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## IN-DEPTH ANALYSIS

# Banks' internal rating models - time for a change? The "system of floors" as proposed by the Basel Committee

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Provided at the request of the  
**Economic and Monetary Affairs Committee**

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### **Abstract**

We provide an assessment of the BCBS proposal on restricting the IRB approach and introducing RWA floors. If well enforced, risk-sensitive capital regulation results in a more efficient credit allocation compared to the SA. Thus, IRB should be maintained. Further, the use of IRB output floors potentially results in unintended negative side effects. Input floors are likely a valuable tool to achieve RWA comparability. Finally, the proposed measures have a potential detrimental impact for European banks as compared to others.

This paper was requested by the European Parliament's Economic and Monetary Affairs Committee.

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## **ABOUT THE EDITOR**

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## LIST OF ABBREVIATIONS

<b>A-IRB</b>	Advanced Internal ratings-based approach
<b>BCBS</b>	Basel Committee on Banking Supervision
<b>bp</b>	Basis points
<b>CCF</b>	Credit conversion factors
<b>EAD</b>	Exposure at default
<b>EBA</b>	European Banking Authority
<b>ECB</b>	European Central Bank
<b>F-IRB</b>	Foundation Internal ratings-based approach
<b>GL</b>	Guidelines
<b>IIF</b>	Institute of International Finance
<b>IRB</b>	Internal ratings-based approach
<b>LGD</b>	Loss given default
<b>PD</b>	Probability of default
<b>RWA</b>	Risk-weighted assets
<b>SA</b>	Standard approach
<b>RTS</b>	Regulatory technical standards
<b>SME</b>	Small and medium-sized enterprises
<b>SRM</b>	Single Resolution Mechanism
<b>SSM</b>	Single Supervisory Mechanism

## EXECUTIVE SUMMARY

In March 2016, the Basel Committee on Banking Supervision (BCBS) published a consultation on several new regulatory measures with the goal to reduce heterogeneity of banks' capital charges based on internal risk models. In a nutshell, the BCBS proposed to restrict the use of internal models (IRB) to few asset classes as well as setting up a system of risk weighted asset (RWA) input and output floors (i.e. RWA generated by internal models could not fall below certain values derived from the standard approach (SA)).

In this paper, we provide an assessment of the BCBS proposal taking the arguments made in the academic literature and by industry representatives into account. All initiatives to overhaul IRB models, to reform the SA, and to introduce IRB floors must be judged against the objective to find the right balance between risk sensitivity, simplicity and comparability. In order to make a judgement from the European point of view, it is important to also consider the specific situation of both the European banking industry and the regulatory and supervisory structure. Our conclusions can be summarized as follows:

*Assessment of the BCBS proposal to restrict the use of IRB models.* We recommend to maintain the IRB model approach and not to shift exposure classes back to the SA. Importantly, risk-sensitive capital regulation results in a more efficient credit allocation compared to the SA if well enforced. The current deficiencies of the IRB approach should better be addressed by continuing the ongoing initiatives that aim at increasing IRB model quality and homogeneity. With the new European supervisory structure in place (Single Supervisory Mechanism / EBA), Europe is well positioned to successfully complete this process and to take full advantage from well-functioning IRB models in the future.

*Assessment of the BCBS proposal to introduce IRB output floors.* We do not recommend the use of IRB output floors because this does not address the major problem (model heterogeneity) and has many unintended negative side effects, as discussed in detail below. In fact, introducing output floors at a high level potentially results in a distortive credit allocation incentivizing banks to invest in more risky projects and forgo less risky investment projects.

*Assessment of the BCBS proposal to introduce IRB input parameter floors and to harmonize the IRB parameter estimation procedures.* In areas where default data is scarce, the proposed IRB input parameter floors are one appropriate measure to prevent over-optimism and to achieve an appropriate level of conservatism and comparability. With regard to limiting the range of practices regarding the estimation of model parameters under IRB approaches, this measure is likely to limit banks' incentives to develop and improve their risk management practices and methodologies.

*Assessment of the European situation.* Europe has just created a new strong central supervisory structure. We are confident that under this structure, it is likely that supervisors will be able to better address RWA heterogeneity without implementing the BCBS proposal. Furthermore, Pillar II already constitutes an effective backstop for RWA heterogeneity and in practice increasingly determines minimum capital requirements for many banks in Europe. Finally, the BCBS proposal potentially has a more detrimental impact for European banks as compared to banks in other regions given that underlying asset risk could substantially vary from region to region.

## 1. INTRODUCTION

**The case for risk-sensitive capital regulation.** Capital adequacy requirements are widely accepted to be the most effective tool to ensure the stability and soundness of financial institutions (Behn et al. 2016b). The determination as well as the level of appropriate capital charges, however, is subject to much debate (see, for example, Diamond and Rajan (2000, 2001), Acharya (2009), Admati and Hellwig (2014)). Market forces alone do not incentivize banks to hold sufficient capital because implicit and explicit guarantees provide banks with an incentive to hold less capital than is socially optimal. However, regulating capital via a simple capital to asset ratio incentivizes banks to hold portfolios with more risky assets (Koehn and Santomero (1980), Kim and Santomero (1988)). Capital regulations with little risk sensitivity share a “flat tax” feature and incentivize banks to increase asset risk within each risk category, thus leading to a distortion in the allocation of credit (Behn et al. 2016a, 2016b).

Consequently, regulators have introduced new regulatory measures to link capital charges to asset risk. The Basel II framework, the most important of such efforts, introduced capital charges for individual loans that depend on risk estimates from banks’ internal risk models (Behn et al. 2016a). The introduction of model-based capital regulation is an important regulatory innovation targeted at incentivizing banks to adopt stronger risk management practices, and -ultimately - increasing the stability of the banking system (Basel Committee on Banking Supervision 2006).

**IRB in practice.** Following the introduction of Basel II (in most countries in 2007), banks could choose between the internal rating based approach (IRB) in which capital charges depend on internal risk estimates of the bank, and the less risk-sensitive standard approach (SA) that does not rely on internal risk parameters. The introduction of IRB required a sophisticated risk management system that had to be certified by the regulator (Basel Committee on Banking Supervision 2004). As a consequence, mostly large banks found it worthwhile to introduce the IRB approach, while most small banks preferred the SA to determine capital charges (Behn et al. 2016a).

Banks that opted for IRB assess the credit risk of their customers with their own internal models which use banks’ internal data in order to estimate key risk parameters such as the probability of customer defaults (PD), the loss in case of a default (LGD), and the exposure at default (EAD). In the advanced IRB approach (A-IRB) the bank estimates all parameters itself. In the foundation IRB approach (F-IRB), banks’ main input is the PD – other parameters are largely prescribed by the Basel regulation. The PD, LGD, and EAD parameters are then entered into a formula in order to derive the risk weighted assets (RWA) that determine the regulatory equity requirements. All banks use the same formula which is prescribed by the Basel regulations.

We want to shortly explain the basic techniques that banks use for the estimation of IRB model parameters. The estimation of the probability of default is based on banks’ historical data from their own past business operations. The data includes historical information on customer credit riskiness (e.g. indicators like profitability, leverage, etc.) and historical default information (the names of defaulted and non-defaulted customers). Based on this information, banks apply statistical models in order to estimate the relation between the risk indicators (input variables) and default (output variable) of their customers. After estimating the model parameters, the model delivers a forecast for the probability of default for current (not historical) customers of the bank.

In a similar manner, the bank uses its own historical records to forecast the amount of losses in the case of a customer default (loss given default - LGD). The statistical models take into account aspects like the amount and nature of collateral or the seniority of the loan contract. Also the exposure at default (EAD) is forecasted. The most important issue here is the question to what extent the customer will have drawn down lines of credit that the bank has committed to.

Because every bank uses its own specific internal data for modelling, model results will necessarily differ from bank to bank. A certain degree of model output heterogeneity is thus a natural consequence of a risk-sensitive capital regulation that is based on banks' internal risk assessment information. A number of reasons may be responsible for diverging IRB model results:

- *Variations in IRB modelling techniques.* IRB models are complex statistical models and banks use a variety of different modelling techniques. Basel guidelines restrict the modelling choices but variation remains because no precise modelling approach is prescribed by the regulations.
- *Input data differences.* Different banks have different customers in their historical database. If one bank by chance has experienced few defaults in the past, its IRB model will likely forecast a lower PD than a bank with more defaults.
- *Differences in national/regional standards and local implementation.* In the course of the IRB approval process, different regulators use different guidelines and rules that they impose on banks in the process of IRB model calibration.

**The benefits of risk-sensitive capital regulation.** IRB based RWA measures have two main advantages compared to the Basel II standard approach (SA). The Basel Committee on Banking Supervision (BCBS)<sup>1</sup> considers the lack of granularity and risk sensitivity in SA as “one of the key weaknesses of the current SA.”

- Granularity is low under the standard approach because all exposures are lumped into few risk categories. Within a risk category, exposures are treated the same. For example, all corporate loans to customers without a rating from a recognized external rating agency receive the same risk weight (RWA of 100%). As a result, the capital adequacy regulation does not reward a bank that has carefully selected low risk customers within a given risk category.
- IRB models are more risk-sensitive in the sense that the bandwidth between the RWA of low risk and high risk customers is larger when banks use IRB models. For example, the RWA for corporate loans varies between 20% and 150% in the SA. The bandwidth of a typical IRB model may range from 10% to 250%. The increased risk sensitivity of IRB models has the consequence that banks achieve larger rewards from implementing a low risk strategy.

**The problems with IRB.** A regulation that is based on banks' internal risk models may suffer from both informational and incentive problems. As argued by Glaeser and Shleifer (2001), coarser regulation can be the optimal regulatory choice and may actually dominate more sophisticated forms of regulation in the presence of enforcement constraints. As several theoretical models have pointed out, if enforcement costs are too high, a simpler (second best) quantity regulation could be superior to a first best complex regulatory framework (see Behn et al. 2016a for an application of this concept with regard to model-based capital regulation).

The overall effects of sophisticated, model-based regulation on banks' credit risk remain controversial. IRB based RWA models by nature also have some disadvantages compared to the SA:

1. *Complexity and opacity.* IRB models are often deemed as “black box models”. This automatically introduces the possibility that banks “tweak” the numbers in their favour. However, the leeway for tweaking IRB models is expected to shrink in the future due to the fact

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<sup>1</sup> Basel Committee on Banking Supervision, Revisions to the Standardised Approach for credit risk, 2015, p.22.



that supervisors become more acquainted with the models and increasingly force the banks to homogenize their models through regulatory guidelines.

2. *Level playing field concerns stemming from IRB model heterogeneity.* Banks with overly optimistic IRB models enjoy a competitive advantage in the form of lower equity requirements compared to IRB banks with unbiased or conservative models.
3. *Level playing field concerns stemming from discrepancies between IRB models and the SA.* If IRB model usage causes a large capital reduction compared to the SA, IRB banks enjoy a competitive advantage over SA banks.
4. *Concerns of aggregate undercapitalization of IRB banks.* A variety of reasons may be responsible:
  - a) Banks may be able to “tweak” their models to their own benefit and thus reduce RWA,
  - b) Local supervisors may try to support their local banks and do not prevent this “tweaking”,
  - c) When banks with different IRB models compete for customers, each bank likely attracts those customers where the bank has an excessively optimistic risk assessment.

**Evidence on RWA heterogeneity.** A number of studies have compared the RWA results of IRB models from different banks and found a high level of heterogeneity in some areas.<sup>2</sup> The main findings may be summarized as follows:

- Banks find it difficult to estimate the PD of low risk portfolios with few observations, resulting in substantial PD variation. Examples are exposures to banks and other financial institutions, sovereigns, and large corporates. In contrast, the PD of SMEs and retail customers can be estimated more easily and lead to only minor differences between IRB models of different banks.
- The LGD estimates of A-IRB models differ widely. It is not yet clear to what extent this reflects
  - a) “tweaking” by banks,
  - b) true differences in expected LGD (stemming e.g. from different collateralization practices among banks),
  - c) differences in model assumptions/differences in local supervisory guidelines etc.
- EAD differences are substantial in some areas (e.g. lines of credit to SMEs). The root cause seems to be missing regulatory guidance and/or different interpretations among banks regarding the definition of what constitutes an “unconditionally cancellable loan commitment”.<sup>3</sup>

Several academic papers have examined in how far IRB models have been used for regulatory arbitrage. Behn et al. (2016a) find for a sample of German banks during the period from 2008 to 2012 that internal risk estimates employed for regulatory purposes systematically underpredict actual default and that both default rates and loss rates are higher for loans that were originated under the model-based approach, while corresponding risk-weights are significantly lower. Interestingly, interest rates are higher for loans originated under the model-based approach, suggesting that banks were aware of the higher risk associated with these loans and priced them accordingly. In a related study, Santos and Plossner (2015) find that low-capital banks’ risk estimates have less explanatory power than those of high-capital banks with regard to the prices set on loans. Congruent with a regulatory motive, the sensitivity to capital is greater for larger, riskier,

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<sup>2</sup> E.g. IIF RWA task force report, November 2014; , Basel Committee on Banking Supervision, Regulatory consistency assessment programme (RCAP) – Analysis of riskweighted assets for credit risk in the banking book, April 2016, Basel Committee on Banking Supervision, Regulatory Consistency Assessment Programme (RCAP) – Report on riskweighted assets for counterparty credit risk (CCR), October 2015.

<sup>3</sup> There is substantial variation in the treatment of these commitments by different banks for capital adequacy purposes, See. Basel Committee on Banking Supervision, Regulatory consistency assessment programme (RCAP) – Analysis of risk-weighted assets for credit risk in the banking book, April 2016

and more opaque credits. These studies suggest that gaming by banks with tight capital constraints is one source for RWA heterogeneity.

**Regulatory reactions to RWA heterogeneity.** Undercapitalization of banks and excessive model heterogeneity have been identified as major weaknesses of the current regulatory regime and the shortcomings have been addressed by various policy measures. The most important is the introduction of the leverage ratio regulation within Basel III, which is defined as the ratio of a bank's tier 1 equity capital over a measure of total exposure. The main idea of a leverage ratio is to ensure that banks hold a minimum level of capital irrespective of the riskiness of their assets. In a way, the leverage ratio can be understood as a lower output floor on RWA aggregated over all exposures.

Other measures are the ongoing “Regulatory Consistency Assessment Programme” and “Hypothetical Portfolio Exercises” – regulatory initiatives that aim at a harmonization of modelling standards in the banking industry. These initiatives are complemented by private industry initiatives with the same goal, e.g. the “RWA task force” of the Institute of International Finance.

The current proposal by the BCBS to limit the use of IRB model usage and to introduce IRB floors is a third complementary initiative. The need to introduce another “backstop” level of protection clearly depends on the ability of the other measures (leverage ratio & harmonization of IRB models) to achieve the desired objectives.

## 2. THE BCBS PROPOSALS

The BCBS proposes a whole set of measures that aim to restrict the use of IRB models and limit the amount of capital savings from using IRB models:<sup>4</sup>

***Proposal 1: Restrictions for the use of IRB models.***

The BCBS proposes to abolish IRB models and to replace them by the SA for a number of exposure classes: exposures to banks and other financial institutions, exposures to large corporates, and equities. For some other exposure classes, the BCBS proposes to replace IRB models by less sophisticated approaches: For midsize corporate exposures, the A-IRB shall be exchanged by the F-IRB. For specialized lending, IRB shall be replaced by the SA or the “supervisory slotting” approach.

***Proposal 2: IRB output floors.***

The BCBS proposes to apply a floor for IRB models with the result, that the minimum capital requirement shall exceed 60% to 90%<sup>5</sup> of the capital requirement from the SA. The committee is not yet decided whether to apply the floor to the aggregate IRB model output or at a more granular level.

***Proposal 3: IRB input parameter floors.***

The BCBS proposes a number of floors, e.g. LGD floors for different segments, a 5 bp PD floor and other constraints for EAD modelling (e.g. application of an EAD floor equal to the credit conversion factors (CCF) of the SA for off credit lines and other commitments).

***Proposal 4: Harmonization of IRB parameter estimation procedures.***

The BCBS proposes to limit the range of practices regarding the estimation of model parameter under the IRB approaches.

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<sup>4</sup> BCBS, Reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches, 2016.

<sup>5</sup> The BCBS has proposed this range but not decided on the final number.

### 3. INDUSTRY COMMENTS

The financial industry has delivered a large amount of comments which generally welcome the stated objective of harmonizing internal models and creating a level playing field, but raise numerous arguments that the BCBS proposals are the wrong way to achieve this because of many negative side effects. The industry proposes a number of alternative solutions with supposedly less negative side effects.

#### 3.1 Negative Side Effects of the BCBS Proposals

The industry mainly points to the following main negative side effects of the BCBS proposals:

1. *Reduction of risk sensitivity.* Less risk-sensitive capital constraints in conjunction with the market pressure to maximize return on equity/capital would encourage banks to reduce exposure to low risk customers and increase exposures to customers with poor credit quality. The proposals make riskier assets relatively less capital-intensive and safer assets more capital-intensive. This could create incentives for banks to concentrate their risk exposures in higher yielding, riskier assets. Separating regulatory capital outcomes from underlying risk levels will lead to suboptimal capital allocation decisions and pricing distortions. This would in particular hit specific market segments and increase the cost of banking services in areas like leasing, factoring, consumer credit, real estate financing, wealth management, centrally cleared derivatives, emerging markets, interbank market exposures, hedged credit exposures and others.

For example, interbank exposures to banks without an external rating would all be subject to a fixed 100% risk weighting, reducing the incentives for banks to concentrate their business at low risk banks. Overall, the overwhelming majority of respondents stress that risk sensitivity of the capital framework should be maintained to ensure appropriate capital allocation.

2. *Introduction of cliff effects.* The low level of granularity of the SA leads to “cliff effects”, i.e. large jumps of RWA. For example, a small corporate rating change from AA- to A+ would cause a RWA jump from 20% to 50% and substantially increase the cost of capital for serving the customer. Industry representatives therefore propose to increase the number of RWA categories. A typical example is specialized lending: BCBS proposes to use 4 risk weight categories between 70% and 200%. The Institute of International Finance (IIF) proposes to use 8 different risk weights between 20% and 200%.
3. *Increase in aggregate capital charges.* Industry representatives expect a material increase in aggregate capital requirements for banks.

It is indeed likely that the BCBS proposals will significantly increase the costs of obtaining low risk services for the bank customers. A good example is the forward mortgage loan. This contract helps home owners to eliminate the risk of interest rate increases after the expiry of the interest fixing period of their current loan contract. Forward loans are at very low risk for the bank (the bank will receive the collateral at the start date of the loan, house prices and income tend to increase over time and decrease default risk compared to the initial mortgage contract). IRB banks currently offer these loans at very competitive prices because A-IRB modelling allows to correctly identify the low risk nature of the contract. In contrast, the SA treats these contracts as uncollateralized and thus very risky because the collateral is delivered only at the start date of the loan. A SA-based floor thus may force banks to charge much higher loan rates and may strongly reduce the use of this contract.

### 3.2 Suggested Alternative Solutions

Many industry comments point to alternative solutions that may deliver the targeted harmonization of IRB model outputs and at the same time do not have the unwarranted side effect of strongly reducing the risk sensitivity of capital regulations:

1. *Harmonization of definitional issues and standards for modelling.* Industry representatives emphasize that a large part of RWA variation is driven by diversity in both bank and supervisory practices. Differences are partly due to too high level discretion in the Basel Standards and their translation into local legislation. Furthermore, local supervisors may have applied different degrees of scrutiny that caused additional RWA variation. Finally, banks had ample freedom to make modelling choices that contributed further to the unintended risk weight variation. RWA variance can thus be reduced through harmonization of banks' modelling practices without sacrificing risk-sensitivity.
2. *Constrained Internal Ratings Based approach instead of shift to SA.* Industry respondents note that concerns within the regulatory community relate to the inputs into the IRB approach rather than the internal ratings approach itself. Rather than abolishing the IRB approach for important exposure classes, future regulations should focus on a harmonized and robust calibration of the input parameter used. Parameters should be calibrated according to strict and homogenous guidelines across banks. Banks propose to estimate parameters based on pooled data across institutions, implying a much higher degree of harmonization. A number of industry representatives also acknowledge that parameter floors may be legitimate in circumstances where data does not allow robust development of models/model components.
3. *Reliance on external rating agencies.* Industry representatives remark that the shift towards the SA automatically increases the reliance on external rating agencies, although the financial crisis demonstrated that overreliance on the judgements of a small number of institutions can lead to substantial undercapitalization problems when those judgements should be inaccurate.

## 4. OUR EVALUATION OF THE BCBS PROPOSALS

### 4.1 Summary of Our Evaluation

All initiatives to overhaul IRB models, to reform the SA, and to introduce IRB floors must be judged against the objective to find the right balance between risk sensitivity, simplicity and comparability. In order to make a judgement from the European point of view, it is important to also consider the specific situation of both the European banking industry and the regulatory and supervisory structure.

Our assessment of the BCBS proposals can be summarized as follows:

*Assessment of restrictions for the use of IRB models (Proposal 1).* We recommend to maintain the IRB model approach and not to shift exposure classes back the SA. The current deficiencies of the IRB approach should better be addressed by continuing the ongoing initiatives that aim at increasing IRB model quality and homogeneity. With the new European supervisory structure in place (single supervisory mechanism / EBA), Europe is well positioned to successfully complete this process and to take full advantage from well-functioning IRB models in the future.

*Assessment of IRB output floors (Proposal 2).* We do not recommend the use of IRB output floors because this does not address the major problem (model heterogeneity) and has many unintended negative side effects discussed in detail below. In fact, introducing output floors at a high level potentially results in a distortive credit allocation incentivizing banks to invest in more risky projects and forgo less risky investment projects.

*Assessment of IRB input parameter floors (Proposal 3) and the harmonization of IRB parameter estimation procedures (Proposal 4).* In areas where default data is scarce, the proposed IRB input parameter floors are appropriate measures to prevent over-optimism and to achieve an appropriate level of conservatism and comparability. With regard to limiting the range of estimation practices of model parameters under IRB approaches, this measure is likely to reduce banks' incentives to develop and improve their risk management practices and methodologies.

*Assessment of the European situation.* It is also necessary to assess the potential consequences of the BCBS proposal with regard to the European situation. The following considerations are important: First, Europe has just created a new strong central supervisory structure. We are confident that under this structure, it is likely that supervisors will be able to address RWA heterogeneity better without implementing the BCBS proposal. Second, the implicit assumption behind the BCBS proposal is that Pillar I is a binding constraint. In Europe, Pillar II already constitutes an effective backstop for RWA heterogeneity and increasingly determines minimum capital requirements for many banks in practice. Third, the BCBS proposal potentially has a more detrimental impact for European banks as for banks in other regions. The reason is that RWA output floors would be unique for specific asset classes throughout the world while the underlying risks for these asset classes may differ substantially in different regions (e.g. mortgage loans in the US tend to be more risky than in Europe). If this is the case, the BCBS proposal would have a drastic impact on capital requirements for European banks relative to banks in other regions.

### 4.2 SA versus IRB Approach: Strong Disadvantages from a Shift towards SA (Proposal 1)

The BCBS proposes to shift large exposure classes from the IRB approach towards the SA and as a consequence would strongly reduce the risk sensitivity of the capital regulations. Risk-sensitive capital regulation is desirable as long as regulators are able to reasonably enforce this regulation. The most relevant criteria in evaluating the BCBS proposal is whether we are likely to observe a more or less efficient allocation of credit through financial intermediaries. The BCBS proposal

constitutes a step towards the SA, which basically can be compared to a “flat tax” regime. A well implemented risk-based capital regulation can be compared to a steering tax under the principle: “who pollutes more should be taxed more” (Behn et al. 2016a). Clearly, we expect a better allocation of bank credit under the second option. Thus, IRB models and the associated increased level of risk sensitivity of capital adequacy regulation constitute one of the most valuable and important improvements in the history of banking regulation. It increases the risk consciousness of banks and discourages banks to invest in riskier assets.

The successful use of IRB models requires effective enforcement and therefore strong and well qualified supervisors. Furthermore, the supervisor needs to stay independent. National regulators sometimes have the tendency to not adequately enforce IRB models with an appropriate degree of scrutiny because they are too closely connected to the supervised banks, which leads to problems stemming from “regulatory capture”. For Europe, we are confident that the new European supervisory structure ensures an effective enforcement of the IRB regulations in the long run.

Heterogeneity of IRB results may be an important concern for regulators and may require a general overhaul of the models – but it does not constitute a reason to abandon IRB models. This is because the degree of heterogeneity can be adjusted and determined by the regulator. In the extreme case, the regulator could force the industry to use the same data pool and the same IRB models, resulting in perfect IRB model homogeneity. We do not believe that perfect homogeneity is desirable, but the point that we want to stress is the fact that IRB model heterogeneity itself is not an argument for abandoning IRB and switch to the SA. Furthermore, there is a broad consensus among industry and supervisors that IRB model heterogeneity needs to be reduced. The European Banking Authority EBA has started a comprehensive “IRB-repair” process that addresses all important issues.<sup>6</sup>

In general, the Basel IRB risk weight function, which is a function of Probability of Default (PD), Loss Given Default (LGD) and Maturity (M), is and remains an appropriate approach to determine credit risk. There are important concerns about the inputs that need to be addressed by future regulation. However, the IRB risk weight function is the appropriate way to induce risk sensitivity and to assess credit risk. Basically all industry comments express the view that the current proposals strongly reduce the risk sensitivity of the Basel regulations. We share their view.

PD, LGD, EAD and maturity have all an obvious and strong relation to credit risk and should continue to be used for capital adequacy purposes. The SA in its current form treats short and long term loans the same, largely disregards the benefits of collateralization, and implicitly assumes that highly diverse customers have the same PD.

### **4.3 IRB Output Floors have many unintended Side Effects (Proposal 2)**

We do not recommend to introduce floors for IRB model outputs because these have many negative side effects and other disadvantages.

#### **Issue #1: Can output floors solve the problem of RWA heterogeneity?**

Once output floors are in place, RWA heterogeneity would only be limited in one direction. In case the level of the floor is chosen at a low level, the policy measures will clearly not be effective in addressing the problem of RWA heterogeneity. If the level of the floor is chosen at a high level, one would basically return to the SA model. In this case the benefits of risk-sensitive capital regulations that we have described in the first section of this paper would be lost. Given this, it is unclear how

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<sup>6</sup> See “The EBA’S regulators review of the IRB approach” (2016), and “Opinion of the European Banking Authority on the implementation of the regulatory review of the IRB Approach” (2016).

the policy measure of RWA floors is able to address the problem of RWA heterogeneity without eliminating the benefits of risk sensitivity.

## **Issue #2: RWA output floors in the context of the overall Basel regulatory framework.**

Basel regulations need to be complemented by a “back stop”. However, we see little reason to introduce IRB floors as an additional backstop to supplement the leverage ratio. The stated objective of the leverage ratio is to reinforce the risk-based requirements with a simple, non-risk-based “back stop” measure. The BCBS argues that such a back stop is needed to prevent undue optimism in bank modelling practices, mitigating model risk, addressing incentive-compatibility issues as banks face incentives to use overly optimistic internal models, improving comparability across banks by providing a standardized risk assessment, and constraining variation in model-derived risk-weighted assets (RWAs) that arises from differences in bank and supervisory practices.<sup>7</sup> Importantly, the Leverage ratio already addresses all these concerns.

The BCBS views the capital floor as a complement to the leverage ratio, introduced as part of Basel III. It claims that each measure addresses different issues and offsets shortcomings of the other. According to BCBS, a capital floor constitutes a second backstop that complements some issues which the leverage ratio does not address:

- RWA inconsistency and dispersion. Excessive variation in RWAs for the same exposures raises level playing field concerns
- Prevent extremely low levels of internally modelled RWAs
- More level playing field between standardized banks and banks using internal models

We do not find these arguments convincing. The second point is adequately addressed by input parameter floors and thus does not justify the introduction of an additional IRB output floor. The first and the third point raised by the BCBS collapses to only one argument: establishment of fair competition between banks in order to create a “level playing field”. This is a legitimate concern, but it should be addressed by designing both the SA and the IRB model approach appropriately. Both intend to quantify risk – the SA with a simplified and the IRB approach with a more advanced approach. If big RWA differences should be observed, at least one of the approaches does not deliver what it ought to deliver and thus should be reformed.

Summing up, the IRB output floor should not be implemented because it is redundant and the leverage ratio already addresses (almost) all relevant issues. It adds unwarranted complexity & bureaucracy. Level playing field concerns regarding competition between IRB banks and small SA banks should be addressed by designing both the IRB and SA approach appropriately, but not by introducing IRB output floors.

## **Issue #3: IRB output floors could have unintended effects by distorting banks capital allocation decision.**

IRB floors will affect the capital charges of those assets that carry the lowest risk (according to banks’ internal models). Those assets that banks consider to be risky will not be affected by this policy measure. Given this, the introduction of RWA floors constitutes a tax on low risk investments and therefore banks are incentivized to invest in the potentially most risky assets in each category. Banks’ margins for low risk loans would deteriorate due to such a policy measure.

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<sup>7</sup> Basel Committee on Banking Supervision, Capital floors: the design of a framework based on standardised approaches, December 2014.



**Issue #4: IRB output floors for specific market segments may adversely affect the level playing field.**

Segment IRB output floors are specific to certain asset categories. They may adversely affect competition when the risk of these assets differs considerably between regions and markets. For example, mortgage loans provided by US banks tend to be riskier than in Europe because US government agencies are the predominant financing source for low risk loans in the US. A unique IRB floor level for the mortgage loan sector would punish banks that invest in European mortgage loans more than banks that invest in US mortgage loans. Under model based regulation, such differences would be endogenously incorporated in the resulting capital requirements of the bank. IRB floors thus will tend to penalize banks that operate in markets with lower risk.

**Issue #5: Regulators may be unable or unwilling to set the right level of the IRB output floors**

IRB floors must be chosen by regulators. This choice requires knowledge about the actual risk of different asset categories. This decision could be wrong or the decision could be affected by political influences. A wrong assessment of the risk for certain asset categories by the regulator could incentivize banks to shift a sizeable fraction of their assets into one of these wrongly assessed asset classes. As a consequence, systemic risk would increase. The investment behaviour by European banks with regard to European sovereign debt is a good example: the RWA for certain sovereigns was extremely low and incentivized banks to shift a considerable fraction of their assets into sovereign exposures.

**Issue #6: IRB Output floors increase complexity**

The introduction of RWA floors creates a new layer of complexity that makes efficient bank management as well as regulatory enforcement potentially more difficult. In the past, a RWA increase for IRB portfolios unequivocally indicated an increase in risk and prompted managers to take precautionary action. With implemented BCBS proposals, the manager would first need to undertake an investigation regarding the reason for the RWA increase and thus the guiding function of RWA figures in the current system diminishes.

**4.4 IRB Input Parameter Floors (Proposal 3) and the Harmonization of IRB Parameter Estimation Procedures (Proposal 4).**

IRB models need to be calibrated in a more homogenous way to improve consistency and comparability, as well as to establish a level playing field. The primary task in this respect is to provide banks with more detailed modelling guidelines and to make sure that parameters are estimated on the basis of high quality data. In areas where default data is scarce, the proposed IRB input parameter floors are appropriate measures to prevent over-optimism and to achieve an appropriate level of conservatism and comparability. These floors should be calibrated carefully and reflect the diverse riskiness of different market segments.

Limiting the range of practices regarding the estimation of model parameters under IRB approaches is likely to reduce banks' incentives to develop and improve their risk management methodologies. One of the main ideas of model-based capital regulation was to incentivize banks to adopt stronger risk management practices (Basel Committee on Banking Supervision, 2006). By limiting the range of practices allowed to estimate model parameters under Basel II, banks could be discouraged to invest in improving novel risk management practices.

## 4.5 The European Perspective: Little Benefits from the BCBS Proposals

We argued above that IRB models have a strong advantage, as it increases risk awareness in banks, improve the capital allocation process and ultimately result in a more resilient banking market. However, IRB based capital regulation requires a strong and independent supervisor as an effectively enforcement agent.

In the past, national supervisors in Europe had strong incentives to not exercise the necessary level of scrutiny. By being “lax”, national supervisors could for example prevent the breakdown of undercapitalized banks or they could provide their local banks with a “competitive advantage” compared to banks from other European countries. As a response to the financial crisis, Europe has created the banking union: a strong central supervisory structure that consists of a Single Rulebook, the Single Supervisory Mechanism (SSM), and the Single Resolution Mechanism (SRM). Well-funded central institutions, such as the ECB and the EBA, are expected to bring the enforcement level of IRB regulations to a completely new level. We consider this supervisory structure to be an important step towards a high degree of IRB model harmonization across Europe.

European supervisors also have the necessary powers to enforce harmonization of IRB models. They can either demand capital surcharges in the pillar II comprehensive capital adequacy assessment, if they deem IRB models too optimistic, or threaten to withdraw the approval to use IRB models. Both of these threats are powerful instruments when supervisors want to enforce model changes. However, due to the high complexity of the subject matter, the IRB repair process needs substantial time to be implemented. The EBA has published a timeline that stretches till the end of 2017.<sup>8</sup> The EBA is currently preparing the introduction of regulatory technical standards (RTS) and guidelines (GL) in order to steer this process. A couple of years will be needed to see whether these efforts have delivered the desired outcomes. By strongly decreasing the importance of IRB models, the BCBS proposals jeopardize the success of this process.

Banking regulators in Europe clearly advocate to not weaken the importance of IRB models. Two quotes from EBA papers illustrate this: “This report reiterates the previously expressed EBA stance in favour of the continued use of the IRB approach”; “EBA also believes that the Basel Committee should ... preserve the core strength of the IRB approach, namely a high degree of risk-sensitivity.”

The BCBS proposals aim at preventing banks from using overoptimistic internal models as inputs for determining their regulatory capital requirements. Regulatory capital according to Basel II has two lower boundaries: Pillar I (based on the output of IRB models) and Pillar II (based on a “comprehensive capital adequacy assessment” by supervisors). The implicit assumption behind the BCBS proposal is that Pillar I is the actual binding constraint. Inadequately calibrated IRB models can only result in an inadequate capitalization of the bank if this assumption holds. In Europe, the argument has little validity because Pillar II increasingly determines the minimum level of capital for many banks. Supervisors increasingly use supplementary risk measures such as the European Stress Test in order to perform their Pillar II assessment. Furthermore, the Pillar II capital assessment forms an effective additional backstop in Europe, supplementing both the RWA models within Pillar II and the Leverage Ratio. This implies that the benefits of the BCBS proposals will be relatively small in Europe.

Finally, the BCBS proposals clearly have differential impacts in different regions of the world. We argued above that the mortgage loan books of US banks are generally more risky compared to Europe as a result of the activities of US government agencies. As a consequence, the introduction of IRB output floors has a much larger impact in Europe compared to the US. A similar argument can be made in respect to other markets. Generally, regions with greater economic stability and

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<sup>8</sup> The EBA’s regulatory review of the IRB approach, 2016, p 23.

regions with lower household and corporate leverage tend to have lower credit risk. Every shift away from IRB models towards the SA will adversely affect these low risk regions. Although we are not able to quantify these effects, we believe that the net effect for Europe is more detrimental than in many other regions of the world.

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