17 December 2013

Summary report on the comparability and pro-cyclicality of capital requirements under the Internal Ratings Based Approach in accordance with Article 502 of the Capital Requirements Regulation

Covering:

1. First interim report on the consistency of risk-weighted assets – top-down assessment of the banking book
2. Second interim report on the consistency of risk-weighted assets – low default portfolios
3. Third interim report on the consistency of risk-weighted assets – low default portfolios
4. Report on the comparability of supervisory rules and practices
5. Report on the pro-cyclicality of capital requirements under the Internal Ratings Based Approach

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Abbreviations

AIRB Approach	Advanced Internal Ratings Based Approach
CA	competent authority
CCF	credit conversion factor
CEBS GL10	Committee of European Banking Supervisors Guidelines No 10
CRD	Capital Requirements Directive – Directive 2006/48/EC and 2006/49/EC
CRD IV	Capital Requirements Directive IV – Directive EU 2013/36
CRR	Capital Requirements Regulation – Regulation EU 575/2013
EAD	exposure at default
EBA	European Banking Authority
ECAI	external credit assessment institution
ECB	European Central Bank
EL	expected loss
ELBE	expected loss best estimate
ESRB	European Systemic Risk Board
FIRB Approach	Foundation Internal Ratings Based Approach
GC	global charge
IRB Approach	Internal Ratings Based Approach
ISG	Impact Study Group
ITS	implementing technical standards
LDP	low default portfolio
LGD	loss given default
LTI	loan-to-income
LTV	loan-to-value
M	maturity
PD	probability of default

PIT	point-in-time
PPU	permanent partial use
RM	residential mortgage
RTS	regulatory technical standards
RW	risk weight
RWA	risk-weighted asset
SA	Standardised Approach
SMEs	small and medium enterprises
TTC	through-the-cycle

1. Executive Summary

The European Banking Authority (EBA) has been mandated to report to the Commission on how methodologies of institutions under the Internal Rating Based (IRB) Approach should converge with a view to more comparable capital requirements while mitigating pro-cyclicality. The EBA understands the provision of Article 502 of the Capital Requirements Regulation (CRR – Regulation EU 575/2013) as constituting two separate but linked issues, namely (i) comparability (the issue of convergence of capital requirements across institutions) and (ii) pro-cyclicality (the issue of variations in capital requirements across the economic cycle, the subsequent impact on lending behaviour and the potential pro-cyclicality effect as amplification of the economic cycle by the financial sector).

The question of the comparability of capital requirements is multifaceted, and the EBA has undertaken substantial work to analyse the issue. The EBA has previously published two studies on comparability, namely an interim top-down report on the consistency of IRB capital requirements and a low default portfolio (LDP) benchmarking exercise. Alongside this summary report, the EBA is publishing two additional studies, a small and medium enterprises (SMEs) and residential mortgages benchmarking exercise and a study on supervisory rules and practices. As regards pro-cyclicality, the EBA is publishing a study on pro-cyclicality of capital requirements under the IRB Approach. This summary report gives a broad overview of the findings in these studies. Together with the abovementioned individual reports, this summary report fulfils the requirement that the EBA report to the Commission on comparability and pro-cyclicality.

The EBA believes that from an overall perspective the IRB framework has proven its validity, as the risk sensitivity in measuring capital requirements should be a key feature of prudential rules. This allows banks to use its knowledge on their customers, adopt to local conditions and most importantly of all, encourage more sophisticated risk management and measurement practices to evolve. That said, the current framework does suffer from several deficiencies, as the modelling choices may at times have been left to broad which has resulted in divergent practices across jurisdictions and banks. This report consequently focus on the current issues in the framework, but it should be noted that the EBA currently believes the IRB framework to be the most appropriate choice for prudential purposes.

The EBA found significant differences in the capital requirements of IRB banks, especially as regards retail and corporate types of exposures. The differences in capital requirements stem from a number of risk- and non-risk-based drivers, which can be linked to a number of sources. It is very difficult to disentangle the extent to which these divergences stem from different regulatory frameworks in place across countries, from supervisory practices or from bank-specific modelling choices; however, from the top-down quantitative exercise, the EBA noticed that four drivers – partial use (permanent and roll-out), Standardised Approach (SA) risk weights (RWs), IRB portfolio mix, and the share and RWs of defaulted assets – can explain around 50% of differences

in the global charge ([1]). It also appears that the differences in implementation of the IRB Approach are linked to different bank and supervisory practices. A residual key component in the variation is due to the inherent risk in the portfolios of the banks and represents drivers of differences in capital requirements which are not intended to be eradicated by the IRB Approach regulatory framework.

The studies already published suggest that differences in capital requirements are largely risk-based. Therefore, the risk-sensitive approach of the regulatory framework is in general successful. However, while a certain amount of non-risk-based difference is to be expected, it would not be appropriate if such variation in practices resulted in material differences that would not reflect clear differences in risk (favouring some institutions and disadvantaging others).

The EBA has conducted a survey on banks and supervisory practices which helped identify a list of practices that tend to increase capital requirements variability, the drivers of which are very similar to those indicated by the quantitative bottom-up exercise, most importantly, RWs for exposures in default, roll-out plan and permanent partial use, definition of default and default rate, probability of default and loss given default calibration, and LDP specificities.

As regards cyclicality of the regulatory framework, overall the evidence on pro-cyclicality of capital requirements is weak, and a clear causal link between capital requirements and the economic cycle could not be established. Therefore, the policy recommendations regarding pro-cyclicality aim to improve transparency and documentation with regard to the rating philosophies, PD calculation and back-testing methodology.

The EBA acknowledges that existing mandates coming from the CRR and Capital Requirements Directive IV (CRD IV – Directive EU 2013/36), namely regulatory and implementing technical standards and guidelines, will cover many of the observed differences in the regulatory implementation as well as in bank and supervisory practices. The majority of them are to be delivered by the end of 2014 and this will, therefore, be a priority for the EBA.

However, not all the drivers are sufficiently covered by these mandates, and therefore dedicated policy recommendations are included in this report, while further benchmarking and analysis remain necessary. In particular, the supervisory benchmarking exercise, which is to be performed on an annual basis, will further investigate some of the observed differences and assess the convergence of bank and supervisory practices in response to EBA standards and guidelines.

[1] Global charge definition is given on p. 11.

2. Introduction

2.1 Mandates

The European Banking Authority (EBA) believes that the use of internal models is an important and integral element of the regulatory framework. Internal models allow banks to use their knowledge about their customers to make precise risk assessments, which leads to more risk-sensitive capital requirements than are possible under the Standardised Approach (SA). It is important that the regulatory framework enables and supports the efforts of the banks in making accurate risk assessments.

The financial crisis has, however, also made clear that trust in internal models may sometimes be questioned. The wide variability of modelling approaches appears to have led to divergent implementations and practices across banks, which makes comparisons across institutions difficult and may put institutions on an unlevel playing field, in particular as the implementation of the Internal Rating Based (IRB) Approach has led to different regulatory rules and supervisory practices. In addition, concerns have been raised about the internal models being used to reduce capital requirements by optimising parameters rather than ensuring precise risk measurements. This has raised doubts about the internal models' ability to convey an accurate picture of riskiness to customers, investors, supervisors and the general public.

The EBA therefore welcomes the opportunity given in the Capital Requirements Regulation (CRR – Regulation EU 575/2013) and Capital Requirements Directive IV (CRD IV – Directive EU 2013/36) to review the current practice, as Article 502 of the CRR mandates the EBA to report on (i) the comparability of capital requirements and (ii) the cyclicality of capital requirements and their potential pro-cyclicality effect by the end of 2013:

'The Commission, in cooperation with EBA, ESRB and the Member States, and taking into account the opinion of the ECB, shall periodically monitor whether this Regulation taken as a whole, together with Directive 2013/36/EU has significant effects on the economic cycle and, in the light of that examination, shall consider whether any remedial measures are justified. By 31 December 2013, EBA shall report to the Commission if and how methodologies of institutions under the IRB Approach should converge with a view to more comparable capital requirements while mitigating pro-cyclicality.'

'Based on that analysis and taking into account the opinion of the ECB, the Commission shall draw up a biennial report and submit it to the European Parliament and to the Council, together with any appropriate proposals. Contributions from credit taking and credit lending parties shall be adequately acknowledged when the report is drawn up.'

The EBA understands the provision of Article 502 of the CRR as constituting two separate but linked issues, namely (i) comparability (the issue of convergence of capital requirements across institutions) and (ii) pro-cyclicality (the issue of variations in capital requirements across the economic cycle, the subsequent impact on lending behaviours and the potential pro-cyclicality effect as amplification of the economic cycle by the financial sector).

Consequently, the EBA has undertaken a number of separate studies to explore the issues of comparability and pro-cyclicality. This summary report sums up the results of these studies. More detailed information about the methodologies used in these studies, detailed explanations of the results and limitations in the data collected can be found in the individual reports. The purpose of this summary report is to compile the main conclusions that the EBA has drawn from these studies.

It should also be made clear that, although the work undertaken by the EBA shows that in some cases substantial differences in the implementation of the Capital Requirements Directive (CRD – Directive 2006/48/EC and 2006/49/EC) exist across institutions and supervisory practices, this does not necessarily imply that the existing implementations and national rules are not compliant with the CRD framework. Instead, the main drivers in the differences across jurisdictions stem from the flexibility of the IRB framework, which leaves many choices open to both institutions and supervisors.

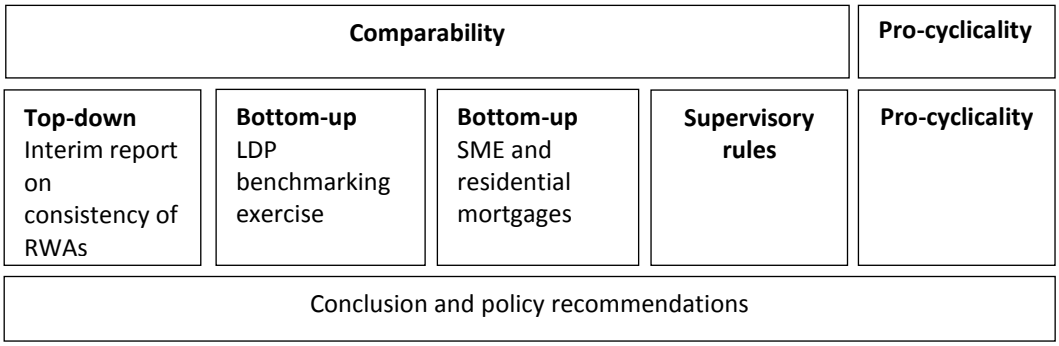
The current IRB framework has proven its validity, given that credit risk should be measured in a risk sensitive manner that allows institutions to use the detailed information on their customers and local conditions. The issues raised in this report however also illustrate the difficulties of, on the one hand, of applying a very detailed and risk sensitive approach and, on the other hand, maintaining a clear and transparent solvency framework, that is perceived as credible. There are therefore improvements necessary to the current IRB framework, which requires more harmonisation and convergence of practices, but the intention behind these changes is to maintain the continued use of a risk-sensitive approach.

2.2 Structure of the report

This summary report integrates the findings and policy recommendations of five individual reports. Two have already been published by the EBA, whereas the other three cover elements that have not been assessed before. Although some general references to the methodologies and overall key findings of the different studies are provided directly in this report, the reader should refer to the different studies to gain a more comprehensive view of the results. The purpose of the summary report is to provide the reader with an overview of the work carried out by the EBA in order to fulfil the mandate, focusing on the main findings and conclusions of the different studies and providing a list of key policy options and recommendations.

Four of the five reports provide insights into comparability, whereas the last report is dedicated to the pro-cyclicality of capital requirements under the IRB Approach. Each of the four reports on comparability assesses a different aspect of comparability in capital requirements, shedding light on the issue from a different angle. This summary report outlines the focus of each of the individual reports and how each of them covers a different aspect of the mandates given in Article 502 of the CRR ([2]). The structure of the work undertaken is illustrated in Figure 1.

Figure 1: Overview of work undertaken by the EBA on comparability and pro-cyclicality



Source: EBA analysis

The first three reports represent the results of a study of differences in capital requirements across large EU institutions, being a top-down assessment based on aggregated information and bottom-up assessments for low default portfolio (LDP) exposures (sovereigns, institutions, large corporate and other corporate portfolios) and for small and medium enterprises (SMEs) and residential mortgages (RMs) exposures.

The work is part of the EBA's programme for investigating the variation of capital requirements and identifying the main drivers that contribute to the existing differences across banks' capital requirements and expected losses (EL). Drivers could relate to differences in the characteristics of the exposures themselves, in credit risk management strategies between banks, in banks' modelling practices or in supervisory practices and regulatory implementations. More specifically, the EBA intended to report on the comparability of capital requirements in three sequential studies:

- the first interim report, containing a top-down assessment of the banking book, published on 26 February 2013;
- the second interim report, containing a detailed assessment of comparability in LDP exposures (sovereigns, institutions, large corporate and other corporate portfolios), published on 5 August 2013;

([2]) While it should be noted that Article 502 of the CRR and this report focus solely on IRB models, internal models are also used for market and operational risk. The EBA has produced a report on the comparability of market risk models, which it believes should also be explored in more detail.

- the third interim report, on comparability for SMEs and RMs exposures, which is published together with this summary report and provides the first, preliminary results of the current ongoing study, which is likely to be finalised in the first quarter of 2014.

Further findings may result from additional studies on capital requirements variations under the IRB Approach for RMs as a result of key drivers such as loan-to-value (LTV), loan-to-income (LTI) and credit risk mitigation; moreover, some thematic work on the calibration of Probability of Default (PD) and Loss Given Default (LGD) at model level for SMEs and RMs is expected to provide additional insights into variation stemming from different banks' modelling practices.

The studies were initially carried out (as in the top-down study) using aggregated available supervisory reporting data (reference date December 2011) for about 89 IRB banks from 16 EU jurisdictions, and then later more granular data (reference dates June 2012 and December 2012) was collected, along with information provided directly by a representative sample of IRB banks (35 banks for LDP and 43 banks for SMEs and RMs) from 14 EU jurisdictions. In the bottom-up studies, more qualitative surveys and bilateral interviews with the banks allowed greater insight into banks' practices.

The assessment of the comparability of capital requirements has also been complemented by a survey of supervisory rules and practices across the competent authorities (CAs), as initial studies highlighted the importance of such drivers in explaining the observed variation in risk-weights (RWs) and EL. The results of an extensive survey of 21 CAs are published together with this summary report.

Finally, a report on the pro-cyclicality of capital requirements under the IRB Approach has been produced, which builds on work undertaken by the EBA together with the European Central Bank (ECB) in 2012 to assess pro-cyclicality. It contains an overview of previous research and conclusions on pro-cyclicality and two empirical assessments of pro-cyclicality, including the evolution of the most important ratios related to risk-weighted asset (RWAs) and their decomposition, and also an econometric analysis of the relationship between macroeconomic indicators and minimum capital requirements.

3. Report on comparability

3.1 Introduction

The purpose of the reports on comparability of capital requirements is to evaluate the sources of differences in capital requirements under the IRB Approach across institutions, to investigate whether the differences are material and to discover to what extent they are driven by risk-based and non-risk-based factors.

Capital requirements differences are risk-based if they are due to differences in the underlying risk of the exposures. Such differences are a direct consequence of the regulatory choices of the EU, the latest implementation of which can be found in the CRR and CRD IV, which allow for risk-based approaches to capital requirements. Such differences are clearly the justification for allowing internal approaches.

Capital requirements differences are non-risk-based if they are due not to differences in underlying risk but instead to differences in the approaches taken to calculating capital requirements. Such differences can arise from the models used, the calibration of model parameters, the exercise of judgement and the application of national discretions. The flexibility of the regulation has allowed different regulatory implementations and supervisory practices to emerge, which may have contributed to capital requirements differences caused by non-risk-based drivers.

This report also entails defining what is meant by 'more comparable capital requirements for credit risk'. While a certain amount of non-risk-based differences are to be expected, it would not be appropriate if variation in practices resulted in material differences in capital requirements that did not reflect clear differences in risk (favouring some institutions and disadvantaging others').

After an investigation of the drivers that contribute to differences in capital requirements, policy options for increasing the comparability of capital requirements and the confidence of the banking stakeholders are explored.

3.2 Methodology and main findings

This section provides an overview of the methodology applied in the different studies and a summary of the main findings. The conclusions are based on data and supported by analysis of a survey of banks, one-to-one interviews and expert judgment. The conclusions are also supported by a dedicated study on supervisory rules and practices involving experts from the different CAs.

In order to assess the comparability of RWs and EL, the studies made use of the global charge (GC) as a key synthetic indicator for investigating the variation. The GC is defined as [(RWA + 12.5*EL)/EAD ([3])], which takes into account both unexpected losses (under the SA and the IRB Approach) and EL. The use of such indicators was important in order to allow a consistent comparison of defaulted assets, removing and isolating *ex ante* an important source of variation stemming from the different practices in the treatment and reporting of RWs and EL for such assets.

Different studies have also performed analysis of and provided evidence on the variation of capital requirements making use of the more common risk weights measure (RWA/EAD). This has been especially the case for non-defaulted assets. Evidence of the materiality of the share of the

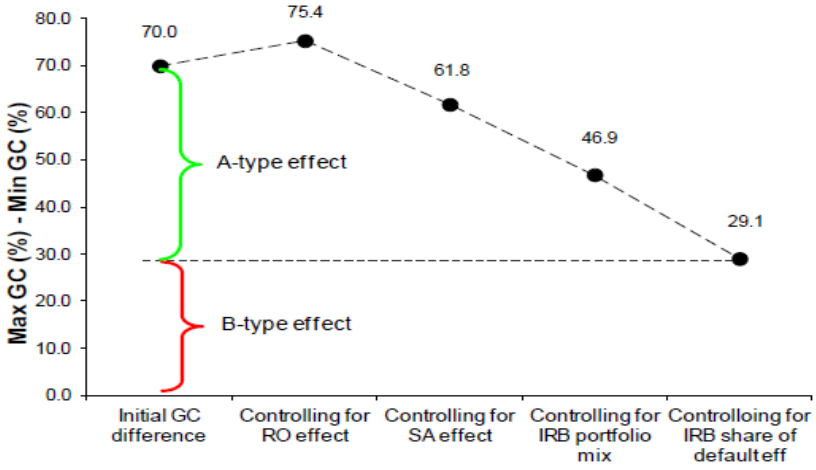
[3] exposure at default

exposures treated under the SA and the relative capital requirements have always been included in the different reports.

In order to investigate and measure the variation in RWs and EL, the different studies made use of implied benchmarks, computed as statistics (medians or averages) of the reported parameters, RW and EL reported by the banks. The results should not be interpreted as the 'true' values but rather as a reference tool for this analysis.

The top-down approach was important in order to identify the major sources of variation, disentangling the variation caused by simple drivers (A-type differences) – such as partial use (permanent and roll-out), SA RWs, IRB portfolio mix, and the share and GC of defaulted assets – from other drivers (B-type differences) more difficult to evaluate. The B-type drivers are not per se a source of concern; rather, they present challenges in investigating heterogeneity in RWs and EL among different banks, given the lack of in-depth knowledge of the institutions and more granular information on the past and current riskiness of their exposures. Figure 2 illustrates change in GC (%) difference for credit risk after taking into account A-type effect.

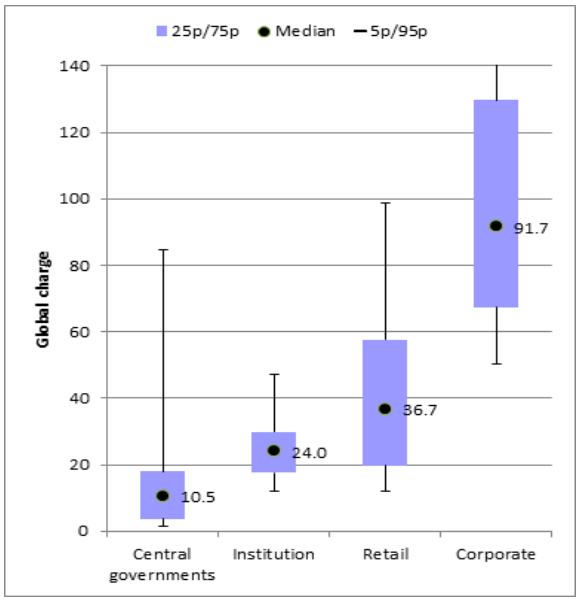
Figure 2: Change in GC (%) difference for credit risk after taking into account A-type effect



Source: EBA's Impact Study Group (ISG) dataset (reference date December 2011), EBA calculation

The initial study also allowed the identification that the highest variability in IRB RWs and EL is related to corporate and retail portfolios. Figure 3 illustrate GC for each IRB asset class at December 2011. One of the key conclusions was that more harmonised disclosure – preferably related to Pillar III reporting – of a similar set of aggregated data would allow third parties, and thus also market analysts, an improved insight into the models and the differences that exist between them as regards capital requirements.

Figure 3: GC for each IRB asset class at December 2011



Source: EBA Impact Study Group (ISG) dataset (reference date December 2011), EBA calculation

The bottom-up studies were designed to collect more granular data in order to examine the potential reasons behind A-type differences (partial use, defaulted assets), investigate modelling practices and appreciate the inherent credit risks. Different approaches were followed for the LDP study and the SME and RM study. For the LDP study, because of the absence of historical defaults, the investigation was conducted through direct comparison of parameters (PD and LGD) applied to real common obligors of the banks. The main challenge consisted in designing a sample representative for all participating institutions. For the SME and RM study, a more extensive collection of historical data used by the banks in the calibration of their models was gathered to assess their general coherence with the reported regulatory parameters and RWs; special attention was paid to the country dimension as a potential source of variation. The EBA also assessed whether the differences stemmed from risk-based or non-risk-based drivers and to what extent the identified differences would be mitigated by the implementation of the CRR and CRD IV and by upcoming EBA developments with regard to regulatory and implementing technical standards (RTS/ITS) and guidelines.

The EBA also elaborated on different supervisory rules and practices which may have a significant impact on banks' practices. The EBA noticed that normative supervisory approaches diverge with regard not only to the legal form given to the additional requirements of the CAs – with a range of national binding standards covering from 80% of the analysed drivers to less than 10% – but also to the key aspects of the regulatory framework on which supervisors issued additional rules. Nevertheless, some trends appear: additionally to CRD minimum requirements, standards mainly related to roll-out plans (87% of cases where public rules had been defined), the definitions of 'default' and 'past due' (80% of public rules), regulatory mapping (58% of public rules), PD and LGD calibration (around 30% of public rules) and floors (around 25% of public rules, but 50% of both public and non-public).

In aggregate, the bottom-up studies together with the survey on supervisory rules and practices allowed the identification of six major drivers characterised by a high variance of bank and supervisory practices where further harmonisation is necessary and has been assigned a high priority. These are described in more detail below.

(i) The GC for defaulted assets

The variance in GC for defaulted assets is one of the major drivers of A-type difference in GC.

For defaulted exposures in the corporate portfolio (according to the LDP report), the discrepancy in RWs and GC is very high among banks. Under the Advanced IRB (AIRB) Approach, 8 out of 22 banks apply RWs equal to zero, compared with the sample average of 14%. The same average for defaulted exposures under the SA is 100%. The IRB GC ranges between 211% and 805%, most of the GC being due to EL. The FIRB GCs show a similar divergence.

The study on RMs, retail SMEs and corporate SMEs highlights the existence of different practices in the estimation of the LGD in default and expected loss best estimate (ELBE) applied to exposures in default. The most common approach (40%) is to use provisions/incurred losses as best estimates; the second most common (15%) is to use the downturn LGD; other approaches reported by banks are somewhere between these two. The unexpected loss component of the LGD is reflected in the ELBE estimation, a fixed add-on reflecting downturn conditions, or a different and more severe calibration of the parameters applied to the estimate. Furthermore, the ELBE tends to be exposure specific while the downturn LGD is estimated at overall portfolio level.

In the context of supervisory practices, only a minority of CAs have adopted rules with regard to calculation of LGD for defaulted exposures. Among the national rules reported by authorities, two main strategies for LGD in default are considered, using either downturn LGD or ELBE plus an eventual add-on, with some variability on the details.

Under Article 144(2) of the CRR, the EBA shall develop draft regulatory technical standards (RTS) to specify the assessment methodology CAs shall follow in assessing the compliance of an institution with the requirements to use the IRB Approach. With regard to the specific issue of downturn LGD, the EBA has to draft RTS to specify the nature, duration and severity of the economic downturn for LGD calibration under Article 181(3)(a) of the CRR. These RTS may partially mitigate the identified differences in supervisory practices and definitions of downturn conditions.

The variability of GC for defaulted assets is high. This can be explained by the use of different regulatory approaches (Foundation IRB (FIRB) Approach, AIRB Approach, SA), and also by the flexibility allowed to banks as regards modelling techniques and supervisory practices. For instance, some differences may result from varying choices as regards the specification of downturn conditions and differences in computation of LGD in default and ELBE. Some banks apply a dedicated model for assets in default, while others do not; some institutions specify additional add-ons to ELBE, while others assume that LGD in default is equal to ELBE (which leads

to no capital requirements for exposures in default). Those divergences require further harmonisation.

The work also identified a wide range of practices followed by the banks in calculating the IRB shortfall. One-third of the CAs have rules concerning the IRB shortfall. The rules diverge with regard to level of calculation (exposure class, type of exposures (model), single exposure) of differences between the LGD for defaulted assets and ELBE. The issue of compensation between defaulted and non-defaulted exposures is addressed in the CRR and CRD IV.

(ii) The roll-out effect

The roll-out plan is categorised as a driver of A-type differences. The top-down analysis emphasises that on average the SA exposures share is 32.1% and standard deviation is 16.5%, with very large differences regarding maximum and minimum coverage by SA exposures, which respectively amount to 82.4% and 2.4% at aggregate level across portfolios.

With regard to the LDP analysis for the central governments' portfolios, 23 out of the 35 banks use the SA, probably making use of the CRD carve-out for the treatment of domestic sovereign exposures denominated and financed in the local currency. However, 11 banks predominantly use internal approaches for central government exposures. For credit institutions and large corporate portfolios, most banks predominantly use an IRB Approach. FIRB and AIRB approaches are equally used for the credit institutions' portfolios, while for large corporate portfolios about two-thirds of the banks use the AIRB Approach.

The IRB Approach is the dominant approach for RMs, retail SME and corporate SME portfolios. For RM, only 1 out of the 42 banks predominantly use the SA; for retail SMEs, this holds for 8 out of the 38 banks, and for corporate SMEs for 4 out of the 38 banks. For corporate SMEs, most banks mainly use the AIRB Approach, but 10 banks mainly use FIRB Approach. The use of the SA as the dominant approach correlates with lower exposure amounts in the banks' portfolios, in absolute and relative terms, in comparison with their IRB peer banks. Besides, SA may still be applied to a large part of the portfolio even where IRB is the dominant approach, and this seems to be driven by different treatment of 'unrated exposures'.

Those differences in the observed balance between assets being weighted in the SA and in the IRB Approach within each institution may result from divergences in the length and practical implementation of roll-out plans. This issue has been covered by additional national implementation rules in most European countries. When additional national rules are applied, they mainly focus on setting quantitative requirements relating to the initial coverage of the models and on the time horizon of the roll-out plan. On both issues, requirements diverge: the minimum initial coverage ranges from 30% to 85% of exposures and with variations in the calculation method used; the maximum specified time horizon ranges from 3 to 7 years. Making use of the European rules, institutions may also be authorised to use the SA permanently for some portfolios under the permanent partial use (PPU) regime. However, rules concerning the implementation of such provision differ significantly, in particular as regards the definitions of

'material counterparty', 'non-significant business units' and 'immaterial exposures in terms of size'.

The observed discrepancies are expected to be significantly reduced by the RTS which will be issued by the EBA according to Article 148(6) of the CRR. The EBA shall indeed develop draft RTS to specify the conditions according to which CAs shall determine the appropriate nature and timing of the sequential roll-out of the IRB Approach. However, the mandate appears to be narrow in scope, leaving aside important aspects where further harmonisation may be necessary with regard to setting the length of roll-out plans and addressing the non-compliance of an institution with a roll-out plan. Otherwise, efforts devoted to the harmonisation of roll-out plans may be undermined by different supervisory approaches. Moreover, the RTS on Article 150(3) of the CRR is expected to harmonise the conditions for authorisation for PPU of the SA. However, high variance in the implementation of the IRB Approach for sovereign exposures may lead to the conclusion that some guidance for supervisors in granting authorisation for PPU of the SA would also be necessary.

(iii) Default definition and default rate

Definition of default is categorised as a driver of B-type differences which contributes to 50% of the variability of the GC. The impact of this driver is hardly quantifiable based on the available information. Indeed, re-estimation of the IRB risk parameters based on a harmonised default definition would be a complex and difficult exercise, if possible at all.

There is a wide range of practices for the definition of default for LDPs, with differences in the computation methods and the criteria used, and no consensus on the use of materiality thresholds (set at an absolute or relative materiality level). Two-thirds 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. The EBA also identified some differences in the computation of the default rate, which can derive from either the numerator or the denominator. Moreover, the method of choosing 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 SME and RMs study also revealed the application of different definitions of default. The number of days past due is used as a criterion by almost all banks to characterise default and the large majority of the banks consider default to occur after 90 days past due. However, a few banks differentiate the approach depending on the country of location of the exposures or by portfolio. In particular, about 20% of the banks reported using a threshold of past-due days higher than 90 days in some countries for residential mortgage exposures; however, such differences may have a limited impact owing to contagion effects. A few banks reported applying past-due thresholds lower than 90 days. A very few other banks reported not using days past due but rather payment terms past due or other similar thresholds. The large majority (75%) of the banks reported using materiality thresholds as a minimum absolute past-due amount, which might vary even within a bank across countries and portfolios. About one-third of the banks always consider

forbearance (medium- to long-term arrangement) and moratoria (short-term arrangement) to be a default event. The large majority (80%) of the banks use a common approach in the computation of the default rate (for both numerator and denominator).

Both default definition and default rate are areas where regulators further specified certain regulatory aspects left open by the CRD, with a possible material impact on the final level of RWAs, especially for SMEs and RMs. Regulatory efforts to clarify the existing framework focused on the calculation of days past due, the materiality thresholds and the treatment of default for risk parameter quantification. On the default definition, the variance of practices derives from the CRD and the CRR and CRD IV, which specify that CAs may replace 90 days with 180 days for exposures secured by residential or SME commercial real estate in the retail exposure class, as well as exposures to public sector entities. On the past-due definition, implementations vary considerably. For instance, some countries have defined hard limits, either in absolute or in relative terms, while others have not done so at all. On the treatment of default for risk parameter quantification, a high variance of implementations is also observed, with supervisors focusing on two aspects: the treatment of technical and multiple defaults, and the treatment of the curing of exposures.

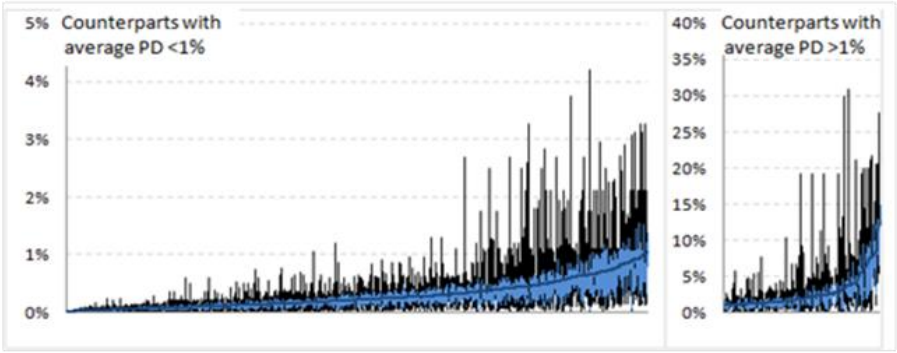
The further implementation of the CRR and CRD IV will help reduce the variability of former implementations where necessary: Article 4(78) of the CRR provides a stricter definition of one-year default rate; the RTS referred to in Article 178(6) of the CRR will promote convergence as regards materiality thresholds. In addition, guidelines on Article 178(7) of the CRR will have a positive impact in setting a uniform implementation of the definition of default. Further harmonisation might be necessary with regard to the size of the relevant sample for calculating the default rate and treatment of defaults for risk parameter quantification.

(iv) PD calibration

PD calibration is categorised as a driver of B-type differences which contributes to the remaining 50% of variability of GC. The relative impact of this driver (the extent to which it explains the remaining variability) is not quantifiable based on the available information.

The LDP analysis revealed a significant variation in the absolute PD values applied to the same counterparties for the different LDPs. Figure 4 illustrates dispersion of the hypothetical PD parameters by counterparty for large corporate portfolios. Given the very low number of observed defaults based on internal and external data, and limitations on the development of statistical models, banks also use expert judgement in the calibration of the PD models. Moreover, the banks also make use of very different rating grade scales (the number of grades ranges from 9 to 30, with varying PD levels and floors), 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).

Figure 4: Large corporate, dispersion of the hypothetical PD parameters by counterparty

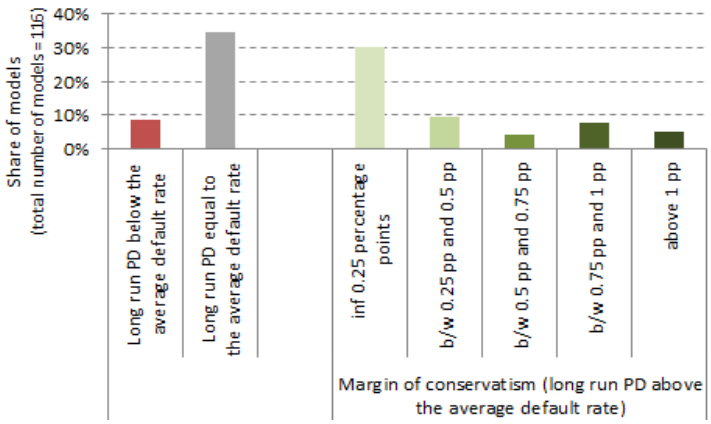


PD in y-axis, counterparties in x-axis, minimum of four PDs reported by counterparty, the dark blue line being the average, light blue representing the interquartile spread (25–75%) and the whisker the minimum/maximum range. Defaulted exposures are excluded.

Data source: EBA exercise (reference date June 2012)

With regard to RMs, a wide range of PD values are observed, with some banks having an EAD-weighted average PD of less than 0.4% and that of others is above 3.5%. For retail SMEs, a high variance, ranging from 1% to 10.8%, can be observed, while for corporate SMEs it ranges from 0.5% to 9.4%. This variance can be explained by country specificities (different downturn conditions and spectra of data) and differences in borrowers' profiles and payment behaviour. However, the variance is also driven by different implementations of the CRD, and in particular different lengths in the time series used, different approaches to integrating internal and external data, and differences in margins of conservatism. The length of the time series used for calibration is sometimes shorter than five years, and the calibration is not always based on the most recent information. Figure 5 illustrates the variances in margins of conservatism across RM exposures with regard to PD models. There are also different practices in the frequency of and triggers for redevelopment and re-estimation of internal models. Some banks have largely automatic rules based on the results produced by periodic back-testing and annual validation; a few banks recalibrate the models yearly. Differences in the number of rating grades and/or use of continuous rating scales appear to be another potential source of differences in capital requirement outcomes.

Figure 5: Illustration of the margin of conservatism (proxy) across RM PD models



Source: EBA specific data collection (reference date December 2012).

The survey on PD calibration confirms that supervisory practices are usually in line with former guidance adopted at European level (Committee of European Banking Supervisors Guidelines No 10 - CEBS GL10) and that CAs have added few general and binding rules to the CRD. When they have done so, they have focused on different aspects of the process, not giving rise to a stable European practice. In particular, the set of data to be used for the calibration of the models and the margin of conservatism to be applied to compensate for data or model weaknesses remain largely heterogeneous, as does the methodology for the calibration of the master scale/rating scale. With regard to the dataset used for calibration, the use of internal versus external data and of a bad and a good economic period are not commonly settled. Explicit supervisory rules are rare with regard to the methodology of calibration of the master scale/rating scale, but where they exist there are some differences between regulatory and internally used calibration.

Further requirements are to be defined in the RTS on Article 144(2) of the CRR, which requires the EBA to specify the assessment methodology that CAs shall follow in assessing the compliance of an institution with the requirements to use the IRB Approach, and on Article 180(3)(b) of the CRR, where the EBA is mandated to specify the methodologies according to which CAs shall assess the methodology of an institution for estimating PD.

The variability of PD calibration and observed banks' practices are considered to be high. Different implementations of long-run average of one-year default rates that are used for PD calibration show that it seems appropriate to provide clear rules for the definition of an economic cycle, the identification of stressed years and how to cope with the absence in the available time series of adequate stress conditions to capture a downturn. Furthermore, some guidance on how to combine different data sources and calibrate margins of conservatism is necessary. Moreover, observed differences in the number of rating grades and/or use of continuous rating scales should encourage application of harmonised rules. While such variability will be mitigated to some extent by the RTS on Articles 144(2) and 180(3)(b) of the CRR, the scope of the EBA mandates may

not sufficiently harmonise PD calibration with respect to the calculation of long-run average default rates, margins of conservatism and calibration of the master scale/rating scale.

(v) LGD calibration

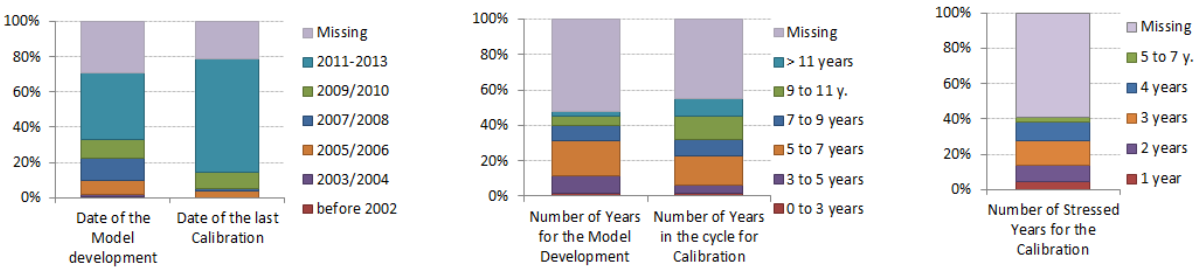
LGD calibration is categorised as a driver of B-type differences which contributes to the remaining 50% of variability of GC. The relative impact of this driver (the extent to which it explains the remaining variability) is not quantifiable based on the available information.

The LDP report emphasised that in a majority of cases own-estimates LGD parameters for the hypothetical portfolio are not very differentiated for unsecured senior exposures. LGD values are often very close to the regulatory value under the FIRB Approach (45%) for credit institutions and large corporate portfolios. There are a few AIRB banks which adopt 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%. The overall lack of default data for LDPs could be a reason for banks to 'safe harbour' and retain values close to the supervisory FIRB LGD. Nevertheless, the high dispersion in LGD at counterparty level calls into question the different calibration approaches followed by the banks. The final calibration of LGD is highly dependent on the interpretation of downturn conditions. Some banks argue that such downturn effects on the LGD could not be observed in the past. A few banks mentioned that such an effect is observable only for collateral and not for the reported senior unsecured LGD. Besides, for the central governments' portfolios and to some extent for the credit institutions' portfolios, banks often argue that no downturn add-on is needed, as defaults occur only 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 with 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') to 20 percentage points, depending heavily on the respective downturn approach of the bank and the portfolio concerned.

With regard to RMs, a wide range of LGD values are observed, with EAD-weighted average LGD ranging from less than 0.8% to above 50%, and a median of 12%. For retail SMEs, high variance in average LGDs, ranging from 8% to 59%, was observed, with a median of 25%; for corporate SMEs, the variance was from 9% to 51%, with a median of 36%. This variance can be explained by country macroeconomic specificities (different downturn conditions and range of data), borrowers' profiles and payment behaviours. However, there is also a long list of drivers which derive from modelling choices. The banks take different approaches to the inclusion of incomplete workout positions, different discount rate definitions/levels for the actualisation of recovery flows, legal and administrative costs, internal haircut estimates, repossession likelihood and use/definition of cure rates. As a result, while banks try to define downturn conditions using broadly similarly approaches, the outcome in terms of the materiality of the downturn add-on and conditions in the computation of the LGD remains significantly variable (see Figure 6). Some

banks periodically fine-tune or adjust the parameters reflecting current and more recent stress conditions in the market, while others are less dynamic.

Figure 6: LGD data specificities – RM ([4])



Source: EBA specific data collection (reference date December 2012).

The survey of CAs shows that a majority (two-thirds) have adopted rules concerning LGD calibration, with a high variance. Calibration of LGD parameters is specifically affected by issues related to the choice of data sources and by the absence of best practices for modelling, in addition to being significantly dependent on the method of calibration, which can be selected by a bank from a rich variety of technical and legal possibilities. This wide spectrum of possibilities stems from a lack of guidelines, or very general, high-level indications. This applies in particular to the treatment of explanatory variables, collateral and guarantees, discounting factor and margin of conservatism.

With regard to the specific issue of downturn LGD calibration, the EBA has to draft RTS to specify the nature, duration and severity of the economic downturn for LGD calibration under Article 181(3)(a) CRR; these RTS will help to address the variability of the LGD calibration. However, this mandate only partially covers the calibration of downturn LGD. The missing element is a further specification of the methodology of downturn LGD calibration to be used, mainly in the context of the appropriate length of data series. Other drivers could also be relevant, such as the treatment of explanatory variables, collateral and guarantees, discounting factor, margin of conservatism and cost.

(vi) LDP specificities

The bilateral interviews with banks confirmed data limitations (either internal or external) and banks' difficulties in calibrating and also regularly assessing the PD, LGD and credit conversion factor (CCF) models for LDP exposures. The small number of defaults in LDPs makes reliable statistical modelling difficult. Therefore, expert judgement and the individual bank's experience play a bigger role for these portfolios than for other portfolios. The overall lack of default data for LDPs could be a reason why banks tend towards the 'safe harbour' of supervisory FIRB LGD and CCF parameters.

([4]) The missing data are due partly to the need to report the information by five different collateral types; not all the banks differentiate their time series by such criteria.

Observed bank difficulties in estimation and validation of models for LDPs, as a result of lack of data availability and increased reliance on expert judgement, should trigger a discussion on the scope and design of the requirements dedicated to LDP. Options that may be considered include further guidelines for the development, calibration, validation and ongoing monitoring of LDPs (back-testing and benchmarking) for banks and supervisors, the creation of floors for certain parameters (such as LGD, CCF) and/or fixed values for such parameters.

(vii) Other sources of differences

The EBA also identified a list of other drivers which may have a material impact on comparability of capital requirements. These and others could be investigated in accordance with the supervisory benchmarking exercise in 2014.

Floors and Pillar I or Pillar II add-ons

Regulatory RWs may differ because of add-ons required by the CAs, given the application of floors, and Pillar I or Pillar II add-ons. With regard to RM portfolios, banks apply a regulatory floor of 10% at the portfolio, sub-portfolio or account level. The EBA noticed that half of the CAs have adopted rules concerning the application of floors, characterised by a high variance in interpretation and implementation. Floors may apply to a minimum PD for sovereigns and to a minimum LGD and/or CCF for some portfolios, with a focus on LGD for RM portfolios. It should be stressed that specifically for RM portfolios, setting the minimum regulatory value of the LGD parameter is very important and is part of the EBA's mandate under Article 164(6) of the CRR.

Variability in the Pillar I capital requirements are also driven by different practices in implementation of add-ons. Several CAs apply additional conservatism in Pillar II, if Pillar II or Pillar I quantitative or qualitative concerns are identified. Uniform implementation of add-ons could further contribute to comparability of Pillar I capital requirements.

Maturity parameter

Potential material variation in capital requirements is caused by different banks and supervisory practices for the computation of the maturity (M) parameter. For the central governments' portfolios, the M parameter explains 20% of the dispersion in RWs. The EBA did not find an economically significant effect for the other LDPs. With regard to supervisory practices, the vast majority of CAs have not established specific rules concerning M parameter calculation. The EBA concludes that a clearer definition of the maturity's use and greater transparency on the computation method are necessary; however, at this juncture the matter is not treated as a priority.

CCF parameter

Data collected for LDPs revealed that the banks are struggling to find enough data by facility type to develop own CCF estimates, meaning banks using the AIRB Approach often either directly use the FIRB CCF parameter or use the FIRB CCF parameter as a benchmark. There is in general a low

variance of rules across the CAs, partly driven by the fact that only a limited number of CAs have defined rules in this regard. The main point of variation seems to be the treatment of negative CCF observations.

Rating update

Regarding LDPs, different frequency in customer information and rating updates seems to drive some of the remaining capital requirement variations across banks. Indeed, the regulation requires banks to update their ratings at least every 12 months.

Application of home country models to exposures located in other countries

Some banks make use of global IRB models for exposures located in different countries. This practice is an opportunity but also a challenge, as it is often difficult because of the absence of enough observations to monitor separately and properly the performance of the models for such exposures.

Regulatory mapping

The study confirmed the application of different approaches for mapping SME exposures in corporate or retail exposure classes. This seems to be largely due to different national implementations of the CRD. A similar feature has been identified for the mapping of housing loans not secured by real estate collateral, such as those defined as ‘secured by real estate portfolio’ or ‘other retail’, and may deserve further attention.

Collateral

For credit institutions, portfolio collateral plays a role in explaining the variation for AIRB banks only. For large corporate portfolios, the collateral contributes to the variation, taking into account that there is an increase in the RW dispersion.

Back-testing

The overall framework applied by the banks for back-testing PD, LGD and CCF models is broadly similar, although there are some differences in how the banks deal with cyclicality, trigger/threshold definitions and use to activate a recalibration/re-estimation of the models, confidence intervals, expert judgement and internal process (granularity and frequency of back-testing).

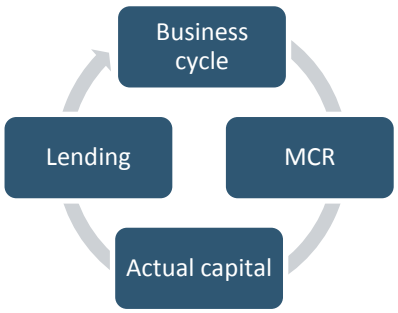
4. Report on pro-cyclicality

4.1 Introduction

According to the Financial Stability Board, the term 'pro-cyclicality' refers to 'the dynamic interactions (positive feedback mechanisms) between the financial and the real sectors of the economy. These mutually reinforcing interactions tend to amplify business cycle fluctuations and cause or exacerbate financial instability'. Hence, pro-cyclicality refers to the amplification of the natural fluctuations in the economic cycle by the activities of the financial sector. The concept of pro-cyclicality is therefore different from the concept of cyclicality, which refers to the expected adjustments of the financial sector to the economic cycle, such as the expansion in institutions' lending portfolios during good times and shrinking intermediary activities during a downturn. Finally, it is important to stress that the focus of this report is not on pro-cyclicality as such but on the pro-cyclicality of capital requirements calculated under the IRB Approach. This implies disentangling the pro-cyclical effect of the financial sector from the pro-cyclical effect of the CRR and CRD IV as introduced by the Basel II implementation in Europe. Furthermore, evidence of pro-cyclicality of capital requirements requires not only evidence of a causal relationship between macroeconomic indicators and minimum capital requirements but also evidence that (i) bank capital regulation has an impact on loan supply and (ii) the supply of loans attenuates the economic cycle.

To illustrate the (potential) relationship between capital requirements and the economic cycle, Figure 7 gives a schematic overview of the different components. The presence of different transmission channels is reflected in the structure of the pro-cyclicality report.

Figure 7: Overview of the relationship between minimum capital requirements and the business cycle



Source: EBA analysis

The empirical analysis with regard to pro-cyclicality has been performed making use of aggregated available supervisory reporting data. The dataset contains semi-annual information on

balance-sheet and income statement information aggregated to the level of Basel II terminology for the period 2nd half of 2008 to 2nd half of 2012. The exact number of banks covered in the dataset varies over time, but, as a reference, there were 89 banks from 16 European countries at the reference date of December 2011, with an average EAD of about EUR 270 billion ([5]). This dataset contains information only on banks applying the IRB Approach.

4.2 Methodology and main findings

The report on pro-cyclicality makes use of econometric regression techniques to examine the link between macroeconomic variables and minimum capital requirements. In this regard, some caveats should be mentioned. First, the econometric regression technique does not provide evidence of a causal relationship between macroeconomic variables and minimum capital requirements. Second, the econometric model covers only part of the pro-cyclicality definition. More specifically, only the relationship between macroeconomic variables and minimum capital requirements is analysed. Evidence of pro-cyclicality in capital requirement regulation requires evidence that also shows a causal link between capital requirements and the economic cycle.

The literature review contains elements both from the academic literature and from the previous ECB–EBA report on pro-cyclicality, which was finalised in April 2012. The main conclusions from the literature review can be summarised as follows:

1. The empirical assessment of the sensitivity of input parameters to minimum capital requirements calculations suggest some counterbalancing effects between cyclical effects of risk parameters such as PDs or LGDs on the one side and anti-cyclical developments in exposures on the other.

2. The findings on minimum capital requirements at the bank and at the portfolio level suggest that there are broad indications for some cyclicality at the level of corporate and retail portfolios. These cyclical effects, however, seem to be mitigated to a large extent at the bank level.

3. The cyclicality of capital requirements depends on the way internal ratings systems are implemented under Basel II. Under the IRB Approach, the rating philosophy for PD may follow either a ‘point-in-time’ (PIT) or a ‘through-the-cycle’ (TTC) approach. PIT ratings represent an assessment of the borrower’s ability to discharge his obligations over a relatively short horizon (e.g. a year), and so can vary considerably over the cycle. The TTC approach focuses on a longer horizon, abstracting in principle from current cyclical conditions. TTC ratings are therefore inherently more stable and less cyclical than PIT ratings. Empirical evidence has shown that IRB banks that compute PIT PDs produce highly significant variations in minimum capital requirements from peak (expansion) to trough (recession), unlike IRB banks that compute TTC PDs.

([5]) Different reports take different subsamples of the ISG database. For instance, the time series and decomposition analysis in the pro-cyclicality report contains the balanced subset of European banks in the ISG database, whereas the econometric analysis in the pro-cyclicality report makes use of the unbalanced subset of European banks.

The descriptive statistics on key bank variables provide insight into the evolution of bank capital requirements over time, the decomposition of RWA across portfolios, the time evolution of effective risk weights (RWA/EAD) and how the most important IRB parameters have evolved over time (PD, PD on non-defaulted exposures, LGD, EAD and share of defaulted assets).

Aggregate statistics show a marked improvement in the average solvency ratio of European banks between 2008 and 2012. The strengthening in bank's capital ratios has been driven both by an increase in capital resources and by a reduction in RWA. Furthermore, the analysis shows how the effective RWs applied to the different portfolios (corporate, sovereign, retail and bank) have evolved over time. Effective RWs have declined for all portfolios, except the bank portfolio, for which RWs increased by 10%. Given the economic circumstances, it appears counterintuitive that RWs applied to the same portfolio (held constant) would have declined over the observed sample period.

The analysis shows that three channels can affect the time evolution in RWAs: a portfolio mix effect (how exposures are distributed across the corporate, bank, retail and sovereign portfolio), a portfolio composition effect (the distribution of exposures within each portfolio) and an IRB ratings effect (the average RW for each portfolio). The challenge is to isolate and quantify the IRB ratings effect. However, due to the limited level of granularity in the dataset, it is not possible to isolate the IRB ratings effect. In fact, only the joint impact of the IRB ratings effect and the portfolio composition effect can be observed.

Despite these data limitations, the evidence seems to suggest that there has been a shift towards portfolios with lower RWs, as exposures in the retail and sovereign portfolio have increased relative to a decline in the share of the bank and corporate portfolio. This finding is in line with the conclusions of Cannata, Casellina and Quagliariello (2011)[6], who mention that banks seem to have adopted dynamic strategies aimed at reallocating their exposures towards less risky portfolios to benefit from lower capital requirements. However, the evidence that is presented does not allow us to conclude whether this is good or bad in terms of lending policies. In particular, the data do not reveal to what extent portfolio reallocations have caused undesired restrictions for some borrowers.

Moreover, evidence on portfolio parameters in the corporate portfolio (which has the largest share of exposures) leads us to conclude that the higher provisioning may be one of the reasons for the decrease in capital requirements. A remarkable increase in the PD of the corporate portfolio has been observed during the recent period of financial crisis, while the PD has declined in the non-defaulted share of the portfolio. The increase in EAD required higher provisioning, as evidenced in our dataset, and this in turn helps to explain the decrease in capital requirements.

([6]) Cannata, F., S. Casellina and M. Quagliariello, 'The myths and truths about Basel II cyclicality', Risk magazine.net, 2011.

The report on pro-cyclicality then analyses pro-cyclicality using econometric regression techniques. The econometric analysis shows a statistically negative relationship between minimum capital requirements and the business cycle, both at the bank and portfolio levels.

However, given the parsimonious specification owing to the relatively small dataset, it would be hard to infer a causal relationship between the macroeconomy and minimum capital requirements from these results. Moreover, the report on pro-cyclicality does not include a quantitative analysis of (i) whether bank capital levels also affect bank lending or (ii) whether credit availability in turn affects the economic cycle. Evidence on both transmission mechanisms is necessary to conclude on any pro-cyclical effect of capital requirements, that is, whether capital requirements amplify the economic cycle. More detailed evidence on the above transmission mechanisms is presented based on other studies, including the ECB Bank Lending Survey.

4.2.1 Findings on cyclicality in other EBA work

The literature review and the econometric analysis of pro-cyclicality already indicated that the cyclicality of capital requirements depends on the way internal ratings systems are implemented under CRD, i.e. the rating philosophy used.

Rating philosophy is dealt with in the report on the LDP. The majority of the banks in the sample (19 out of the 35 banks) follow a TTC approach. The rest of the banks reported using a PIT approach or a hybrid approach. However, 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 did not necessarily use a systematic adjustment. Rather, the approaches seem to represent the internal rating philosophy/interpretation of the bank. Therefore, sometimes the EBA did not find large differences in the method of rating calibration or assignation between two banks even if one of those banks defined itself as TTC and the other as PIT.

Findings from the SME and RMs report indicate that the philosophy of the rating system may have a more material impact on SME and RMs portfolios, where behavioural models are more PIT. It should, however, be kept in mind that these conclusions are based on a self-assessment of the banks taking part in the survey. Indeed, the survey results confirm that around 40% of the models are based on a hybrid approach, 35% on a PIT approach and 15% on a TTC approach. However, in terms of the observed level of cyclicality, it seems that more models (17%) than expected, when looking at the rating philosophy approach, are close to a TTC approach and thus have an observed level of cyclicality below 10%.

Via its survey regarding supervisory practices in IRB models, the EBA analysed supervisory rules in relation to the following drivers: (i) rating system philosophy, (ii) PD parameter – risk quantification (the length and the period for calibration imply the stability or the change within the cycle of the parameter), (iii) PD parameter – risk differentiation (migration), and (iv) back-testing of cyclicality performance. Overall, fewer than 40% of CAs have rules concerning the rating philosophy. There is a low variance of rules across the CAs, since very few supervisors have defined very specific and prescriptive requirements. When they specified such rules, they were

generally in line with CEBS GL10. The lack of transparency on the rating philosophy in IRB models reinforces the need for policy recommendations that ensure a better documentation of the rating models.

4.2.2 The existence of pro-cyclicality

The findings in the reports show no evidence of pro-cyclicality of capital requirements. The analysis point out that there is some evidence of a (negative) relationship between macroeconomic variables and IRB parameters, but this seems to be mitigated to a large extent by portfolio reallocations. Banks seem to have adopted dynamic strategies aimed at reallocating their exposures towards less risky portfolios to benefit from lower capital requirements. However, full proof of pro-cyclicality of capital requirements is not available; this would require evidence demonstrating a causal link between capital requirements and the economic cycle, that is, whether capital requirements amplify the economic cycle.

Furthermore, studies have shown that the cyclicality of capital requirements depends on the way internal ratings systems are implemented under Basel II, i.e. on whether PDs follow a PIT or a TTC approach. Empirical evidence has shown that IRB banks that compute PIT PDs produce highly significant variations in minimum capital requirements from peak (expansion) to trough (recession), unlike IRB banks that compute TTC PDs. Findings from the bank survey on banks' rating philosophies used for rating SME and RM portfolios point out that 75% of banks' models are based on a hybrid or PIT approach. Hence, bank capital requirements stemming from SME and RM exposures are expected to be most prone to a pro-cyclical effect.

5. Conclusions and policy recommendations

The studies in aggregate confirm the existence of a variation in RWs and EL among banks. Some sources of variation have been clearly identified and are to be 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 analysis. Some discrepancies might be reduced by harmonisation across banks' and jurisdictions' regulatory implementation and supervisory practices.

Many sources of variation will be addressed by the development of RTS/ITS and guidelines related to the use by institutions of the IRB Approach for the calculation of RWA, as envisaged by the CRR and CRD IV. The majority of mandates in this regard are due by the end of 2014.

The following suggestions for policy options should be seen as potential directions for future work to be considered by the CAs and the EBA. They should not be seen as comprehensive or as pre-empting any specific policy measures.

With regard to comparability, the following main areas of work should contribute to greater harmonisation.

1) Initiatives stemming from CRR and CRD IV mandates dedicated to drivers identified as material:

a) Drafting technical standards and guidelines with regard to the following areas: PPU and roll-out plan (Articles 148(6) and 150(3) of the CRR); default definition (Article 178(6) and (7) of the CRR); assessment methodology of the PD parameter (Article 180(3)(b) of the CRR); downturn conditions for LGD parameter estimation (Article 181(3)(a) of the CRR); higher minimum values of LGD parameter (Article 164(6) of the CRR); and assessment methodology of the IRB Approach (Article 144(2) of the CRR).

b) Benchmarks on IRB parameter estimates. Supervisory benchmarking exercise for risk parameters will be conducted on an annual basis in accordance with the RTS/ITS of Article 78 of the CRR. This exercise has the added value of allowing data sharing across the EU supervisors and introducing the regular conduct of such an exercise. Moreover, it should also support the analysis of where divergences are material, and thus provide indicative measures where supervisors should investigate further with regards to areas, parameters or banks outliers.

2) The following additional initiatives will be explored by the EBA, for all the drivers identified as material that are not covered by legal mandates:

a) Enhance supervisory disclosure and transparency by the banks about RWA-related information.

Improvements in Pillar III information would allow for better comparisons by third parties: publication on a regular basis of statistics of RWs, EL, observed default and loss rates by country/portfolio; promotion of enhanced bank disclosure through harmonised definitions and templates to achieve greater consistency and comparability.

b) Enhance regulatory and supervisory approach of:

(i) How RWA on defaulted assets is to be computed, with regard to computation of LGD in default, ELBE and IRB shortfall.

(ii) The total length of the roll-out plan and supervisory practices regarding non-compliance of an institution with the roll-out plan. Further guidance for supervisors in granting authorisation for PPU of the SA for sovereign exposures is necessary. Moreover, principles on the treatment of unrated exposures (exposures not included in the roll-out plan or not in PPU) need to be specified.

(iii) PD computation, namely calculation of long-run average of default rates (data used to calibrate the models); the margin of conservatism; updating the data used for calibration; and calibration of the internal ratings scales.

(iv) Downturn LGD computation, namely methodology/ies of calibration; data to be used to calibrate the models to downturn conditions; the level of conservatism to be included in the downturn LGD.

(v) Additional clarification on the treatment of LDPs. The following options will be considered: guidelines for the development, calibration, validation and ongoing monitoring of LDPs (back-testing and benchmarking) for banks and supervisors; the creation of floors for certain parameters (such as LGD, CCF) and/or fixed values for such parameters.

The EBA could further develop own initiative guidelines to help improve the situation in the prioritised areas.

In order to have a better understanding of pro-cyclicality in the future and in particular to improve transparency and documentation, the CAs should put special emphasis on the following recommendations when assessing IRB systems. The EBA will put forward these policy recommendations in the RTS on Article 144(2) of the CRR.

Institutions should adopt and document policies to explain the philosophy of each rating system and how grades and risk parameters are expected to vary with movements in the general economic cycle or more specific cycles relevant to each risk parameter.

Institutions are to systematically record the following information about their approach to PD estimation, separately for each rating system:

the historical time horizon over which default rates have been averaged for the calculation of grade-level long-run PDs;

the planned frequency with which PDs will be re-estimated (if at all) and how the historical time horizon will change at each point of re-estimation;

the level of conservatism that has been applied to compensate for uncertainty in PD estimation, specifically from the use of historical default rate time series that are shorter than one economic cycle (as required by Article 179(1)(a) of the CRR – 'the less data an institution has, the more conservative it shall be in its estimation').

3) Institutions are to ensure the accuracy of back-testing measures for PD parameter quantification with respect to intended rating philosophy/ies.

With the above improvements to the IRB Approach, it is the assessment of the EBA that this will lead to a convergence of practices and ensure that non-risk based drivers of IRB models are minimised. This will enhance the credibility and comparability of the IRB Approaches and ensure that it also in the future remains an integral part of risk management and measurement framework.

6. Annexes

1. First interim report on the consistency of risk-weighted assets – top-down assessment of the banking book
2. Second interim report on the consistency of risk-weighted assets – low default portfolios
3. Third interim report on the consistency of risk-weighted assets – SME and residential mortgages
4. Report on the comparability of supervisory rules and practices
5. Report on the pro-cyclicality of capital requirements under the Internal Ratings Based Approach