unsecured LGD (only for AIRB banks) and PD is split in the explanation for the RW deviation from the benchmark. The impact of a parameter is positive (RW is increased) if the results move inside the benchmark circle (green circle).

It should be noted that the relative proportions of the banks' RW deviation from the benchmark linked to the PD and the LGD vary across banks. In fact, six out of the ten AIRB banks analysed have a lowering impact for their RW compared with the benchmark due to their LGD([34]) (orange diamond outside the green circle). Looking at the impact of the PD, we see lowering and increasing impacts on RWs, showing that there is discrepancy across banks for evaluating the PD of central governments. However, we also observe compensation effects between PD and LGD (PD impact and LGD impact being on different sides of the benchmark green line).

([33]) In this section 4, a bank is labelled as AIRB for a portfolio if this bank has reported at least one exposure under the AIRB Approach in its actual IRB exposures to the HPE.

([34]) The benchmark is computed taking into account advanced and foundation LGD parameters; however, the results are displayed only for banks having AIRB-reported exposures.

Figure 20: Simple average RW deviation from the benchmark (median RW of the other banks for the same counterparty), in unity, central governments ([35])



Data source: EBA exercise.

Banks are ordered by their deviation from the benchmark for their real exposures.

In order to estimate how the deviations of the banks' RW from the benchmark are reduced by the different drivers of risk, we analyse the impacts of those drivers on the standard deviation of the benchmark deviation ([36]). In fact, if all the banks had the same RW for the same counterparty, the benchmark deviation would be equal to zero and the standard deviation calculated on the sample would also be equal to zero.

We scale the standard deviation by setting the initial standard deviation at 100 and analyse the reduction implied by the following additive steps:

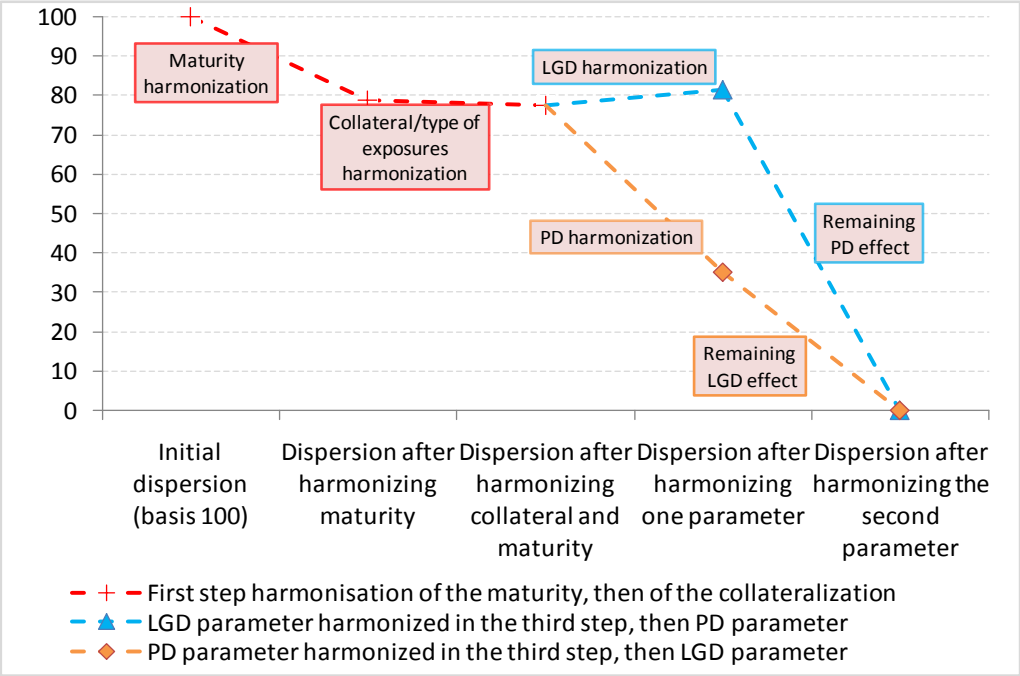
- harmonisation of the maturity;
- harmonisation of the collateralisation/exposure types (no collateral as a result of hypothetical unsecured LGD);
- harmonisation of the LGD or PD parameter.

([35]) Only 11 banks are represented in this chart because, to be represented, a bank should have exposures under the IRB Approach to at least 15 counterparties for which at least four banks have provided ratings.

([36]) For each step (1), (2), (3), (3.1) and (3.2) we calculate the standard deviation for the sample of the deviation from benchmark (simple average deviation calculated by bank). Then we assigned the basis 100 to the standard deviation of step (1) to create a standard deviation index and observe its evolution through steps (2), (3), (3.1) and (3.2).

It is important to note that the relation is not linear, because, depending on the IRB formula, the order of the steps influences the nature of the impact of each step. We can illustrate this impact by alternatively representing the harmonisation of the LGD or the PD in the third step (see Figure 21).

Figure 21: Evolution of the standard deviation of the RWs deviation from benchmark after different harmonisation steps, central governments portfolio, FIRB and AIRB banks[37]



Data source: EBA exercise.

Figure 21 seems to illustrate that, for the central governments portfolio, a major part (20 %) of the RW dispersion could be explained by the difference in maturity of exposure. Correcting for collateral and types of exposure does not seem to reduce the dispersion. The remaining difference can be assigned to PD and LGD impacts. We see that the influence of the PD is, in both cases, greater than the influence of the LGD.

4.3 Hypothetical portfolio exercise for the credit institutions portfolio

For the credit institutions, Figure 22 (left graph) seems to show that the maturity and the collateral may have little impact in explaining the discrepancy in RWs (deviation from benchmark). This appears to be confirmed by Figure 23, where the dispersion is even higher after fixing the maturity and the level of collateral.

The right-hand graph of Figure 22 seems to show that for AIRB banks the LGD could be mainly a driver for lower RWs (orange diamond outside the benchmark green circle), whereas the PD could be, in most cases, a driver for higher RWs (with the exception of banks 110, 125 and 131).

([37]) The results for AIRB banks are presented in Annex III only for credit institutions (Figure 54) and for large corporate (Figure 55). As to the central government, ten out of the eleven banks studied have AIRB exposures; we are not providing the figure for AIRB banks only.

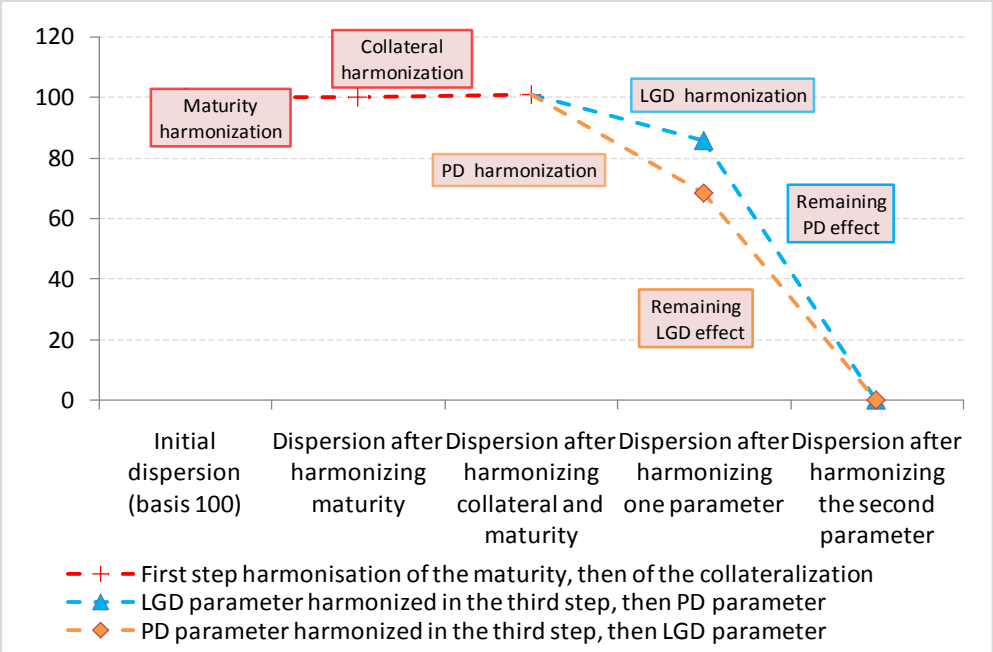
Figure 22: Simple average RW deviation from the benchmark (median RWs of the other banks for the same counterparty), in unity, credit institutions

Data source: EBA exercise.

Figure 23 shows that maturity and collateralization do not seem to be a factor of explanation for the RW dispersion for the total sample of IRB banks. The same analysis for AIRB banks sample (see Figure 54 in Annex III) shows that the use of collateralization decreases the dispersion in RW by about 20%; one explanation could be that banks which have reported higher hypothetical unsecured LGD in the exercise make more use of credit risk mitigants for their real exposures, thus they have actual LGD parameter more in line with the others banks.

Indeed in Figure 23, the dispersion seems to be completely driven by the PD and LGD. Which of these two parameters has the larger impact is not clear, since their relative impact depends on the order in the harmonization steps, the first being smaller than the second.

Figure 23: Evolution of the standard deviation of the RWs deviation from the benchmark after different harmonisation steps, credit institutions portfolio, FIRB and AIRB banks



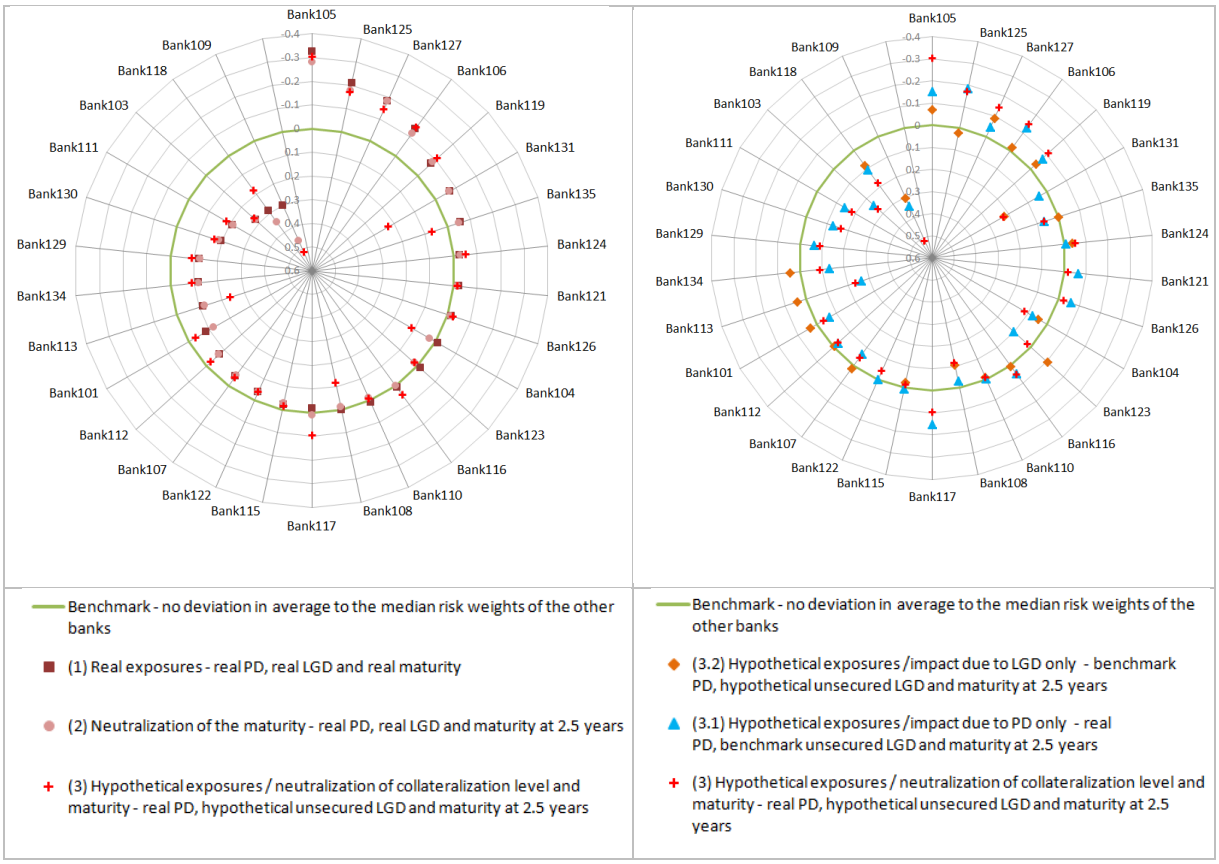
Data source: EBA exercise.

4.4 Hypothetical portfolio exercise for the large corporate portfolio

The findings for the large corporate portfolio are similar to those for the credit institutions portfolio. The maturity does not seem to help explain the discrepancy in banks' RWs, whereas the level of collateralisation could be a potential driver of RW differences for some banks (e.g. banks 104, 108, 131 and 135). However, as a whole, the impact of the level of collateralisation is rather low (see Figure 25).

There seems to exist also some compensation effect between PD and LGD for AIRB banks (banks 101, 107, 113, 123, 125 and 134), with the LGD having mainly a negative impact, implying lower RWs (orange diamond outside the benchmark green circle).

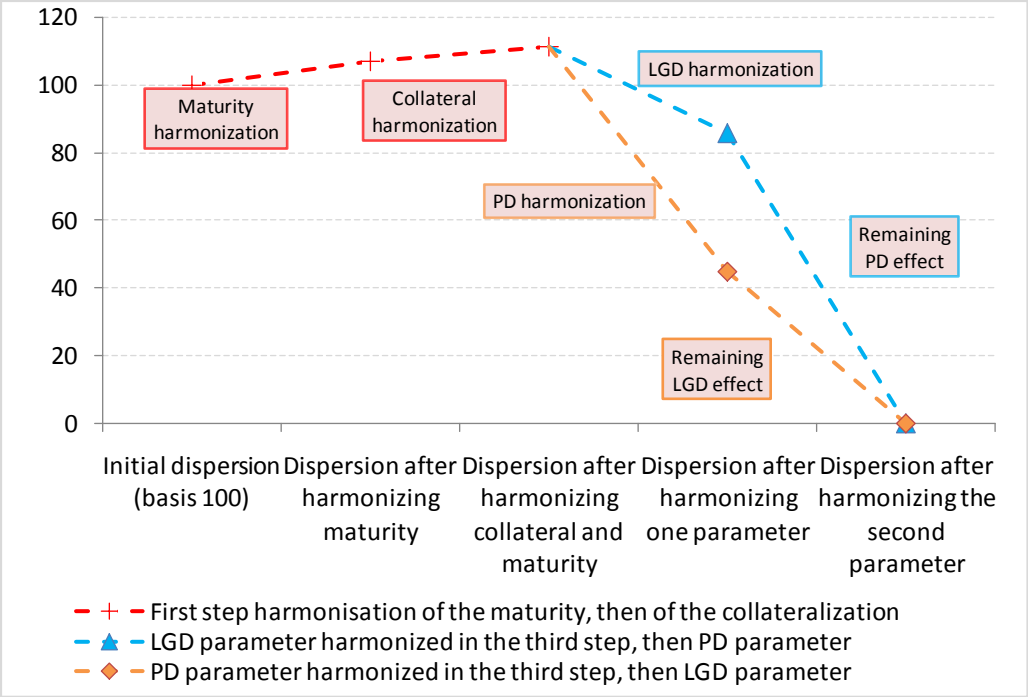
Figure 24: Simple average RW deviation from the benchmark (median RW of the other banks for the same counterparty), in unity, large corporate



Data source: EBA exercise.

Figure 25 seems to corroborate the finding that, at the sample level, maturity and collateralisation could make a relatively small contribution to the discrepancy in RWs, whereas the PD and the LGD could be the main drivers. The PD effect seems to be larger than the LGD effect.

Figure 25: Evolution of the standard deviation of the RWs deviation from the benchmark after different harmonisation steps, large corporate portfolio, FIRB and AIRB banks



Data source: EBA exercise.

4.5 Conclusion for the hypothetical portfolio exercise

The findings based on the hypothetical exercise should be considered very carefully when extrapolated to the overall bank's portfolio due to the limited number of observations and banks included in some analyses, as well as the different level of representativeness/coverage of this exercise for each individual bank.

However, some conclusions at the HPE level can be useful in understanding the relevance of the varying maturity, level of collateralisation and the PD and LGD parameters in order to explain the remaining B-type differences. Some compensation effect between PD and LGD can also be noted.

For the central governments portfolio the maturity explains 20% of the dispersion in risk weights, and the residual part seems driven by PDs and LGDs. For the credit institutions collateral play a role in explaining the variation only for AIRB banks. For large corporate the collateral contributes to the variation as after controlling for it there is an increase in the RW dispersion; only for FIRB banks the maturity parameter explain part of the variation in the RW.

This finding raises the need to have a closer look at the banks' parameter models in order to better understand the differences within these models.

5. Thorough look at the parameter models or other differences

In section 3 we identified A-type drivers and were able to estimate the impact of these drivers on the LDP portfolios using a top-down approach. The remaining variation of around 50 % (B-type differences) was analysed via the HPE (see section 4). The purpose of this section is to apply a more qualitative approach to the assessment of the discrepancies within the rating models. Where it was possible, the potential factors which could explain the remaining differences in RWs were highlighted, and proposals for improvement were made. This qualitative approach is based on the study of the qualitative questionnaire of the 35 banks of the sample and from the outcome of the interviews carried out individually for a subsample of 12 banks.

Potential drivers for B-type differences can, therefore, be identified; however, the impact of these drivers is not quantifiable based on the available information. To quantify the impact, further investigations would be needed.

We first present the findings concerning the default definition (subsection 5.1), which may have an impact on all risk parameters. Then we present some findings regarding PD (subsection 5.2) and LGD (subsection 5.3) parameters. Finally, we illustrate the variation in maturity (subsection 5.4) and in credit conversion factors (subsection 5.5) among our sample of banks.

5.1 Default definition and default rate

5.1.1 Default definition

We observed a wide range of practices for the definition of default ([38]), including differences in the method of computation, in the criteria used and the applicability and level of materiality thresholds.

Regarding the default criteria, the application of 90 days past due seems to be the general practice. However, the method of calculating the 90 days past due diverges between banks. For example, some banks use a materiality threshold to set an absolute or relative level. In practice, two third of banks start counting the days past due when the first non-payment occurs and one third when a non-payment materiality threshold is reached.

However, LDPs seem to be characterised by the predominance of the ‘unlikely to pay’ criterion and close monitoring of the counterparties included on a warning list. The objective characteristics of these criteria could be one explanation (e.g. the impact of the cut-off date in June 2012 for the HPE, different payment behaviours depending on the bank) of the observed differences in the default status within the EBA exercise.

Although, due to the low number of defaults, those differences in definition have no material impact on the RWs of the banks for these portfolios, they could still have an additional impact on, for instance, the default rate and the calibration of rating models.

5.1.2 Default rate

In addition to the potential impact of the default definition on the default rate, we observed differences in the computation of the default rate, in both the numerator and the denominator. The main difference

([38]) Annex VII, Part 4, points 44 to 48, of Directive 2006/48/EC.

can be attributed to the approach of including defaulted exposures in the denominator. Moreover, the way of counting the relevant sample for calculating the default rate differs between banks, e.g. all counterparties at the end of the period, at the beginning of the period or with a moving window, etc.

The differences in calculating the default rate will have an impact on the calibration process when using internal data. A better specification of the regulatory requirements for the calculation of the default rate could help to create a more common understanding among banks.

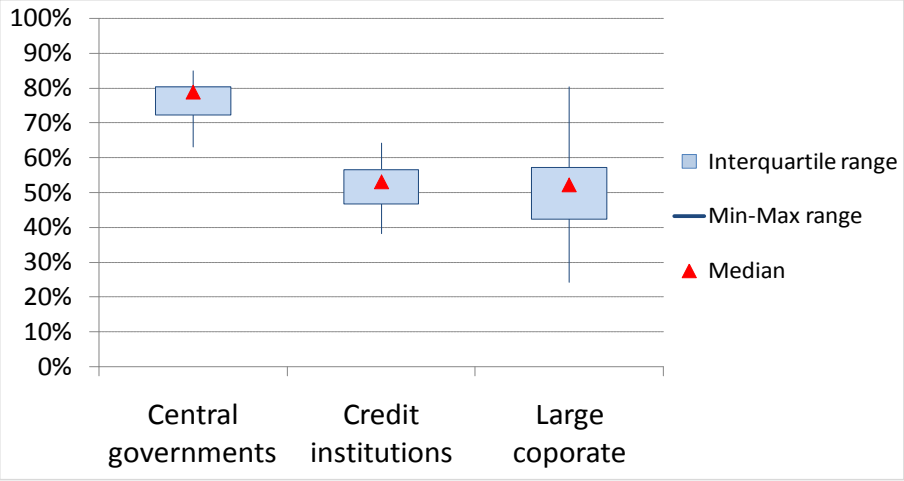
5.2 PD parameter

The internal models used for PD estimation for the LDP have the particularity that the few instances of actual default observed by the banks themselves, and also by the market in general, put restrictions on the development of statistical models. Thus, banks often use mixed approaches that take into account internal and external data as well as expert judgement. In the following subsection, we first illustrate the differences in assigned PDs at counterparty level based on the HPE dataset. Then we aim to analyse the reasons of the differences across PD by assessing the integration of the economic cycle, the importance of the use of external data, the impact of the different rating scales and the rating update processes.

5.2.1 Illustration of PD discrepancies at counterparty level

In section 4 we discussed the impact of the PD differences within the RW computation. By a drill-down on obligor level, we observed that, on the one hand, the banks seem to rank the counterparties in the HPE largely in the same way. Therefore, there is not extreme disagreement on the relative risk of counterparties. This observation especially holds for central governments (Figure 26).

Figure 26: Distribution of the Kendall tau association measure[39] within the sample of banks for LDP

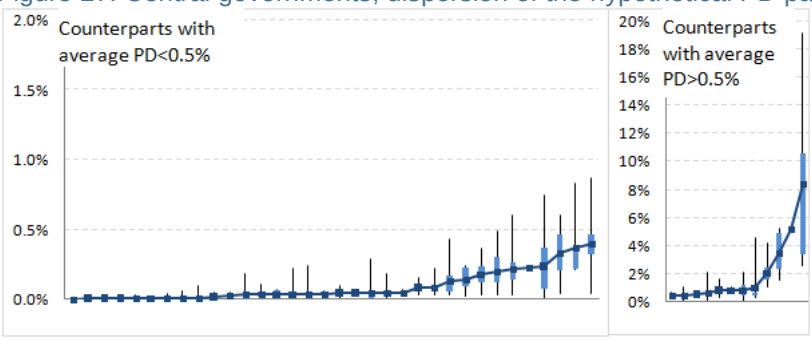


([39])Kendall tau association measure indicates whether the relative orderings of common counterparts assessed by two banks are similar (or one bank and external ratings). It may range between -100% and 100%. A high association (close to 100%) means that the bank has the same relative ordering as the other bank (or external rating). A low association (around 0%) means that the banks have very few similar relative ordering. An association measure around -100% means that the banks have inverse relative ordering. We use the average association measure for each bank (weighted by the number of common counterpart) to represent the distribution of association measures with other banks (or external ratings) for the whole sample.

Data source: EBA exercise.

On the other hand, as illustrated in Figure 27, Figure 28 and Figure 29, the differences in the absolute PD level may be large for the same counterparty within our sample of 35 banks. This may be due to different perceptions of risk but also to methodological choices, which we review in the following subsections.

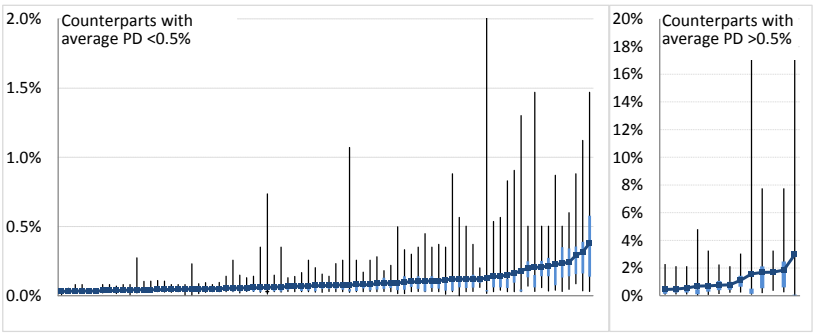
Figure 27: Central governments, dispersion of the hypothetical PD parameters by counterparty



PD in y-axis, counterparties in x-axis, minimum of four PDs reported by counterparty, the dark blue line being the average, light blue representing the interquartile spread (25–75 %) and the whisker the minimum/maximum range. Defaulted exposures are excluded.

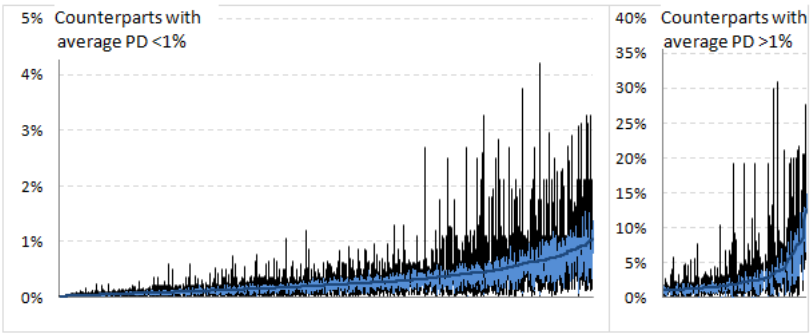
Data source: EBA exercise.

Figure 28: Credit institutions, dispersion of the hypothetical PD parameters by counterparty



Data source: EBA exercise.

Figure 29: Large corporate, dispersion of the hypothetical PD parameters by counterparty



Data source: EBA exercise.

5.2.2 Integration of the economic cycle

The rating philosophy and potential integration of the economic cycle in PD estimations is often addressed with the question whether a rating model is following a point in time (PiT) approach or a

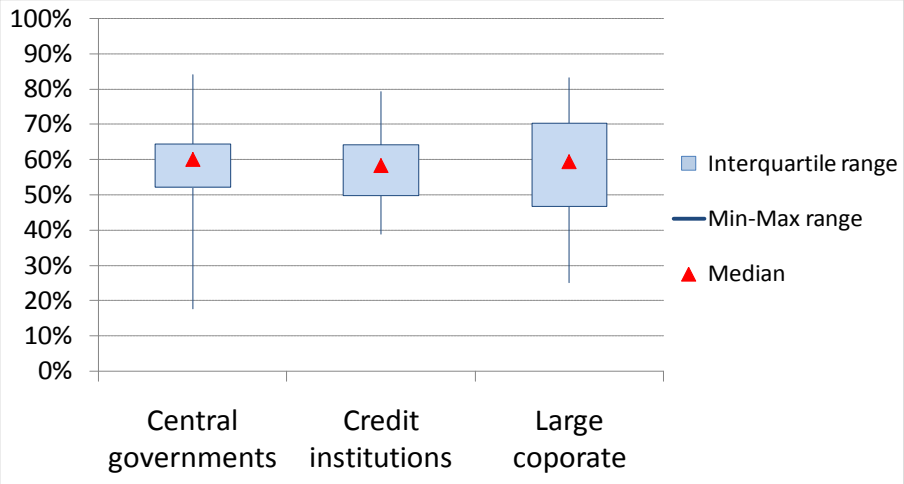
through the cycle (TTC) approach. Theoretically, during their model development process, banks choose between a TTC or PiT approach. The aim of a pure TTC approach is to integrate the economic cycle and smooth its impact to have less variable RWs. This approach has been adopted by the majority of the banks in the sample (19 out of 35 banks sampled). The rest of the banks reported using a PiT approach or a hybrid approach. However, the interviews with a subsample of 12 banks illustrate that there is still plenty of room for clarification on the PiT and TTC approaches. For example, banks that reported using a TTC approach do not necessarily use a systematic adjustment. Rather, the approaches seem to represent the internal rating philosophy/interpretation of the bank. Therefore, sometimes we did not find large differences in the method of rating calibration or assignation between two banks even if one of those banks defines itself as TTC and the other as PiT.

5.2.3 Use of external data

As stated in the introduction, to counteract the insufficiency of internal default data, banks frequently rely on external data or ratings. This is particularly the case for credit institutions and central governments portfolios, where either only external data are used or in combination with internal data.

The use of external data could mean either combining data at the model calibration stage or benchmarking the output of the internal model *a posteriori*. The widespread use of external data or benchmarks could be indicated by the level of the association measure within the sample of banks and between banks and external ratings ([40]).

Figure 30: Distribution of the Kendall tau association measure between banks' PD and external ratings for LDPs



Data source: EBA exercise.

In the case of large corporate, the reliance on external data is more balanced, with half of the banks using only internal data, often with a broader definition of large corporate (or even no threshold ([41])), and others still relying mainly on external data. This is confirmed by the wider range of association measures for large corporate in Figure 26.

([40]) We used the average external rating reported by the sample of banks.
([41]) Only half of the models used for corporate have a threshold on total assets or turnover to separate large corporate from SMEs, with a high dispersion on the defined level (from EUR 1.33million to EUR 500million, the usual level being EUR 50million).

5.2.4 Rating scale

(1) Granularity of rating scale

Many banks use masterscales for assigning the internal PD to a counterparty. Half of the banks in the sample have a single masterscale in place for all their LDPs. In some cases, the reported masterscale is used only for internal reporting purposes whereas the RWA computation relies on continuous PDs.

The methodology for developing and calibrating master scales varies across banks, leading to masterscales of different granularity. Banks reported master scales with a granularity from 9 up to 30 rating grades, with the most granular typically being used for large corporate. It was not possible based on the questionnaire to identify a common approach to fix the rating-grade PDs, not even for the lowest PD in the first bucket. Some banks fix the PD at the regulatory floor of 3 basis points (bps) for large corporate and credit institutions portfolios. Others use internal floors (often below 3 bps) for internal purposes. Although many banks use an exponential development of PDs, we did not find any common pattern of path from one rating grade to another.

(2) Mapping to external rating scale

Because of the lack of internal default data and subsequent appropriate internal default rates, the assigned internal rating-grade PDs are often derived from default rates of external agencies. Therefore, in many cases, a mapping of the internal masterscales to the masterscales of the big three rating agencies Moody's, Standard & Poor's and Fitch is available. Moreover, 16 banks have provided the mapping between their internal rating scales and at least one external rating scale. Most of these 16 banks do not have a perfect match between the external and their internal rating scale, e.g. due to the lower number of rating grades or different design of grades. It is observable that the range of assigned PDs for comparable rating grades may differ significantly (for example, for the 15th rating grade B/B2/B, the mapping indicates PDs from 2.7 % to 28.6 %), whereas the same PD may correspond to different rating grades depending of the bank (for example 0.4 % has been assigned to the 9th rating grade BBB/Baa2/BBB and to the 12th rating grade BB/Ba2/BB).

The different granularity and the divergence of PDs of comparable rating grades between banks can have an impact on the level of the final PD and thus on the RWA, even if the banks are in line regarding the relative risk of a counterparty.

5.2.5 Rating updates/penalties

Another potential source of differences is the process of updating the internal ratings. Indeed, the regulation requires the banks to update their ratings at least every 12 months. Without prejudice to the regulation above, updates should also be performed as soon as any new relevant information that influences the rating of a counterparty becomes available. All banks in the sample comply with the obligation of an annual rating update. Most banks update their ratings annually using the latest available financial statements and any additional qualitative information about the counterparties. However, some banks update their internal rating more frequently (monthly or quarterly). Furthermore, in many banks the internal monitoring of clients can trigger an update of the rating within the year according to relevant intra-annual information (e.g. with quarterly financial statements).

Having said this, we also observed one bank that seems to have a tolerance level of 18 months for a rating review.

The practice seems to be relatively comparable between banks, with some outliers. Based on this observation, the B-type differences may stem from more diversity in the information used to define the rating. Indeed, some banks show a high tolerance towards the vintage of data.

Nearly half of the banks have penalties applied to expired ratings (mainly notches down).

Further specific work is needed to quantify the importance of those practices to explain the B-type differences, but it is clear that the combination of different vintage of information, schedules of rating update and calibration of rating scales produces some of those B-type differences.

5.3 LGD parameter

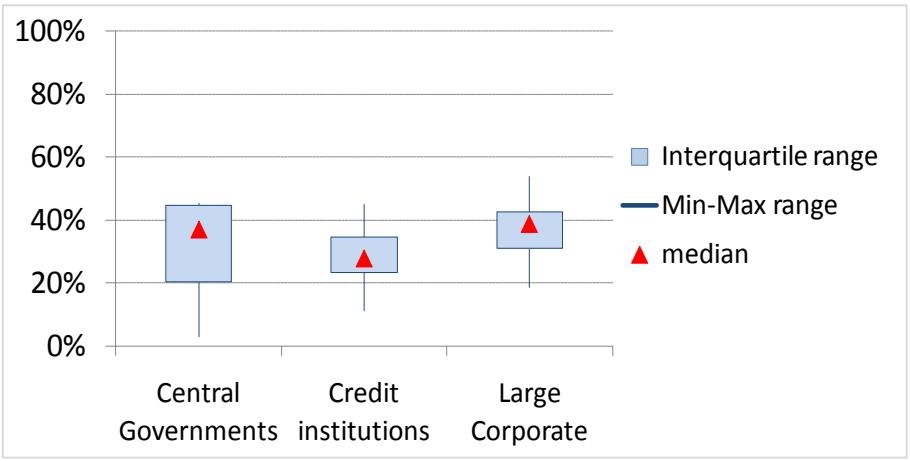
The analysis in section 4 confirmed that the LGD parameter is also an explanatory factor for the discrepancy in RWs between the banks. In the following subsection, we first present some descriptive statistics regarding LGD in the LDP and illustrate the differences in assigned LGD at counterparty level in the HPE dataset. We then analyse the calibration of LGD models and discuss the influence of the exposure types and the level of collateralisation on the final assigned LGD.

Most of the 35 banks included in the EBA sample use the advanced IRB Approach to some extent for their LDP (23 banks for the large corporate, 16 for credit institutions and 14 for central governments), even if this approach is not the prevalent one, as recorded in Figure 5 ([42]).

The banks also reported the actual EAD-weighted average LGD for their LDP central governments, credit institutions and large corporate. Figure 31shows that the level of the average LGD varies between banks (e.g. between 11 % and 45 % for credit institutions) as well as between portfolios (average at 37 % for central governments, 28 % for credit institutions and 39 % for large corporate).

([42]) Numbers of banks differ from numbers reported in Figure 5 because here banks are counted if they use the AIRB Approach for at least a part of their portfolio.

Figure 31: Distribution of EAD-weighted average LGD for the three LDPs, for the sample under IRB

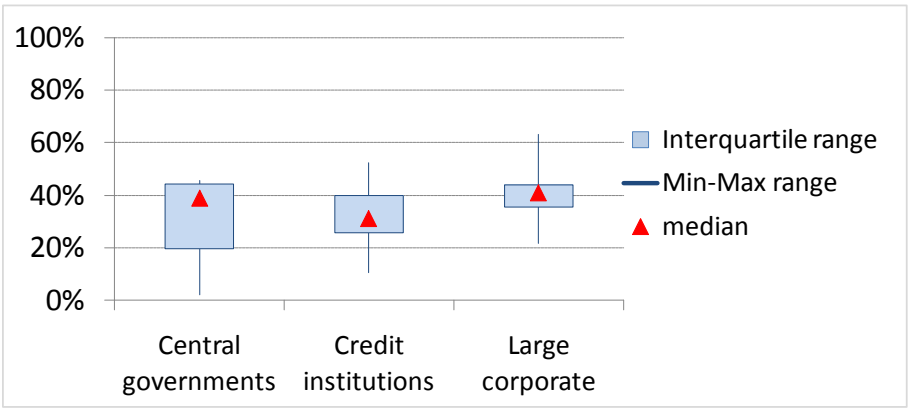


Data source: EBA exercise.

It must be kept in mind that the above values for the whole LDP and not for the HPE subsample. Accordingly, the differences may be affected by the composition of the portfolio of each bank, the level of collateralisation and the approach used (FIRB or AIRB).

In comparison with the values above, the average LGD for the counterparties in the HPE data sample (note: exposures are assumed to be identical for all counterparties) changes only slightly.

Figure 32: Distribution of EAD-weighted average LGD for the three LDPs, for the sample under IRB, HPE data



Data source: EBA exercise.

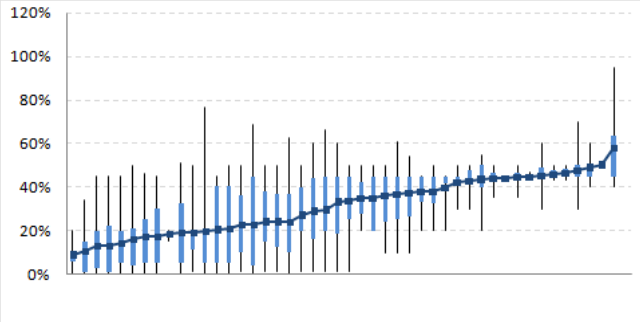
5.3.1 Illustration of LGD discrepancies at portfolio and counterparty levels

In the HPE, the banks delivered the LGD assigned to a senior unsecured loan. Therefore, we can represent the discrepancy across banks when assigning an unsecured LGD to the same counterparty. At counterparty level, we observe in the HPE a wide range of LGDs. In the large corporate portfolio, in particular, some LGDs for selected counterparties are close to zero, while other counterparties have an LGD up to 100 %. For the credit institutions portfolio and the large corporate portfolio, it is notable that the average LGD for senior unsecured loans is often very close to the FIRB LGD of 45 %, (with a small interquartile range), even if the majority of the banks are under advanced approach for this portfolio (17 out of 35 banks for credit institutions portfolio, 24 out of 35 banks for the large corporate portfolio). The overall lack of default data for the LDP could be a reason that banks tend towards the

'safe harbour' of supervisory FIRB LGD. Furthermore we observe for the credit institutions portfolio that the extreme values are driven by few banks, due to the low granularity of their LGD for the counterparties included in the exercise.

Nevertheless, the high dispersion in LGD at counterparty level calls into question the different calibration approaches followed by the banks.

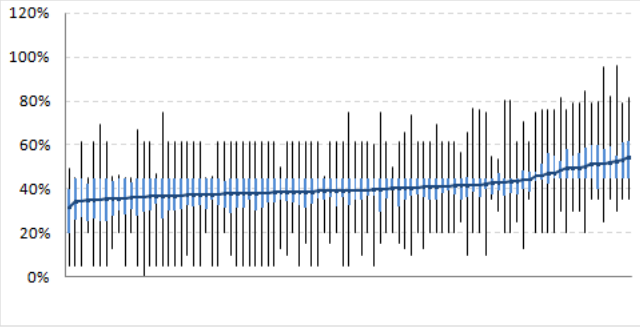
Figure 33: Central governments, dispersion of the hypothetical LGD parameters by counterparty



LGD in y-axis, counterparties in x-axis, minimum of four LGDs reported by counterparty, the dark blue line being the average, the light blue representing the interquartile spread (25–75 %) and the whisker the minimum/maximum range. Defaulted exposures are excluded.

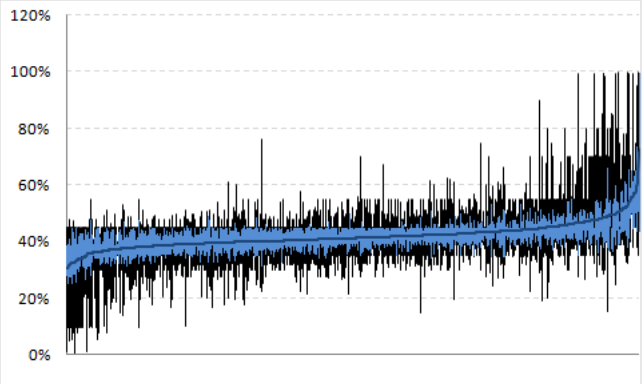
Data source: EBA exercise.

Figure 34: Credit institutions, dispersion of the hypothetical LGD parameters by counterparty



Data source: EBA exercise.

Figure 35: Large corporate, dispersion of the hypothetical LGD parameters by counterparty



Data source: EBA exercise.

5.3.2 Calibration of LGD model

The interviews with banks confirmed that the calibration of LGD is difficult, with banks struggling to find enough default data to model their LGD, especially for central government and credit institutions. The situation is even more complex in comparison with PD modelling because in LGD modelling the banks are limited to the analysis of defaulted counterparties to identify the appropriate level of LGD and the explanatory factors. To deal with this issue, banks are maximising the information that they can collect by using, for example, closed files as well as files still in work-out in their dataset or by giving great weight to expert judgments. Some banks use conservative layers.

Downturn effect

Many banks interpret downturn conditions as the conditions observed during recession phases or the period of a historical crisis. These periods are identified by the banks in the sample in general by:

- negative observations of macroeconomic factors (GDP, unemployment rates and sharp reductions in industrial production);
- a higher average default rate;
- a higher average loss rate;
- a deterioration of the relevant risk drivers (cure rates, secured and unsecured recovery rates, collateral market values, indirect costs, time to recovery or discount factors).

However, some banks argue that such downturn effects on the LGD could not be observed in the past. Few banks mention that such an effect is only observable for collaterals and not for the reported senior unsecured LGD in the HPE. Besides, for the central governments portfolio and to some extent the credit institutions portfolio, banks often argue that no downturn add-on is needed, as defaults only occur during downturn phases and the estimated LGD based on these data are 'downturn LGD' and so appropriate for downturn conditions. For the other portfolios, in most cases the average long-term losses or risk drivers are compared to those observed during downturn periods to determine an appropriate 'downturn LGD' or respective add-on factor.

Such add-ons may vary from zero (no difference between long-term average LGD and 'downturn LGD') up to 20 percentage points, strongly depending on the respective downturn approach of the bank and the portfolio concerned.

Granularity of unsecured LGD

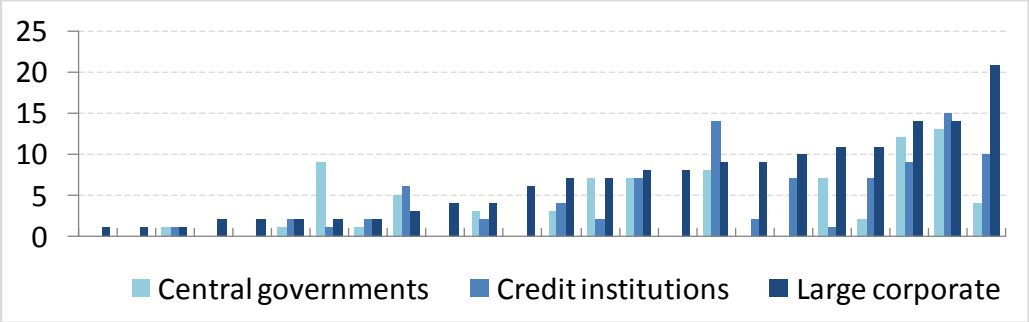
Most of the banks use an LGD model that estimates discrete LGD for unsecured exposures with a wide discrepancy in the number of unsecured LGD buckets among banks.

We observed that some banks may use only one unsecured LGD band whereas others may use as many as 23 different unsecured LGD bands ([43]) (a band has been fixed as a difference higher than five percentage points between two LGDs).

([43]) The number of unsecured LGD bands is based on data from the hypothetical exercise. Thus, depending on the coverage of the different LGD bands of a bank by the counterparty names included in this exercise, the number of LGD bands may be underestimated.

Moreover, as shown in Figure 36, the same bank may have developed different complexities of unsecured LGD settings depending on the portfolio. Indeed, a bank with more than 10 LGD bands for the large corporate has only two different LGD bands for the credit institutions and seven LGD bands for the central governments portfolio.

Figure 36: Number of LGD bands for AIRB banks and by LDPs, hypothetical exercise



The y-axis is the number of LGD bands. Two bands are, at a minimum distant by five percentage points. The x-axis represents the different banks that have submitted advanced LGD parameters in the HPE. The banks are ordered by number of reported LGD bands for the large corporate portfolio.

Data source: EBA exercise.

The high discrepancies in unsecured LGD and the degree of complexity of LGD approaches may be to some extent due to the different assessments of the banks and their ability to differentiate between different counterparties. On the other hand, the large number of LGD bands may be questionable because of the low-default characteristic of those portfolios.

LGD floor

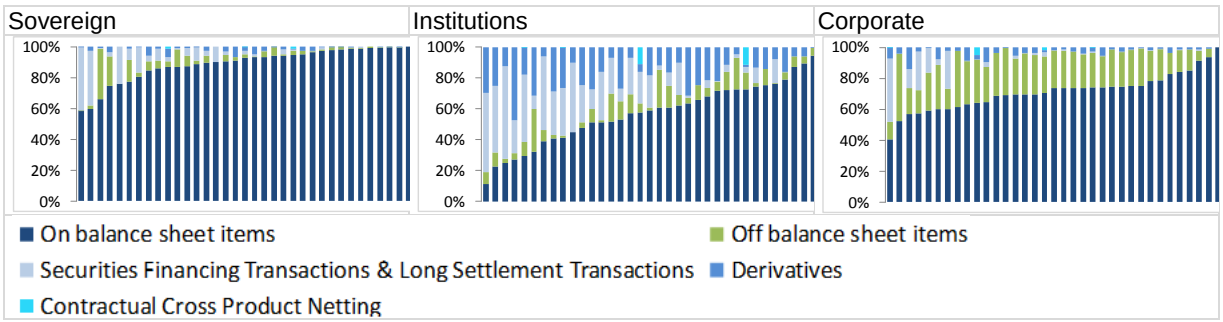
In addition to the large range of LGD shown above, there are even differences in the use of floors for unsecured LGD. Fifteen banks in the sample apply a floor to the unsecured LGD, this floor being below 10 % for nine of them.

5.3.3 The different types of exposures as an explanatory factor

The calibration of LGD may also depend on the type of exposures. The banks were asked to report their real wholesale exposures, split into several given exposure types, together with the EAD-weighted average LGD. The breakdown indicates that most of the banks have mainly on-balance sheet exposures, but some may be also exposed to other types of exposures, namely off-balance sheet items, securities financing transactions and long settlement transactions, derivatives and contractual cross-product netting.

Figure 37 demonstrates the composition of non-defaulted exposure by portfolio for each bank of the sample. The sovereign exposures are mainly on-balance sheet, whereas we see more diversity for the institutions and the corporate portfolios.

Figure 37: Repartition of EAD (cumulative percentage) by type of exposures and by wholesale portfolios, non-defaulted exposures



The banks are ordered by share of exposures to on-balance sheet items by portfolio.

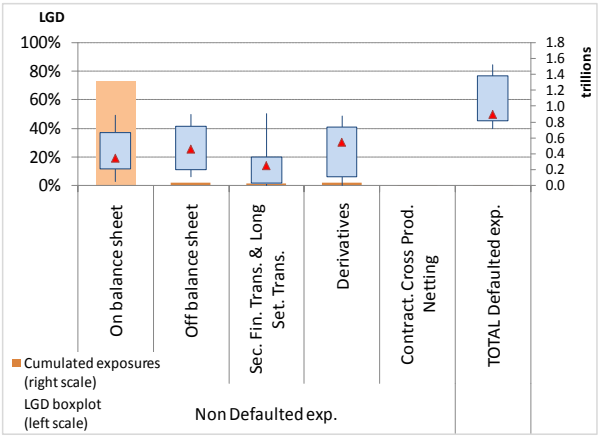
Data source: EBA exercise.

During the interviews with the subsample of 12 banks, it was confirmed that the PD is independent of the type of exposure, as expected. However, the diversity in the composition of the non-defaulted exposure may lead to differences in the risk parameters, especially for own estimated LGD.

In Figure 38, Figure 39 and Figure 40,we represent the cumulated exposures under AIRB Approach by type of exposure as well as the distribution of the own estimate LGD parameter.

For the sovereign portfolio, most of the exposures are on-balance sheet items; therefore, the types of exposure will not play a major role in explaining the differences of LGD, even if the levels of LGD depending on the exposure types are different, as shown in Figure 38.

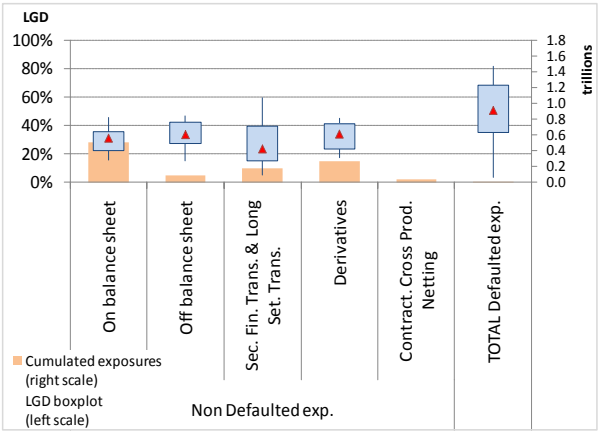
Figure 38: Cumulated exposure under AIRB Approach by types of exposure across all banks and distribution of the average own estimates LGD parameter per banks, sovereign portfolio



Data source: EBA exercise.

For the institutions portfolio (Figure 39), the type of exposure may play a larger role, because on-balance-sheet exposures are still the main type of exposures, but securities financing transactions, long settlement transactions and derivatives are also relevant. This may explain some differences in the total EAD-weighted average LGD between banks, as the spectrum of LGD is larger for those types of exposure, keeping in mind that the different levels could be also a result of varying levels of collateralisation.

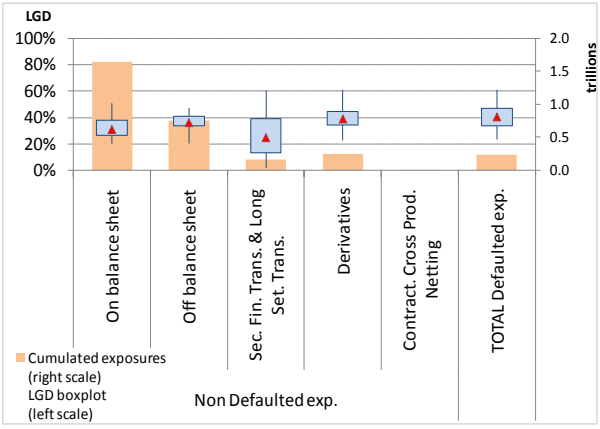
Figure 39: Cumulated exposure under AIRB Approach by types of exposure across all banks and distribution of the average own estimates LGD parameter per banks, institutions portfolio[44]



Data source: EBA exercise.

For the corporate portfolio (Figure 40), the situation is similar to that of the institutions portfolio, with larger exposures to off-balance-sheet items. For the latter, the range of LGD is rather narrow; however, the amount of exposures gives some importance to the CCF applied when calculating the EAD under the advanced approach (see subsection 5.5 below).

Figure 40: Cumulated exposure under AIRB Approach by types of exposure across all banks and distribution of the average own estimates LGD parameter per banks, corporate portfolio



Data source: EBA exercise.

5.3.4 Collateralisation

The role of collateralisation is key for attributing the level of total LGD. Indeed, we observe that the European banks in the sample have very different levels of collateralisation. Consequently, the collateralisation is very low for the central governments; for the credit institutions portfolio, the situation is more heterogeneous, with most of the secured EAD being collateralised with eligible financial collateral; and, in the large corporate portfolio, a portion of the secured exposure is collateralised by eligible financial collateral, by real estate or by other physical collateral.

[44] We did not provide boxplots when less than four data points were available.

Figure 41: Share of secured EAD for the three LDPs, all exposures

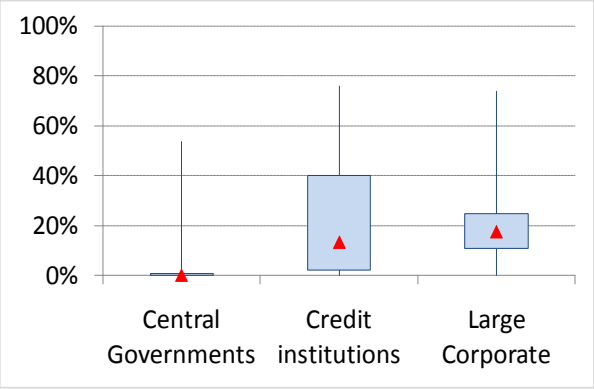
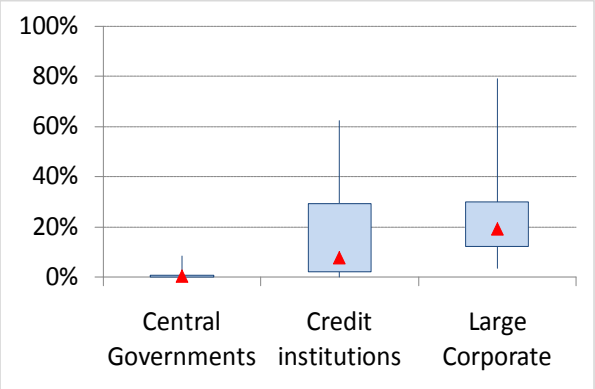


Figure 42: Share of secured EAD for the three LDPs, exposures under own estimates only



Data source: EBA exercise.

We see from Figure 41 and Figure 42 that collateralisation may explain a large part of the LGD variation across the sample for the credit institutions and, to a lesser extent, for the large corporate. However, for central governments the collateralisation is very low with the exception of very few banks.

Apart from the level of collateralisation, the LDP analysis also showed potential discrepancies in the reporting practices of banks. This heterogeneity leads in some cases to difficulties in comparing like with like. That was especially the case for the reported secured EAD or secured/unsecured LGD, with some banks reporting only the share secured with the corresponding LGD, whereas others reported the overall EAD with a weighted average LGD based on the secured/unsecured portion.

5.4 Maturity parameter

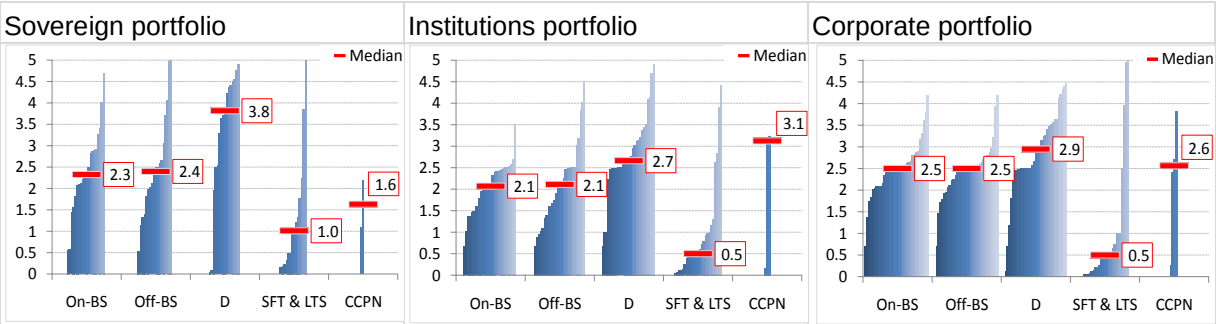
The maturity profile of exposures may play an important role in explaining the variability in RWs, as it is an input into the IRB capital requirements for the sovereign, institutions and corporate asset classes. Broadly speaking, longer maturities result in higher capital requirements because there is a greater potential for longer exposures to migrate into worse grades. However, the possible use of either the foundation approach, in which maturity is generally assumed to be 2.5 years, or the advanced approach, in which the remaining contractual maturity is used, usually within a floor of one year and a cap of five years, has to be kept in mind.

In section 4, we find that the impact due to the maturity reduced the discrepancy of the risk weights of government exposures by 20%. We did not find an economically significant effect for the other low default portfolios. But this may be due to some compensation effect between exposures as the maturity structure differs between banks (see Figure 44).

From the supervisory formula, one can expect, in principle, a stronger interaction between PD and maturity for LDPs. For instance, at a fixed PD of 3 bps, the RWs are cut by half when taking a maturity of one year instead of 2.5 years. It is only a 25 % reduction when the PD is set at 30 bp.

Furthermore, the profile of maturity may be different across exposure types, with notably longer maturity for derivative products of the sovereign portfolio, and to a lesser extent for other ones. Thus, RW variation may also be explained by differences in the bank's share of the exposure types (see Figure 38, Figure 39 and Figure 40 for the distribution of exposure types).

Figure 43: Distribution of the non-EAD-weighted average maturity (foundation and advanced approaches) and median maturity by type of exposures and by banks for the wholesale portfolios, in years

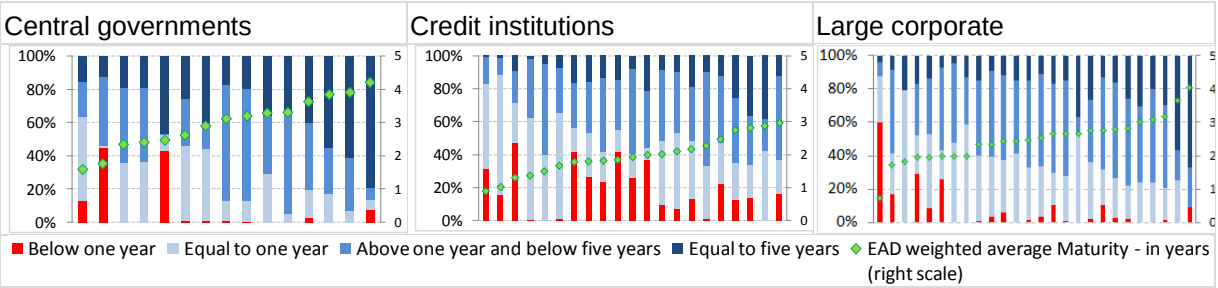


On-BS, on-balance-sheet; Off-BS, off-balance-sheet; D, derivatives; SFT & LTS, securities financing transactions and long settlement transactions; CCPN, contractual cross-product netting. The different distributions are ordered by maturity for each type of exposures The banks are ordered by increasing maturity by type of exposures and portfolios.

Data source: EBA exercise, non-defaulted exposures.

This may also explain the difference in maturity structure across banks (see Figure 44), with an average maturity ranging from 1.5 years to more than four years for the central governments, from one to three years for the credit institutions and from 0.7 ([45]) to four years for the large corporate. Furthermore, we do not observe a common pattern of maturity structure across banks; this may be due to differences in the type of exposure but also in the method of calculating maturity.

Figure 44: Repartition of EAD with advanced approach for maturity by maturity buckets (cumulative percentage) and EAD-weighted average maturity by LDPs (in years) for the LDPs



The left y-axis shows the repartition of the exposures under advanced approach for maturity by maturity bucket; the right y-axis shows the average maturity. The x-axis represents the banks using advanced approach. The maturity is not the contractual maturity but the maturity used in the RWA computation. The banks are ordered by EAD-weighted average maturity.

([45]) The average maturity below one year is mainly explained by exposures to securities financing transactions and long settlement transactions. The application of a national discretion about the one-year maturity floor may also play a role for some counterparties or type of exposures.

Data source: EBA exercise.

Those findings encourage a clearer definition of the maturity's use and more transparency on the computation method (foundation/advanced approach and use of floor).

5.5 EAD, Credit Conversion Factor parameter

The CCFs aim to assign a credit-equivalent exposure value to off-balance sheet items. They depend on the nature of the off-balance sheet exposures. The foundation approach allows only five different values for the CCF; the values being between 100 % and 0 % (see Figure 45).

Figure 45: Off-balance sheet items and foundation conversation factors

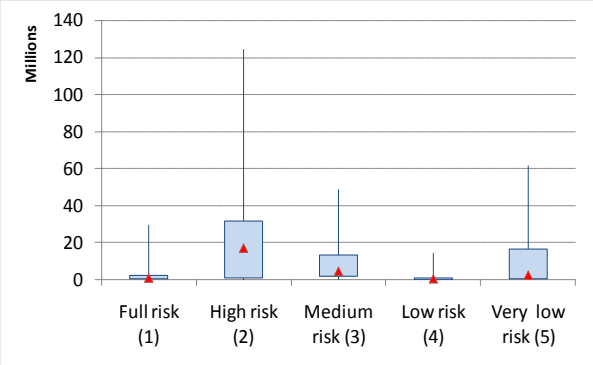
Categories in the figures[46]		Off-balance sheet items	Foundation CCF (%)
(1)	Full risk[47]	Full risk (risk equivalent to on-balance sheet item)	100
(2)	High risk	Undrawn committed credit lines, note issuance facilities (NIFs) and revolving underwriting facilities (RUFs)	75
(3)	Medium risk	Undrawn committed facilities (unissued guarantees, stand-by letter of credit) considered as medium risk Issued warranties and indemnities, guarantees, irrevocable stand by letter of credit and documentary credit considered as medium risk	50
(4)	Low risk	Undrawn committed facilities (unissued guarantees, stand-by letter of credit considered as medium-low risk Issued short-term letter of credit and other medium-low risk off-balance sheet items considered as medium–low risk	20
(5)	Very low risk	Undrawn uncommitted credit lines considered as low risk Undrawn purchase commitments for revolving purchased receivables and other low-risk off-balance sheet items	0

As shown above in the report, there are significant discrepancies between banks regarding their share of off-balance sheet items; some of them have large exposures and others very limited exposures. Consequently, the CCF has very different impacts on the RWs of the banks. Given the higher proportion of off-balance sheet items in the large corporate portfolio ([48]), the analysis focuses on the large corporate portfolio.

From Figure 46, we observe that the distribution of exposures for this portfolio between the different categories is not uniform and that exposures classified as high and very low risk are the most represented ones.

([46]) These categories are not related to the categories as in Annex II of Directive 2006/48/EC.
([47]) This category is assigned only to exposures under foundation approach.
([48]) The proportion of off-balance sheet items compared with the on-balance sheet exposure ranges:
- for large corporate, from 13 % to 64 % with a median at 41 %;
- for the credit institutions, from 1 % to 56 % with a median at 11 %;
- the central governments, from 0.2 % to 59 % with a median at 7 %.

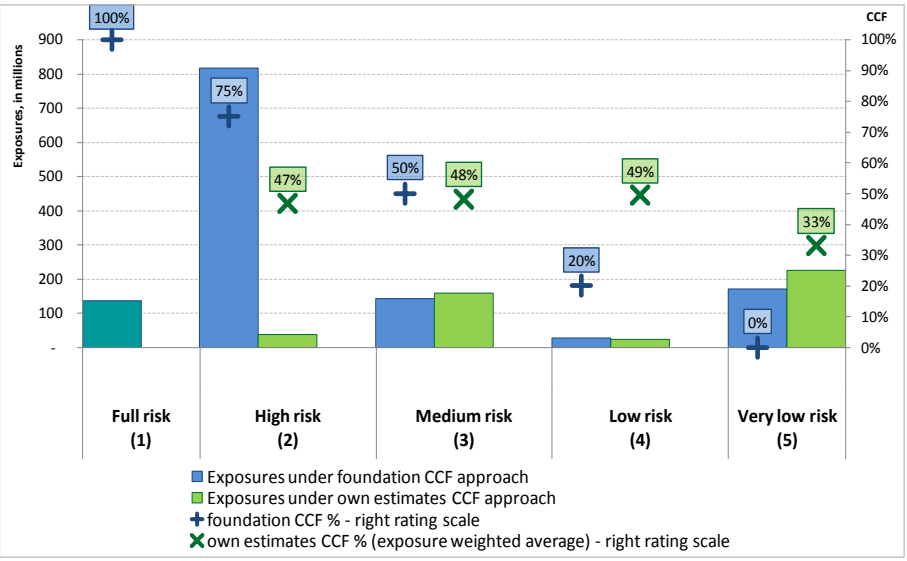
Figure 46: Distribution of exposure (under FIRB and AIRB) amount by off-balance sheet categories (see Figure 45), total exposure, large corporate portfolio



Data source: EBA exercise.

The use of own estimates CCF slightly changes this finding (see Figure 46); those exposures fall mainly into the medium and the very low risk categories. The weighted averages of own estimates CCF are relatively uniform between the different categories, with only a slightly lower level for the very low-risk category.

Figure 47: Exposures under foundation CCF and own estimates CCF by facility categories[49] (see Figure 45) and level of foundation CCF and own estimates CCF, large corporate portfolio



Data source: EBA exercise.

Furthermore, even when using AIRB LGD parameters, some banks still use foundation CCF and others have a mix of foundation and own estimate CCF (of the 24 banks which have submitted advanced LGD parameters, 17 reported own estimates CCF). However, the banks are admittedly struggling to find enough data by facility type to develop own estimates models, and the foundation CCF is often used as a benchmark by the banks.

([49]) For the full-risk category, we do not differentiate between exposures under the foundation approach and the advanced approach.

6. Conclusion

Key findings

This second interim report on LDP also confirms the results of the first interim report for wholesale exposures. The more detailed analyses carried out for a representative number of IRB banks shows significant variation in the RWs and EL across banks. In line with the findings of the previous report, key drivers in explaining the differences are the share of partial use of the Standardised Approach (permanent exemption and roll-out), the share of defaulted assets and the portfolio mix ([50]). After controlling for such effects, the residual variation is driven by differences in the inherent credit risk of the banks' IRB exposures and possible discrepancies in supervisory and banks' practices.

This report identifies, however, the existence of variation in EL and RWA by exposure across banks even when the analysis is conducted on hypothetical identical exposures to the same counterparties.

The comparative analyses conducted with the benchmarking portfolio exercise, to be considered carefully because of their intrinsic limitations, found some banks with relatively low RWs for one or two exposure types, but rarely for all three portfolios (central governments, credit institutions and large corporate). On the other hand, it was also found that differences in collateralisation and maturity can partly explain RW differences for government exposures, but not for the others two LDPs. Harmonisation of the level of collateralisation does not reduce the dispersion in RW across all IRB banks, but for the credit institutions portfolio increases the dispersion within the sample of AIRB banks.

The qualitative information gathered in the interviews with the banks and through specific questionnaires seems to confirm that the differences in risk parameters can still be driven by possible discrepancies either in the supervisory practices or the banks' practices.

For the PD and LGD, there is a widespread range of practices for the definition of default. Whereas differences in the granularity of the ratings, the adjustment for cyclical effects and the mapping between the internal PD and the external ratings can explain some differences in PD parameters across banks, data limitations (either internal or external) and banks' difficulties in calibrating and regularly validating the PD models for the LDP exposures are also key drivers of differences. They imply the inclusion of different expert judgements and levels of conservatism in the risk parameter calibration. Those data limitations and calibration/validation issues also exist for the LGD parameter. However, additional inconsistent implementation of the CRD in the different countries and/or banks' different approaches to capturing downturn conditions can also explain material differences in LGD parameters across banks. Maturity parameters and own estimates CCF can play an important role in explaining the discrepancy in RWs.

Some of those practice-based drivers of RWA variations are provided for in the Basel framework and the European banking regulation. Views may differ regarding the acceptable level of RWA variation across banks, since any regime based on internal models implies some variation. However, in order to reduce the discrepancies in RWA computation across banks, some of the differences in banks' and

([50]) By 'different portfolio mix' is meant the different share of wholesale exposures (i.e. some banks may have a larger proportion of sovereign exposures than others).

supervisory practices could be addressed in the regulatory and implementing technical standards that the EBA is mandated to develop in the next few years, in accordance with the CRR and CRD4.

Potential policy issues for future consideration

The following suggestions for policy options should be seen as **potential directions for future work** to be considered by the national competent authority and the EBA. **They should not be seen as comprehensive, or as pre-empting any specific policy measures.**
The following four main areas of work have been identified

1) Enhanced supervisory disclosure and transparency by the banks about RWA-related information. Examples: publication on a regular basis of statistics of RWs, EL, observed default and loss rates by country/portfolio; promoting enhancement of banks' disclosure according to harmonised definitions and templates to achieve greater consistency and comparability.
A first limited exercise will be incorporated into the EBA transparency exercise that will take place in late 2013[51] and a more comprehensive one thereafter.

2) Ongoing support to national competent authorities in the implementation of the upcoming new regulation (single rule book) by promoting an exchange of experiences and supervisory interventions related to the validation and ongoing supervisory monitoring of internal models and promoting the identification and use of good practice including through joint work in colleges; encourage a more rigorous and comprehensive model validation process in banks by promoting the identification and sharing of best practice.

3) More formally, the development of additional guidelines and draft technical standards that specifically address the LDP issues. Examples where additional clarity is needed: treatment of defaulted exposures, conservatism or cyclical effects, partial use of the Standardised Approach (permanent and roll-out), exemptions from the one-year maturity floor, requirements related to estimation of IRB parameters, use of external data, LDP scope and design and calibration rating scales.

4) Benchmarks or constraints on IRB parameter estimates. For example: supervisory benchmarks for risk parameters could be created from the data collected through this study and similar future work (see Article 78 of the new CRD4 on supervisory benchmarking exercise). Other alternatives could include the creation of floors for certain parameters (such as LGD), or fixed values of such parameters for certain asset classes.

[51] See http://www.eba.europa.eu/-/eba-recommends-supervisors-to-conduct-asset-quality-reviews-and-adjusts-the-next-eu-wide-stress-test-timeline

Annex I: List of the banks included in the sample

The banks are ordered by country of the home national supervisor. This order is never used in the report.

Bank name	ISO code of the country of the home supervisor
ERSTE GROUP BANK (EGB)	AT
RAIFFEISEN ZENTRALBANK ÖSTERREICH (RZB)	
BELFIUS	BE
KBC BANK	
DEUTSCHE BANK AG	DE
COMMERZBANK AG	
DANSKE BANK	DK
JYSKE BANK	
SYDBANK	
BANCO SANTANDER S.A.	ES
BANCO BILBAO VIZCAYA ARGENTARIA S.A. (BBVA)	
OP-POHJOLA GROUP	FI
BNP PARIBAS	FR
CREDIT AGRICOLE	
SOCIETE GENERALE	
ROYAL BANK OF SCOTLAND GROUP PLC	GB
HSBC HOLDINGS PLC	
BARCLAYS PLC	
LLOYDS BANKING GROUP PLC	
ALLIED IRISH BANKS PLC	IE
BANK OF IRELAND	
IRISH LIFE AND PERMANENT	
INTESA SANPAOLO S.P.A	IT
UNICREDIT S.P.A	
BANCA MONTE DEI PASCHI DI SIENA S.P.A	
BANCO POPOLARE - S.C.	
UNIONE DI BANCHE ITALIANE SCPA (UBI BANCA)	
ING BANK NV	NL
RABOBANK NEDERLAND	
BANCO COMERCIAL PORTUGUÊS, SA (BCP OR MILLENNIUM BCP)	PT
ESPÍRITO SANTO FINANCIAL GROUP, SA (ESFG)	
NORDEA BANK AB	SE
SKANDINAVISKA ENSKILDA BANKEN AB (SEB)	
SVENSKA HANDELSBANKEN AB	
SWEDBANK AB	

Annex II: Intermediary steps for the top-down approach

The purpose of this annex is to provide more detail regarding the practical application of the top-down methodology step by step.

Start	Initial GC deviations from benchmark (GC average)
Step 1	Controlling for the effect of the share of defaulted exposures
Step 2	Controlling for the difference in GC for defaulted exposures
Step 3	Controlling for the effect of the portfolio mix (portfolio mix effect)
Step 4	Controlling for the effect of the share of exposures in roll-out (R-O effect) and the GC for exposures under Standardised Approach (SA GC effect)
Outcome 1	Remaining GC deviations due to B-type differences (IRB GC deviations)
Outcome 2	Remaining RW deviations due to B-type differences (IRB RW deviations)

The initial variation is measured computing the standard deviation of the banks' GC differences from the benchmark (see Figure 16).

Figure 48: Observed initial statistics of GC and RW

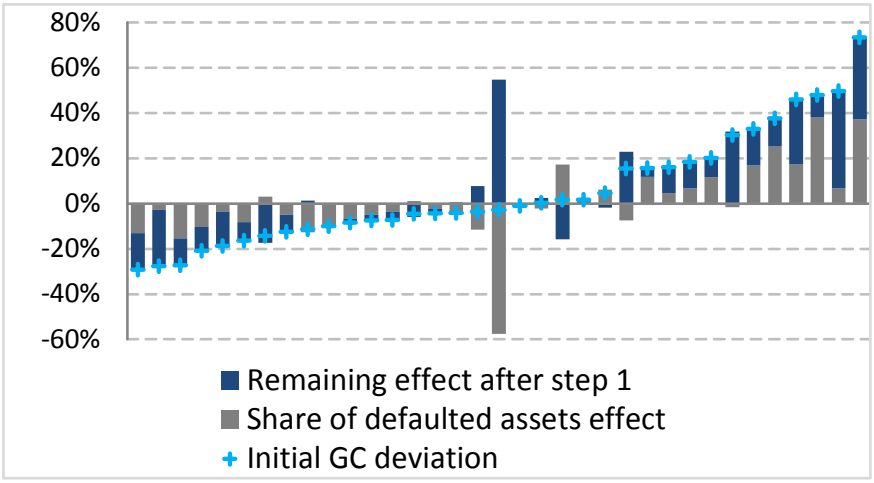
		Wholesale portfolio				
		Sovereign	Institutions	Corporate		
					Large corp.	Other corp.
DEFAULTED AND NON-DEFAULTED						
GC						
Weighted Average	52.7%	7.4%	21.9%	84.8%	-	-
StDev	24.6%	6.1%	8.2%	36.1%	-	-
RW						
Weighted Average	34.7%	4.1%	18.7%	54.8%	-	-
StDev	12.0%	3.6%	6.5%	22.4%	-	-
NON-DEFAULTED						
GC						
Weighted Average	37.7%	4.2%	19.3%	61.3%	57.3%	69.2%
StDev	15.2%	3.6%	6.8%	27.7%	21.5%	34.2%
RW						
Weighted Average	34.9%	4.1%	18.7%	56.4%	53.6%	62.0%
StDev	13.1%	3.6%	6.6%	23.4%	19.4%	28.1%

The benchmark used for the exercise is the weighted average bank in the sample (see Figure 48). This 'average' bank has the following characteristics:

- GC of 52.7% (GC IRB 57.6%, RW SA 39.7%, RW IRB 32.8%); GC on defaulted assets of 501.6%; GC on non-defaulted assets of 37.7% (GC IRB 37.4%, RW SA 38.4%, RW IRB 33.5%)
- Share of defaulted assets of 3.2%
- Portfolio mix composition for non-defaulted assets with sovereign accounting for 28.4%, institutions for 17.6%, large corporate for 35.9% and other corporate for 18.1%
- Share of non-defaulted assets in partial use (SA) of 27.7% (sovereign for 45.7%, institutions 25.2%, large corporate 18.7%, other corporate 20.7%)
- GC on non-defaulted assets sovereign for about 4.2%, institutions (19.3%), large corporate (57.3%) and other corporate (69.2%)

In the Step 1, the methodology tries to exclude the differences in the GC stemming from the different share of defaulted assets. The share of defaulted assets of each bank is substituted by the benchmark figure but we continue to apply the bank average GC for defaulted assets. The standard deviation is recomputed (now 17.8%) on the difference between the residual GC differences for each bank from the benchmark.

Figure 49: Step 1 – controlling for the effect of the share of defaulted exposures

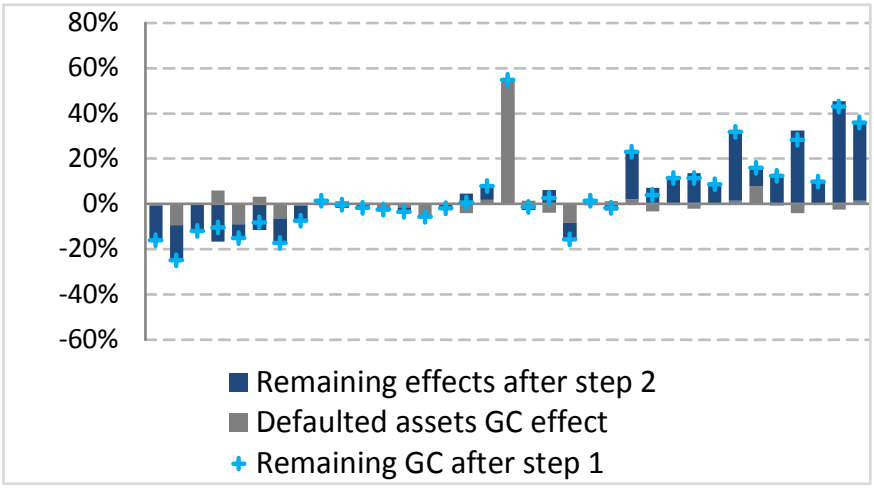


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

In the Step 2, the methodology tries to exclude the differences in the GC stemming from the different GC for defaulted assets. The GC of each bank is substituted by the benchmark figure and we use the benchmark for the share of defaulted assets. The standard deviation is recomputed (now 14.7%) on the difference between the residual GC differences for each bank from the benchmark.

Figure 50: Step 2 – controlling for the differences in GC for defaulted exposures

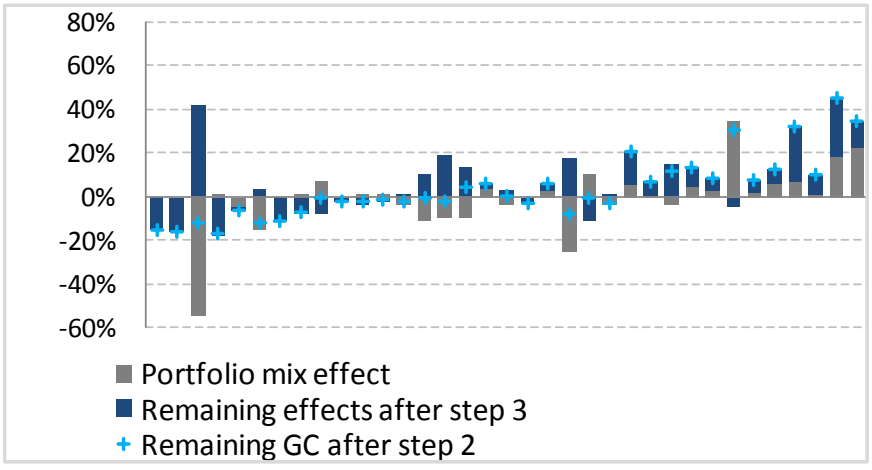


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

In the Step 3, the methodology tries to exclude the difference stemming from the different portfolio mix of the bank for non-defaulted assets. The share of the different exposure class of each bank is substituted by the benchmark ones but we continue to apply the bank average GC for the different exposure class. The standard deviation is recomputed (now 12.9%) on the difference between the residual GC differences for each bank from the benchmark.

Figure 51: Step 3 – controlling for the portfolio mix effect

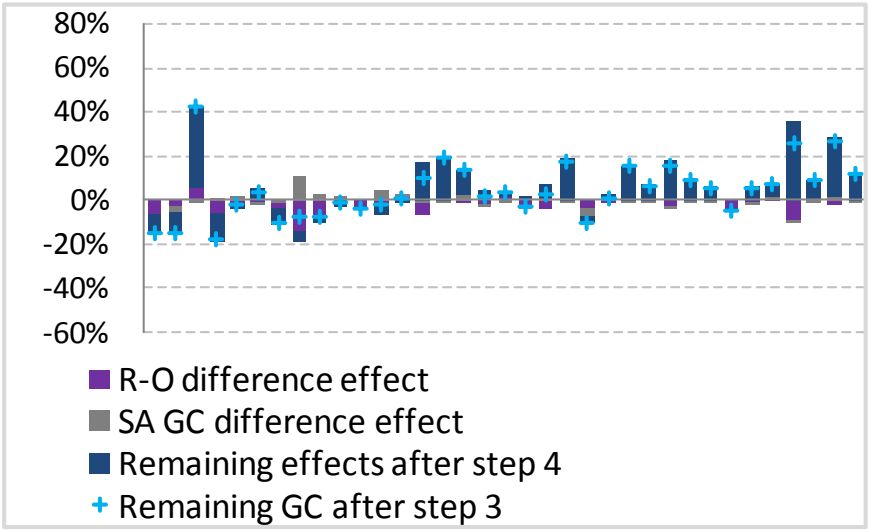


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

In the Step 4, the methodology tries to exclude the difference stemming from the different PU share and SA RW of the bank for each non-defaulted exposure class. The PU share and the SA RW of the different exposure class of each bank is substituted by the benchmark ones but we continue to apply respectively the bank average SA RW and the PU share for the different exposure class. The standard deviation is recomputed (now 12%) on the difference between the residual GC differences for each bank from the benchmark.

Figure 52: Step 4 – controlling for R-O effect and SA effect

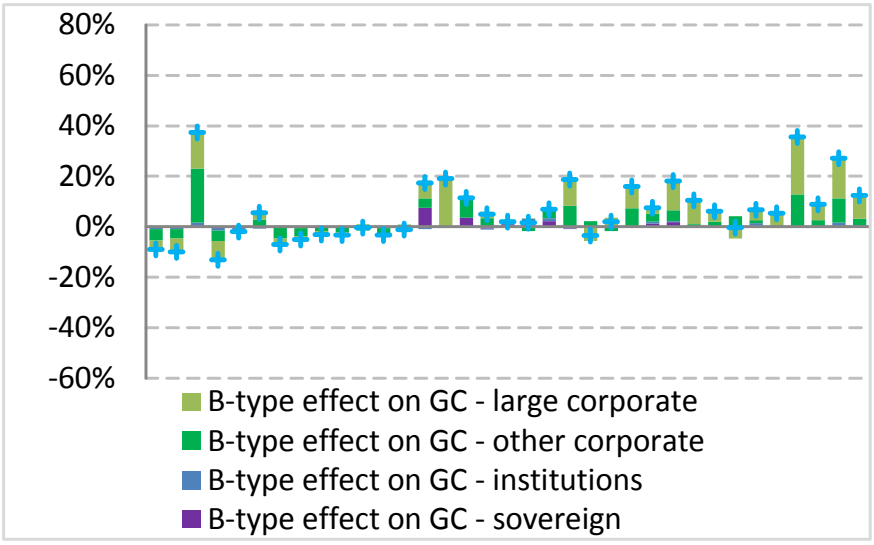


Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

In the outcome 1 (see Figure 53), we decompose the residual IRB GC difference (Step 4) showing the results stemming by the application of the same methodology for each exposure class (Step 1 to Step 4). The residual IRB GC difference for each exposure class is additive (the sum is equivalent to the result after Step 4 for the wholesale portfolio); this is not the case for the standard deviation computed on the difference between the residual GC differences of each exposure class for each bank from the benchmark (large corporate 7.2%, other corporate 5.3%, institutions 0.8%, sovereign 1.5%).

Figure 53: IRB GC deviations by LDPs on non-defaulted exposures



Data source: EBA exercise.

The banks are ordered by their GC level (see Figure 16).

In the outcome 2 (see Figure 17), we decompose the residual IRB GC difference for each exposure class removing the IRB EL component of each bank and eventually show outcome 1 but at IRB RW

level. The standard deviation computed on the residual IRB RW differences is 8.7% for large corporate, 6% other corporate, 1% institutions, 2% sovereign).

.

Annex III: Results of the HPE exercise for AIRB banks only

Below, we present the results the evolution of the standard deviation index for the subsample of AIRB banks. The results for the central governments are not displayed, as only one bank had foundation exposures in the analysed sample.

Figure 54: Evolution of the standard deviation of the RW deviation from benchmark after different harmonisation steps, credit institutions portfolio, AIRB banks only

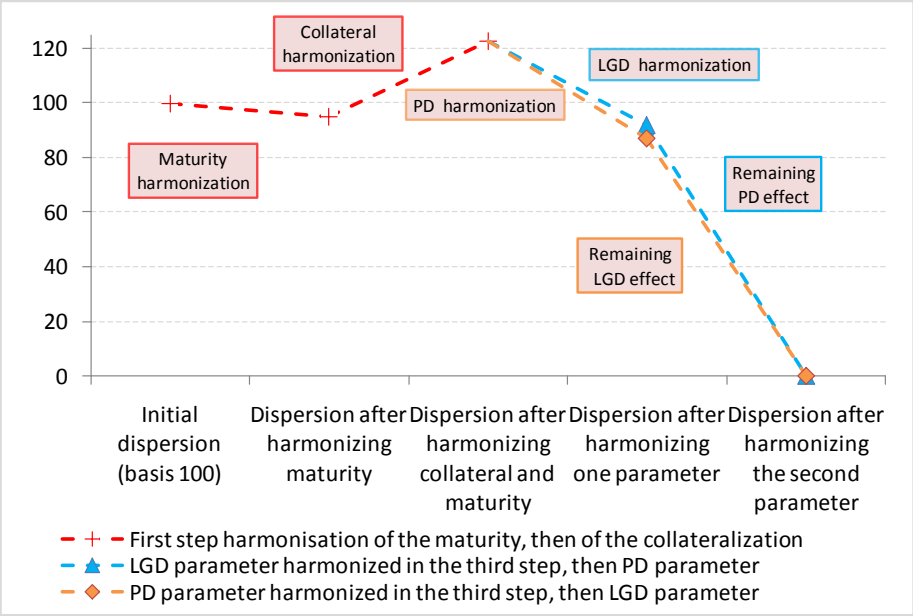
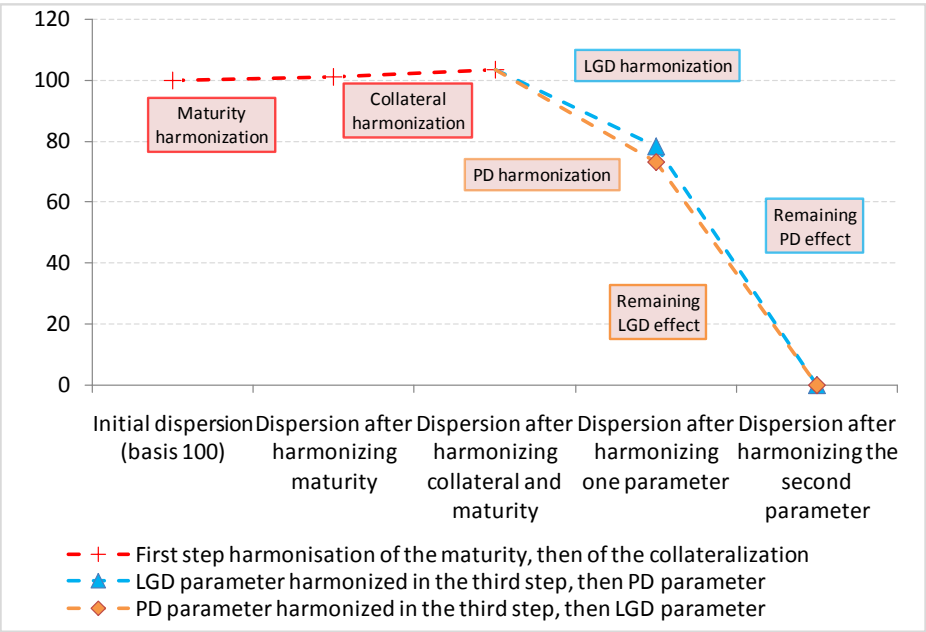


Figure 55: Evolution of the standard deviation of the RWs deviation from benchmark after different harmonisation steps, large corporate portfolio, AIRB banks only



Data source: EBA exercise.