IN-DEPTH ANALYSIS

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

External author: Andrea Resti
Bocconi University

Provided at the request of the
Economic and Monetary Affairs Committee

ECON

November 2016

EN

IN-DEPTH ANALYSIS

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

External author: Andrea Resti
Bocconi University

Provided in advance of the public hearing
of the Chair of the Single Supervision Mechanism
in ECON
on 9 November 2016

Abstract

In this note, we discuss the proposal for a reform of internal rating models outlined by the Basel Committee. We first present internal rating models (which currently generate roughly 50% of supervisory capital in the European Union) and the reasons why they have been increasingly criticised. We then review the key proposals circulated by the Basel Committee: the removal of internal models for "low-default portfolios" (where defaults are too infrequent to allow adequate calibration); additional constraints on internal models' estimates ("input floors"); an "output floor" tying the capital requirements generated by internal ratings to those that would emerge from the standardised approach. We than explain why, in our opinion, floors represent a technically flawed answer, and suggest a number of supervisory actions that may be pursued, instead, to restore internal models' credibility, without causing an excessive burden for banking authorities. Such actions, which have already been explored by the EU in the last few years, should be embraced wholeheartedly by supervisors, to ensure that increased transparency on implementation and validation practices may restore market confidence in internal models.

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

AUTHOR

Andrea Resti, Bocconi University

CONTENTS

LIST OF ABBREVIATIONS

AIRB	Advanced internal ratings-based (approach)
BCBS	Basel Committee on Banking Supervision
CET1	Common Equity Tier 1 Capital
CRD4	Directive 2013/36/EU (Capital Requirements Directive #4)
CRR	Regulation (EU) No 575/2013 (Capital Requirements Regulation)
EAD	Exposure at Default
FIRB	Foundation internal ratings-based (approach)
IRB	Internal ratings-based (approach)
LGD	Loss Given Default
PD	Probability of Default
RWAs	Risk-weighted Assets
TRIM	Targeted Review of Internal Models

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The international standards agreed by the Basel Committee on Banking Supervision require bank capital to hold capital on the basis of their risk-weighted assets ("RWAs"). With "Basel II", in 2004, two alternative ways of computing RWAs for credit risk were introduced: the standardised approach and the internal ratings-based (IRB) approach. According to the former, RWAs are computed by multiplying the face value of credit exposures by a set of risk weights chosen by regulators for different obligor types and risk levels. The IRB allows banks to estimate internally the key risk parameters of each credit exposure, using models that must be validated by competent authorities. Their estimates are then plugged into a "supervisory formula", which generates risk-weighted assets.

Since Basel II was implemented, banks have been keen to develop internal models that would generate lower RWAs, in order to achieve capital savings. This has prompted distrust towards internal rating models, and investors have started to look at "RWA tweaking" as a suspicious practice. After the financial crisis, IRB may have provided a way to make ends meet as supervisors and investors were keen to see banks reinforce their capital, but lenders found it hard to tap the equity market at reasonable conditions. In the European Union, roughly 50% of bank capital requirements are generated through IRB, with corporate and retail portfolios accounting for over three quarters of the total. There are signs that IRB usage is more widespread in countries where banks are in a better position to lobby local supervisors into approving internal models (i.e., market concentration is stronger and the ratio of bank total assets to GDP is higher).

In March 2016, the Basel Committee has released a reform proposal aimed at reducing undue variability in RWAs. This involves the removal of IRB approaches for exposures where defaults are too infrequent to allow for adequate calibration (like loans to financial institutions and large corporates). Additionally internal models would be disciplined through a set of constraints on estimation practices and on the minimum values of the risk parameters ("input floors"). Finally, the Committee is also considering an "output floor", whereby the capital requirements generated by IRB will not be allowed to fall below some percentage (e.g. 60%, or 90%) of the requirements that would emerge from the standardised approach.

In our opinion, floors provide a technically flawed answer to a real problem. While it is true that internal models may have been used opportunistically, with a view to minimizing capital requirements rather than achieving an unbiased measure of risk, it is hard to see how their risk-sensitivity can be increased by unconditionally constraining them through a grid of preset values and binding minima. Indeed, any move by regulators to address the weaknesses of the IRB approach should be aimed at improving its ability to capture risks and translate them into proportionate capital levels. The main shortcomings of floors are the following:

- by imposing floors across the board, supervisors would give banks an additional "risk budget", which they would use to absorb the extra costs generated by higher regulatory capital; hence, portfolios where the actual risk content is below the floor would gradually shift towards more lucrative (and riskier) exposures;
- output floors would refer to a new (and untested) standardised approach that the Basel Committee is still developing: the latter should first be implemented, and put to work for some time, before it is used as a benchmark to discipline internal models;
- internal rating systems may require huge investments in terms of data, econometric tools, specialised personnel, reliable documentation, back-testing, validation procedures and interaction with supervisors. European banks have been investing significantly in such systems, relying on a regulatory framework where they were allowed to reap capital relief against low-risk, high quality exposures;
- internal ratings have become a common language, whereby different structures and roles within a bank can communicate horizontally (e.g., ensuring consistency between commercial targets, risk

appetite constraints, value creation objectives), as well as escalate risk vertically, up to the board of directors. This would be severely disrupted if risk assessments were biased by conservative floors, which would lack credibility in the eyes of the banks' top management.

The temptation to go down the avenue of simple *regulatory* fixes should therefore be resisted. Indeed, to improve consistency and comparability across internal models, a major *supervisory* effort is required, to ensure that internal ratings are built and validated based on common practices. This includes:

- guidelines and technical standards (like those being released by the European Banking Authority) to clarify how the concepts in the Basel regulation should be interpreted and implemented. Indeed, while banks and supervisors are reluctant to abandon local practices, since this entails considerable adaptation costs, convergence towards harmonised definitions may help restore comparability and ensure a level playing field;
- "benchmarking exercises" where IRB banks are requested to use their models on a common benchmark portfolio. By looking at differences across the results generated by individual institutions, sources of undesirable variability in RWAs can be identified, and unrealistic models can be challenged.

These efforts should be promoted on a global scale, e.g., by means of peer reviews promoted by the Basel Committee. However, they may pose a challenge to supervisors in terms of available resources and time constraints; hence, ways should be sought to avoid that they generate a disproportionate burden. This can be achieved through a combination of the following policies:

- rolling back low-default to simpler IRB approaches or to the standardised approach when internal data is poor, or model performance is uncertain;
- allowing permanent exemptions from IRB when banks feel that internal models would not lead to a significant improvement of their risk assessment capacity. This would free up resources for the development and validation of models on "core" portfolios;
- enabling private sector investors to assess the credibility of IRB models by providing them with better information on the banks' risk-weighted assets and internal systems (e.g., by requiring banks to use standardised templates when releasing enhanced Pillar 3 data);
- applying floors selectively, as a transitional tools when new rules are being phased in, or to address limited situations (e.g., new and untested products) where actual risks are notoriously underestimated;
- using floors for models that are built on relatively poor data series and/or have led to disappointing back-testing results, making them more or less stringent depending on whether model weaknesses are subsequently addressed;
- carrying out comparisons between IRB and standardised approach to highlight outliers that require further scrutiny, to help focus supervisory analysis where IRB models generate seemingly week results.

If Europe is to improve the credibility of IRB models, it is also important that its supervisory authorities – who sit in the Basel Committee and contribute to its choices - are fully involved in this effort, and can embrace it without reservations. Floors may be tempting for supervisors, as they can be seen as a safety net against reputational risk and a shortcut to save time and human resources. Transparency on validation practices may not always be welcome, as it deprives supervisors of a tool to implement discretionary policies and possibly support weak, capital constrained institutions. However, as market participants believe that differences across rating models sometimes reflect gaps among competent authorities, it is vital to show – through commonly agreed procedures and peer reviews – that supervisory authorities are being held accountable for the accuracy and unbiasedness of their validation processes.

1. INTRODUCTION[*]

On March 24, 2016 the Basel Committee on Banking Supervision ("BCBS") released a reform proposal[1] aimed at reducing the undue variability in risk-weighted assets ("RWAs") generated by banks trough their own rating models (following the internal ratings-based, or "IRB", approaches introduced in 2004 by the so-called Basel II Accord)[2]. The Committee proposes to remove IRB approaches for exposures where defaults are too infrequent to allow adequate calibration ("low-default portfolios"), and to discipline internal models through a set of constraints to estimation practices and to the minimum values of their risk parameters ("input floors"). Furthermore, the BCSB is also considering an "output floor", meaning that the capital requirements generated by IRB will not be allowed to fall below some percentage (to be set in the range of 60%-90%) of the requirements that would emerge from the so-called standardised approach (aimed at banks that have no validated internal models).

In this short note, we first summarise the basics of internal rating models (§0) and the reasons why they have been increasingly criticised and need to be revisited (§0). We then review the key proposals circulated by the Basel Committee (§0) and provide a critical assessment of floors (§0), suggesting alternative ways of addressing IRB weaknesses (§0). §0 concludes, highlighting possible policy implications.

---

[*] Although the views expressed in this report are only mine, I wish to gratefully acknowledge talks and e-mail exchanges with the following people and institutions: Andrea Enria (EBA), Adam Farkas (EBA), Santiago Fernandez De Lis Alonso (BBVA), Chiara Giordano and Aurelio Maccario (Unicredit), Michele Lanotte and Bruna Szegö (Bank of Italy), Mario Nava (European Commission), Sergio Nicoletti Altimari (European Central Bank), Gianfranco Torriero (Italian Bankers' Association). §0 of this note draws on joint research work carried out with Brunella Bruno and Giacomo Nocera, whose contribution is also gratefully acknowledged.

[1] (Basel Committee on Banking Supervision, 2016a).

[2] This is part of a wide-ranging effort by the Committee to amend the current standards for market risk, credit risk, operational risk and interest rate risk in the banking book (Magnus et al., 2016), sometimes called "Basel 4" by bank representatives and the financial press.

2. INTERNAL RATING MODELS IN A NUTSHELL

Prudential regulations require banks to hold a minimum amount of own funds ("regulatory capital") to offset losses that may originate from their risky investments. Capital requirements must therefore increase with the riskiness of a bank's assets.

The first international accord on bank capital ("Basel I", 1988[3]) required capital to be equal to a certain percentage (e.g., 8%) of a bank's RWAs. In turn, RWAs were computed by multiplying the face value of credit exposures by a set of risk weights chosen by regulators. Such weights ranged from 0%, for credit exposures towards OECD governments and public sector entities (where no regulatory capital was required), to 100% for most loans to individuals and non-financial companies. While this made it easier to implement the accord across different jurisdictions, it proved simplistic over time, as well as prone to regulatory arbitrage. E.g., a "flat" 100% risk weight for all non-financial companies meant that banks could focus on high-risk borrowers in order to maximize interest revenues in the short term, while increasing future defaults and credit losses.

The second accord on bank capital ("Basel II", 2004[4]) introduced two alternative ways of computing minimum capital requirements for credit risk: the standardised approach and the internal ratings-based (IRB) approach.

The standardised approach is an evolution of the Basel I accord, where risk weights were further refined and diversified. They now depend not only on the type of obligors (e.g., non-financial companies, banks or individuals) but also on their credit risk (which in most jurisdictions can be estimated through ratings issued by credit rating agencies).

The IRB approach requires that four key parameters be estimated, which capture the credit risk of an exposure: PD (probability of default), LGD (loss given default, i.e., the loss rate in the event of a default, which can be expected to be low if the exposure is secured by high-quality collateral), EAD (exposure size at default, which could increase if the borrower draws additional credit lines) and life-to-maturity. Banks develop models to estimate such parameters (mostly by means of statistical techniques) and, once such models have been validated by their competent authorities, estimates can be plugged into an algorithm called the "supervisory formula", which generates risk-weighted assets on the basis of the underlying credit risk. Generally speaking, long-term, large exposures with high PD and LGD convert into higher risk-weighted assets.

When all four parameters are estimated internally, a bank is said to follow the *advanced* IRB approach ("AIRB"); if, instead, a bank only estimates PDs (using supervisory pre-set values for LGD, EAD and maturity), then it follows the so-called *foundation* internal ratings-based approach ("FIRB").

Generally speaking, the standardised approach and the IRB approaches generate different RWAs for the same exposure. Consider e.g. a €100,000 loan to a small enterprise (see Figure 1). This would command a 75% risk weight under the standardised approach and therefore convert into RWAs for €75,000. On the other hand its PD, LGD, EAD and maturity – estimated by internal models and plugged into the supervisory formula – may produce RWAs for €50,000. This would be considerably less than the standardised RWAs (€75,000), which in turn is lower than the unweighted total assets (€100,000).

---

[3] (Basel Committee on Banking Supervision, 1988).
[4] (Basel Committee on Banking Supervision, 2004).

Figure 1: Alternative approaches to RWA computation
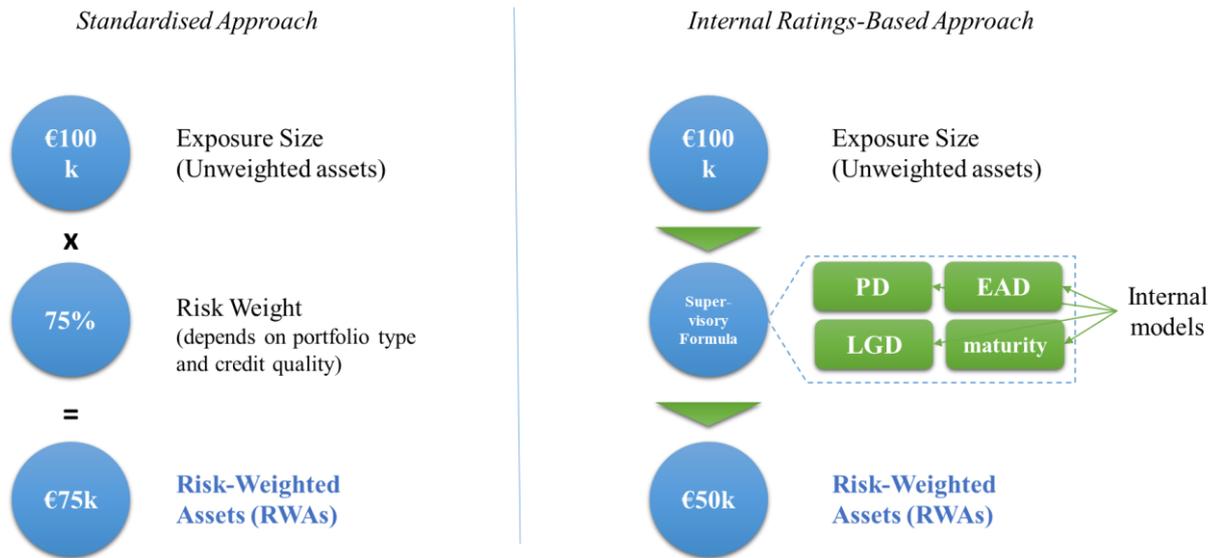
Based on data released by national authorities[5] (see Table 1), roughly half of the capital requirements imposed on European banks is generated through IRB approaches. While internal models account for less than 33% of the total in countries like Austria, Greece, Italy and Portugal, their usage exceeds 70% in Denmark, The Netherlands and Sweden. The role of IRB is less significant if one looks as the number of institutions (24%), as internal models are usually developed by mid- to large-sized banks. Such models are mostly used for corporate and retail portfolios[6], which account for 51% and 26%, respectively, of the total capital generated by the IRB approach.

---

[5] Data refer to 2013. Since 2014, no pan-European data are made available by the European Banking Authority, and values for individual countries must be hand-collected from the websites of the various national authorities. Starting with 2015, data for large banking groups in the Eurozone are released by the Single Supervisory Mechanism (with no country-by-country breakdown), while national authorities in the Eurozone only report values for less significant institutions.

[6] In the Basel jargon, "corporate" designates a non-financial company, while "retail" encompasses individuals and small-medium enterprises (SMEs), although larger SMEs may be classified as corporates.

Table 1: IRB usage in EU countries – Source: National Authorities, end-2013

Country	Share of capital requirements for credit risk originated by internal models	Share of institutions using internal models	IRB-generated capital by portfolio		
			Corporate	Retail	Other
Austria	30.1%	8.6%	49.5%	20.5%	30.1%
Belgium	62.6%	25.7%	54.4%	24.2%	21.3%
Bulgaria	17.0%	4.2%	71.0%	20.3%	8.7%
Cyprus	0.0%	0.0%			
Czech Republic	63.1%	29.4%	55.9%	30.4%	13.7%
Germany	37.7%	2.6%	63.0%	14.7%	22.3%
Denmark	81.5%	22.9%	47.3%	23.2%	29.5%
Estonia	73.0%	50.0%	73.2%	24.8%	2.0%
Greece	19.1%	10.0%	73.3%	26.1%	0.7%
Spain	38.8%	26.7%	50.5%	31.7%	17.8%
Finland	60.0%	58.0%	41.5%	24.5%	34.0%
France	47.5%	61.9%	47.7%	27.8%	24.5%
United Kingdom	64.9%	14.5%	47.1%	42.1%	10.8%
Croatia	12.1%	5.7%	64.9%	32.2%	3.0%
Hungary	38.0%	4.4%	50.7%	31.5%	17.8%
Ireland	45.7%	62.5%	39.0%	50.9%	10.1%
Italy	27.0%	9.0%	74.9%	17.3%	7.8%
Lithuania	54.2%	30.0%	73.3%	26.0%	0.7%
Luxembourg	36.1%	16.1%	42.4%	10.2%	47.4%
Latvia	37.2%	5.6%	67.6%	29.7%	2.7%
Malta	1.8%	8.3%	4.2%	0.0%	95.8%
Netherlands	79.0%	20.6%	49.3%	26.9%	23.8%
Poland	16.2%	0.7%	64.3%	28.2%	7.5%
Portugal	24.7%	12.7%	65.2%	23.4%	11.4%
Romania	14.3%	9.7%	66.3%	25.9%	7.8%
Sweden	78.8%	21.9%	*n. a.*		
Slovenia	2.2%	5.0%	92.8%	0.0%	7.2%
Slovakia	47.1%	23.1%	69.4%	27.5%	3.1%
Norway	39.8%	11.5%	58.4%	13.4%	28.1%
Weighted average	*48.4%*	*24.2%*	*51.6%*	*26.0%*	*22.3%*

IRB adoption is not mandatory in Europe, nor is it based on the Basel rules. As a matter of comparison, in the US 15 "core" banks with total assets above $250bn each are instead *required* to implement the IRB approach, accounting for about 75% of the banking system and 100% of the internationally-active banks (Basel Committee on Banking Supervision, 2016b). Other banks can do so on a voluntary basis, although no one currently does. Only the advanced IRB approach is available, as foundation IRB is not allowed. As of February 2014, eight core banks had validated models in place, while the remaining seven were awaiting full supervisory approval (and still used the Basel I weights to compute risk-weighted assets).

3. WHY ARE BANK INTERNAL RATINGS IN THE CROSSHAIRS?

IRB approaches have a number of advantages over the standardised approach. Firstly, they produce a more granular assessment of risk: e.g., any small increase in the obligor's PD leads to a slightly higher capital requirement, while the standardised approach may cause "jumps" in regulatory capital ("cliff effects") as the obligor's credit rating is downgraded. Secondly, IRB approaches have encouraged institutions to implement sound and sophisticated risk management schemes. Thirdly, since internal models are widely employed in the banks' credit management processes (e.g. for screening, pricing, monitoring and provisioning purposes), using them as a basis for setting capital requirements helps narrow the gap between the regulatory and the managerial perspective.

Since Basel II was agreed, a growing number of banks have opted for the IRB approach, many of which have achieved substantial capital savings. This has generated distrust towards internal rating models, and investors have started to look at "RWA tweaking" as a suspicious practice. The 2007-2009 financial crisis has prompted doubts that the IRB approach may have helped banks disguise a rising credit bubble by keeping their RWAs artificially low. After the crisis, as supervisors and investors were keen to see banks reinforce their capital, but lenders found it hard to tap the equity market at reasonable conditions, IRB models may have provided a way to make ends meet. Figure 3 shows the average *RWA density* (RWAs over unweighted total assets) for a sample of 50 large European banking groups: one can see that between 2008 and 2014 – as credit risk in most countries was increasing – RWA density actually fell at a significant pace. The adoption of the IRB approach by more banks and for more portfolios (also shown in the chart) may have played a role in the process. In fact, as IRB adoption only occurs upon request, banks are likely to leave the standardised approach only if they anticipate substantial benefits.

Figure 2: Risk weights and IRB adoption over time – Source: (Bruno et al., 2015) - Sample: 50 largest banking groups in the EU – All variables are sample averages
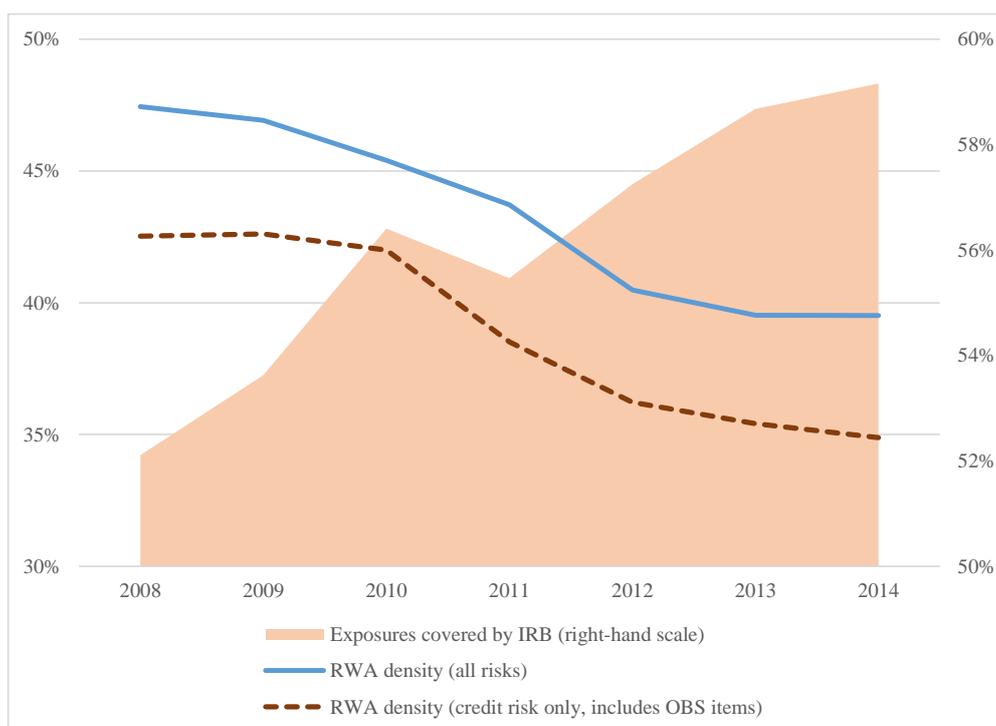
A number of empirical studies have found significant divergences in RWAs across banks and jurisdictions. This includes reports released by supranational institutions, equity analysts and academics. E.g., (Le Leslé and Avramova, 2012) argue that differences can be ascribed both to bank-specific factors, which reflect actual risk-taking (e.g., business models or asset quality) and to factors unrelated to bank risks (e.g., due to institutional, accounting, and regulatory variables). Similarly

(European Banking Authority, 2013) finds that about 50% of the divergence can be explained by relatively few factors (like the banks' portfolio mix, the share of assets covered by the IRB approach), but RWA densities also reflect differences in the implementation of the IRB approach by banks and local supervisors (e.g. in the treatment of defaulted credit exposures). Similarly, (Basel Committee on Banking Supervision, 2013) notes that up to 75% of the variability in risk weights for credit risk is driven by differences in underlying risk (e.g., in the relative share of different asset classes), but there are also important practice-based drivers, some of which stem from supervisory choices at the national level. (Ledo, 2012) argues that, although some divergences are justified, there is still scope for a more level playing field, mainly through closer international coordination among supervisors in the validation of IRB models. (Arroyo et al., 2012) also emphasize the role of the validation process in explaining cross-country discrepancies. (Mariathasan and Merrouche, 2013) find that reported risk declines upon IRB adoption, and that this effect is more significant for weakly capitalized banks; this may indicate that capital-constrained banks, possibly encouraged by local authorities, switch to IRB to shore up their capital ratios. Based on German loan-by-loan data, (Behn et al., 2016) argue that IRB models under-predict actual default rates, and IRB banks are aware of that, as they tend to charge comparatively higher lending rates.

Table 2 shows the key results of an analysis carried out on the same sample used in Figure 2 (i.e., EU's 50 largest banking groups in 2008-2014). The left-end column lists a number of variables that have proved statistically significant in explaining RWA densities (both for all risks and for credit risk only). The numbers next to each variable are standardised coefficients: higher values suggest a stronger effect. Cells shaded in green (red) highlight variables associated with lower (higher) RWA densities.

In short, one can see that banks showing lower RWA densities are larger, better capitalised, and use IRB approaches more extensively. Conversely, business models rooted in traditional banking intermediation (based on deposit taking and loans to non-financial companies) tend to be associated with higher RWAs. When GDP slows and banks shift assets towards low-risk investments (like treasuries), RWAs decrease for banks relying mostly on the standardised approach; however, the opposite occurs to "heavy IRB users", as their internal models pick up the increase in the borrowers' risk profile. Even when all these variables are taken into consideration, national segmentations are still significant: this can be due to different legal frameworks (e.g. affecting PDs or LGDs) as well as to discrepancies in the way internal models are built by banks and validated by local supervisors. Overall, the variables listed in Table 2 explain 82% of the variability observed in RWA densities (69% when one looks at credit risk alone), meaning that a significant share of RWA heterogeneity remains unexplained.

Table 2: Main determinants of RWA densities – Source (Bruno et al., 2016)

	All risks	Credit risk only (includes OBS items)
Size (total assets, log)	-0.22	-0.14
Deposits/total assets	0.18	0.11
Loans/total assets	0.38	0.28
Loans to corporate/Total loans	0.16	0.15
Tier1 capital ratio	-0.25	-0.31
IRB usage above 50% of the corporate and retail portfolios ("Heavy IRB user")	-0.16	-0.33
GDP Growth	0.13	0.18
GDP Growth for IRB heavy users	-0.12	-0.21
Country segmentations	*Significant*	*Significant*
Share of explained variance	*82%*	*69%*

Since banks using IRB more extensively appear to enjoy substantially lower RWAs, Table 3 investigates the key determinants of IRB usage (the share of a bank's credit exposures where internal models are used). One can see that IRB approaches are more widely adopted by large and well-capitalised banks. Furthermore, some characteristics of the national banking systems also prove significant: in fact, IRB usage is more frequent when market concentration is high and when banks play a stronger role in a country's economy. One could argue that, under such circumstances, banks are in a better position to lobby local supervisors into approving internal models, thereby extracting higher capital savings.

Table 3:   Main determinants of IRB usage – Source (Bruno et al., 2015)[7]

Size (total assets, log)	0.15
Tier1 capital ratio	0.16
Market share of the country's three largest banks	0.28
Bank total assets over country GDP	0.21
Share of explained variance	68%

It should be emphasised that RWA variability should not, *per se*, be a cause of concern to regulators and investors. Indeed, heterogeneity in RWA densities is welcome, as long as it captures differences in the underlying risks.

Additionally, it would be unfair to blame internal models for making banks vulnerable ahead of the 2007-2009 financial crisis. As concerns Europe, the use of IRB approaches for regulatory purposes was first allowed in June 2006 by the Capital Requirements Directive (Directive 2006/49/EC, also known as CRD). As the implementation and prehemptive validation of internal ratings takes several months, or years, it is hard to see how IRB models could have been deployed, on a vast scale, before the outburst of the crisis.

Still, unexplained RWA variability, as well as the role played by national segmentations in driving RWA densities and IRB adoption, suggest that more consistency may be needed in the way internal ratings are built by banks and validated by supervisors. This includes several areas, such as the definition of default, the calibration of risk parameters and the treatment of defaulted assets, where local practices differ significantly, leading to an uneven implementation of the Basel rules[8].

---

[7] The quoted study uses data until 2012. The table is based on updated computations, taking into account also 2013 and 2014 data.

[8] See e.g. (European Banking Authority, 2015a).

4. THE BASEL COMMITTEE'S PROPOSAL FOR A SYSTEM OF FLOORS

As mentioned above, to address undue variability in RWAs the Basel Committee has circulated a proposal involving three main areas:
- the removal of IRB for low-default portfolios ("LDPs");
- constraints on the estimation of credit risk parameters and input floors;
- output floors on capital requirements.

These are briefly described below.

Low-default portfolios - LDPs are portfolios where risk-modelling techniques are less advanced, the quantity and quality of relevant data may be limited, and banks do not have an information advantage compared to external sources. According to the BCBS, this includes loans to banks and other financial institutions, large corporates (i.e., groups with total assets above €50bn) and equity investments. It has been proposed that IRB approaches be removed for such portfolios. In the case of corporates belonging to groups with revenues above €200m, only the Foundation IRB approach would be allowed. No changes are being proposed for sovereign exposures, as these are subject to an ongoing separate review. Various limits to IRB approaches are also being proposed for specialised lending, counterparty credit risk and the so-called "credit valuation adjustments" that banks have to make to the fair value of financial contracts and securities.

Constraints and input floors - To increase the comparability of IRB-generated RWAs, the BCBS is proposing to limit the range of practices that banks may follow when estimating an exposure's PD, LGD and EAD. E.g., PD ratings should be assigned in such a way that they remain stable across economic cycles; banks will have to follow a pre-set multiplier when estimating how LGDs would deteriorate in an economic downturn; EAD estimates should be based on data that reflects the specific exposures to which they are to be applied. PDs, LGDs and EADs are also being subjected to *input floors*. Namely: i) the PD for corporate and retail portfolios cannot fall below 0,05%, meaning that at least 5 out of 10,000 obligors are expected to default every year (0,10% for revolving credit cards); ii) the LGDs for unsecured exposures (where no collateral is available) are being floored at 25% for corporates, 30% for retail exposures and 50% for credit cards. Floors for secured exposures depend on the type of collateral provided, ranging from 0% (in the case of eligible financial instruments) to 20% (for physical capital, such as machinery or inventories), with retail mortgages set at 10%; iii) banks will not be allowed to use internal EAD estimations (and will use the same conversion factors set out in the standardised approach) for LDPs and for non-revolving exposures. All these input floors, however, have been put forward as a mere "baseline" proposal, open to further calibration, on the basis e.g. of national specificities.

Output floors – As mentioned above, capital requirements arising from IRB may be required to stay above some fixed percentage of the requirements that would emerge from the standardised approach (which, in turn, is being reformed with a view to making it more risk-sensitive, and possibly less dependent on credit rating agencies[9]). Such percentage is still open to calibration, although the Basel Committee expects that it might fall in the 60%-90% range. It is unclear whether such an *output floor* would have to be met by individual portfolios, or just on an aggregate basis. Although floors have already been used by the BCBS in the past, they were conceived as a temporary tool aimed at ensuring a smooth transition to new regulations; the current proposal, instead, sees them as a permanent device to discipline internal ratings.

To ensure that the output floor does not lead to an overall increase in capital requirements, the BCBS has engaged in a quantitative impact study ("QIS") with a wide, international sample of banks. While the results of that exercise have not been disclosed yet, anecdotal evidence suggests that the new floor

---

[9] (Basel Committee on Banking Supervision, 2015).

may lead to a material rise in capital requirements for a number of large European banks. On an aggregate basis, the European Banking Federation estimates that the output floor may cause an increase in the amount of required high-quality capital ("common equity Tier 1 capital", also known as "CET1") ranging from €50bn (assuming the floor is set to 60%) to €202bn (if 90% is chosen). This would sit on top of another €250bn due to input floors and new rules on LDPs.

As a matter of comparison, US banks using internal rating models must already meet an output floor set at 100% of the risk-weighted assets generated by the US version of the standardised approach. Accordingly, they would be virtually unaffected by the introduction of output floors into the Basel international framework.

5. THE FALLACY OF FLOORS

As seen above, the Basel Committee proposal relies heavily on floors, to be imposed both on risk parameters and on the capital requirements generated by the supervisory formula. This, in our opinion, may provide a technically flawed answer to a real problem.

While it is true that internal models may have been used opportunistically, with a view to minimizing capital requirements rather than achieving an unbiased measure of risk, it is hard to see how their risk-sensitivity can be increased by unconditionally constraining them through a grid of preset values and binding minima. Indeed, any move by regulators to address the weaknesses of the IRB approach should be aimed at improving its ability to capture risks and translate them into proportionate (i.e., higher or lower) capital levels. It is hard to see how this can be achieved by rules that may prompt an increase in regulatory capital also for high-quality portfolios.

In fact, floors may end up making banks more risk-seeking, increasing the amount of potential losses faced by lenders. To show why, Figure 3 provides a stylized example:

- in Panel (I), two banks ("G" for good, "B" for bad) operate with the same amount of capital; however, B's assets are riskier, and generate higher returns, although B hides this from supervisors by tweaking its internal rating models. In the short term, B achieves a higher return on equity, but in the long run – as risks materialize – it is more likely to default, causing social costs and instability;
- in Panel (II), regulators impose a capital floor to B, pushing it to B* and restoring capital adequacy. However, since the floor is imposed on banks, without carefully capturing their actual risk content, the same capital increase may be requested to G (shifting it to G*). This severely dilutes G's return on equity. If G is listed, the stock price will fall, reflecting lower earnings per share. Managers will feel under pressure to take action and restore the bank's profitability;
- in Panel III, G will turn to lower-quality exposures (e.g., mortgages with a high loan-to-value ratio), increasing the riskiness of its assets until the internal models generate an amount of capital that is equal to the one imposed by the floor. This will cause a shift from G* to G** (which in turn is equal to B*), boosting short-term profits and pleasing shareholders. Meanwhile, B may resume tweaking its models and move to B**, where short-term earnings are higher and the floor is not binding. While regulators will be taking comfort from the increased capital levels in the banking system (B** and G** taken together) generated by the floor, the final result will be a higher potential for losses and instability in the long run.

Figure 3: Perverse effects of capital floors
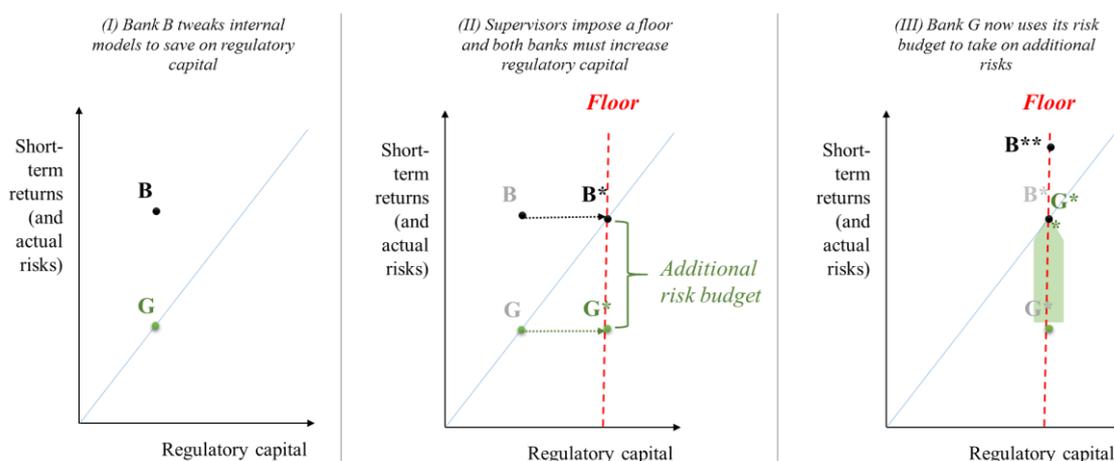
The example shows that, by imposing a floor across the board, supervisors are in fact assigning bank G an additional "risk budget", which it will use to absorb the extra costs generated by higher regulatory capital. Hence, portfolios where the actual risk content is below the floor will gradually shift towards more lucrative (and riskier) exposures. Such an effect will be stronger if floors are applied on an individual basis (as is the case for "input floors" in the Basel proposal). In fact, every single loan where risk parameters are better than the minima dictated by the BCBS may come under pressure and eventually be replaced with a riskier exposure.

In light of the above, one may wonder whether it would be wise to fight IRB misuses by letting floors curtail the capital savings enjoyed by institutions that deploy a sound combination of low-risk assets and unbiased models. Indeed, the development of internal rating systems may require huge investments in terms of data structures, econometric tools, specialised personnel, reliable documentation, periodic back-testing and updates, validation procedures and interaction with supervisors. As shown in Figure 2, a wide layer of European banks has been investing significantly in such systems, relying on a regulatory framework where they were allowed enough flexibility to reap capital relief against low-risk, high quality exposures. It would now be unfair and short-sighted to constrain the risk-sensitivity of internal models by subjecting them to floors, regardless of the models' accuracy and the actual risk content of the underlying portfolios.

Furthermore, consideration should be given to the fact that internal ratings have become a common language, whereby different structures and roles within a bank can communicate horizontally (e.g., ensuring consistency between commercial targets, risk appetite constraints, value creation objectives), as well as escalate risk vertically, up to the board of directors, when necessary. Such a communication process would be severely disrupted if risk assessments were constrained by an over-simplified metrics based on conservative floors, which would lack credibility in the eyes of the banks' middle and top management.

Finally, it should be emphasised that model diversity is desirable from a supervisory point of view, since it reduces systemic risk by ensuring that individual banks rely on different risk assessment criteria, and therefore cannot by affected simultaneously by the same source of errors.

6. ALTERNATIVE APPROACHES TO DISCIPLINING INTERNAL RATINGS

While generalised floors are not a suitable answer, it is true that bank internal ratings need to be revisited and somehow disciplined. Risk weights based on the IRB approach have prompted increasing scepticism among market participants, scholars and rule makers; their credibility has become so low that the Economist magazine, a few years ago, dubbed them as "do-it-yourself capital" (The Economist, 2012).

However, as IRB models must be complex and flexible, to accurately measure each bank's underlying risks, no easy *regulatory* fix can be expected to work. The temptation to go down the avenue of "simple, uniform, quick rules" must therefore be resisted, as it would lead to ineffective – if not counterproductive – results. Indeed, to improve consistency, transparency and comparability across internal models, a major *supervisory* effort is required, to ensure that internal ratings are built and validated on the basis of a set of common standards.

The European Union has already engaged in such an effort, and a number of promising developments are already taking place.

To begin with, guidelines and technical standards are being released by the European Banking Authority[10] to clarify how the concepts in the Basel regulation should be interpreted and implemented. In fact, international accords like those agreed in Basel, as well as level 1 regulations enacted by the European Union, leave considerable room for subjective interpretation when general rules are put into practice. E.g., while it is clear that ratings must be calibrated on the basis of the banks' past default history, a significant degree of uncertainty exists on how defaults should be recorded (e.g., concerning the definition of "material" exposures, or the treatment of exposures that become solvent again, and then re-default) and what type of historical data should be used. While banks and supervisors are reluctant to abandon local practices, since this entails considerable adaptation costs, convergence towards harmonised definitions may help restore comparability and ensure a level playing field. As part of the move towards greater consistency in model development and validation, the Single Supervisory Mechanism has recently launched a wide-ranging exercise known as the Targeted Review of Internal Models (TRIM), aimed at harmonising the way Eurozone banks implement the IRB approach over a multi-year time window.

Additionally, following Article 78 of CRD4, the European Banking Authority and the competent authorities have engaged in "benchmarking exercises" where IRB banks are requested to use their models to compute capital requirements on a common benchmark portfolio[11]. By looking at differences across the results generated by individual institutions, supervisors can investigate sources of undesirable variability in RWAs and challenge any unrealistic assumptions that may emerge in the models developed by lenders. When a divergence in own funds occurs, that is not motivated by differences in the underlying assets, competent authorities may adopt corrective actions, so that an adequate risk assessment capacity is restored.

Such an effort to harmonise definitions and processes, and to ensure consistency of internal models by means of benchmarking exercises and common validation standards, should be promoted on a global scale, and actively pursued by both EU and non-EU jurisdictions. Indeed, peer review processes led by supranational bodies – including the Financial Stability Board and the Basel Committee – could be deployed to highlight differences in the way internal models are built by banks in different countries and audited by their local authorities, with a view to promoting consistency and putting pressure onto weak supervisory practices.

---

[10]See (European Banking Authority, 2015a).
[11]Benchmarking exercises have also been carried out by the BCBS. See (Basel Committee on Banking Supervision, 2016b, 2013).

Such supervisory actions are intrinsically correct, and may prove very beneficial to the credibility of internal ratings. They should be wholeheartedly supported by European institutions, and not be derailed by subjecting banks to arbitrary binding floors. It is true however, that similar actions may pose a challenge to supervisors in terms of human resources, technical skills and time constraints. This should not be ignored, and ways should be sought to avoid that a disproportionate burden is placed onto the EBA, the ECB and the other competent authorities.

In order to save forces and prevent the supervisory response from becoming overly expensive, the following remedies should be considered:

- low-default portfolios, where banks do not have an informational advantage over external rating experts (e.g. because the internal data is poor, or because the performance of statistical model is subject to wide margins of uncertainty), may indeed be rolled back to the standardised approach, as proposed by the BCBS, or to the foundation IRB approach (with the latter option avoiding a generalised increase in capital levels that is hardly justified by past loss experience). However, rather than establishing an absolute prohibition to use advanced models, regulators should raise the bar in terms of quality standards that must be met by banks to start using (or to retain) IRB on LDPs. This could happen for wholesale portfolios, large corporates and – possibly – for sovereign obligors. Furthermore, the Basel II demand that IRB approaches must be extended, over time, to all material portfolios within a banking group, should be revisited. By letting banks permanently exclude from the IRB approach those portfolios where they feel that model development would prove too uncertain, one could scale down the number of models that supervisors are requested to validate. This would free up resources for "core" exposures where lenders can develop internal tools more reliably. Needless to say, exclusions should be motivated and subject to supervisory scrutiny, with capital surcharges being imposed on banks that cherry-pick portfolios to avoid using IRB models where the latter would signal additional risks;
- private sector investors and analysts must be called to join forces with supervisors in the quest for more transparent and credible IRB models. To that effect, it is important that banks be requested to disclose the key characteristics of their risk-weighted assets by using standardised templates, to make it easier for outsiders to monitor and discipline inconsistencies across otherwise similar institutions. In an effort to improve market scrutiny of the banks' internal systems, the Basel Committee in 2015 released a revised version of the so-called "Pillar 3 framework", whereby banks are mandated to disclose certain characteristics of their risky assets and risk management systems. As a result, the EBA is currently working on ad hoc guidelines to ensure that banks use specific formats for disclosures, to allow investors and rating agencies to compare data across the board, identifying outliers and raising market awareness;
- furthermore, there might be a place for floors in the supervisory toolkit, although in our opinion they should only be deployed under specific conditions, where the benefits can be expected to be substantial, and unintended consequences are remote. E.g., floors could be used as transitional tools when new rules are being phased in (as was the case with Basel II), or to address limited situations where actual risks are notoriously underestimated (e.g., because of new "aggressive" lending products, which are likely to lead to higher losses than it can be inferred from past data). Additionally, floors could be triggered for models that are built on relatively poor data series and/or have led to disappointing back-testing results. In such cases, floors may be waived as banks address model weaknesses and performances improve, or instead be made more stringent over time, until banks are *de facto* rolled back to the standardised approach.
- comparisons between capital requirements generated by the IRB approaches and those based on the standardised approach should definitely be pursued, although without them triggering mechanical constraints. Rather, such comparisons should be used to highlight outliers that require further scrutiny, to help focus supervisory analysis where IRB models generate seemingly weak

results[12]. Additional capital cushions should then be imposed only if RWAs are found to be too low in light of the underlying portfolio quality.

It is important to note that transparency is key to ensure that supervisory efforts succeed in restoring IRB credibility. As market participants believe that differences across rating models sometimes reflect gaps among competent authorities, it is vital to show – through commonly agreed procedures and peer reviews – that supervisors are being held accountable for the accuracy and unbiasedness of their validation processes. As far as Europe is concerned, it is hard to overstate the benefits of reinforcing the current two-layer structure of banking supervision, where competent authorities (including the ECB) control banks and the EBA ensures that progresses in supervisory convergence are assessed and further encouraged.

---

[12]A similar approach is followed by the EBA Technical Standards on benchmarking (European Banking Authority, 2015b), where it is argued that capital requirements generated by IRB should be compared with 80% of the capital generated by the standardised approach and with the actual losses and defaults experienced in the previous 1 to 5 years, and any significant gaps should lead to closer investigation.

7. CONCLUDING REMARKS

The Basel Committee is currently considering the introduction of floors on internal rating models used for regulatory purposes, by constraining risk parameters for specific portfolios ("input floors") as well as by setting a minimum threshold – based on the standardised approach – for overall capital requirements ("output floor").

Although the credibility of the IRB approach has indeed come under increasing pressure, due to heterogeneous implementation practices and validation schemes, floors provide a wrong answer to a legitimate call for greater harmonisation and comparability.

While it may be politically tempting for Europe to accept IRB floors as long as they are calibrated in a way that avoids major impacts on its lenders, it should be made clear that, from a technical point of view, floors are an unwelcome tool that depletes the risk-sensitiveness of bank capital requirements.

As far as output floors are concerned, it is also worth recalling that they would refer to a new (and totally untested) standardised approach that the Basel Committee is still developing. The latter includes provisions that have been heavily criticised by the industry, such as the introduction of capital requirements on the undrawn portion of unconditionally cancellable credit commitments. One therefore wonders whether the new standardised approach should first be implemented, and put to work for some time, before it is used as a benchmark to discipline internal models (which, in some cases, have been in place for several years amid tight supervisory scrutiny). Indeed, there is a risk that the new standardised approach may produce capital requirements that are not enough risk sensitive to serve as a valid point of reference. If this were the case, floors would end up masking differences in the underlying risks, and could hardly be seen as a way to enhance transparency and comparability of regulatory capital.

Additionally, as the new standardised approach would still rely heavily on external ratings, one may wonder whether using it to constrain the IRB approach is fully consistent with the EU legislators' desire to reduce mechanstic regulatory reliance on credit rating agencies[13].

In short, as internal ratings are being criticised for providing a poor picture of the banks' actual risk levels, their risk-sensitivity should not be depleted by superimposing additional constraints, but rather reinforced in an effort to discipline them through enhanced, internationally-harmonised supervisory scrutiny. As mentioned in §0, European institutions have already undertaken a number of steps in the right direction, by promoting uniform definitions and criteria, benchmarking exercises, enhanced transparency towards private sector investors. Such moves should be extended on a global scale, and the Basel Committee could promote peer reviews on local validation practices, just like it currently does – under the Regulatory Consistency Assessment Programme – to encourage uniform adoption of international capital rules. While targeted and temporary floors may contribute to the effort to harmonise internal ratings, indiscriminate constraints on IRB models may cause serious damage to the objective of promoting better credit risk management tools.

If Europe chooses to toughen bank internal ratings, rather than to subject them to a regulatory straitjacket, it is important that its bank supervisors – who sit in the Basel Committee and will contribute to its future choices - are fully involved in this effort, and can embrace it without reservations or second thoughts. Floors may be tempting for banking authorities, as they can be seen as a safety net against reputational risk and a shortcut to save time and human resources. Transparency on validation practices may not always be welcome, as it deprives supervisors of a tool to implement discretionary policies and possibly support weak, capital constrained institutions.

---

[13]See Article 5 of Regulation 1060/2009/EC on credit rating agencies, as amended by Regulation 462/2013/EU.

Still, in the light of the huge advances made by lenders in developing, implementing and using better credit management systems, Europe should not embrace a U-turn towards standardised, one-size-fits-all floors; and keep promoting better risk assessment and supervisory standards.

REFERENCES

- Arroyo, J., Colomer, I., García-Baena, R., González-Mosquera, L., 2012. Comparing risk-weighted assets: the importance of supervisory validation processes. Estabilidad Financiera 22, 9–29.

- Basel Committee on Banking Supervision, 2016a. Reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches (Consultative document No. d362). Bank for International Settlements, Basel.

- Basel Committee on Banking Supervision (Ed.), 2016b. Regulatory consistency assessment programme (RCAP) – Analysis of risk-weighted assets for credit risk in the banking book, Regulatory Consistency Assessment Programme (RCAP). Bank for Internat. Settlements, Basel.

- Basel Committee on Banking Supervision, 2015. Revisions to the Standardised Approach for credit risk - second consultative document (Consultative document No. d347). Bank for International Settlements, Basel.

- Basel Committee on Banking Supervision, 2013. Regulatory Consistency Assessment Programme (RCAP) analysis of risk-weighted assets for credit risk in the banking book. Bank for Internat. Settlements, Basel.

- Basel Committee on Banking Supervision, 2004. Basel II: International Convergence of Capital Measurement and Capital Standards: a Revised Framework. Bank for International Settlements, Basel.

- Basel Committee on Banking Supervision, 1988. International convergence of capital measurement and capital standards. Bank for International Settlements, Basel.

- Behn, M., Haselmann, R., Vig, V., European Central Bank, 2016. The limits of model-based regulation. No 1928 / July 2016 No 1928 / July 2016. European Central Bank, Frankfurt am Main.

- Bruno, B., Nocera, G., Resti, A., 2016. Are risk-based capital requirements detrimental to corporate lending? Evidence from Europe, unpublished working paper. Bocconi University, Milano.

- Bruno, B., Nocera, G., Resti, A., 2015. The Credibility of European Bankss Risk-Weighted Capital: Structural Differences or National Segmentations? SSRN Electronic Journal. doi:10.2139/ssrn.2613943

- European Banking Authority, 2015a. The Future of the IRB Approach (Discussion paper No. EBA/DP/2015/01). European Banking Authority, London.

- European Banking Authority, 2015b. EBA Final Draft Regulatory Technical Standards on benchmarking portfolio assessment standards and assessment sharing procedures under Article 78 of Directive 2013/36/EU (Capital Requirements Directive – CRD IV) (No. EBA /RTS/2015/01). European Banking Authority, London.

- European Banking Authority, 2013. Interim results of the EBA review of the consistency of risk-weighted assets. Top-down assessment of the banking book. European Banking Authority, London.

- Le Leslé, V., Avramova, S., 2012. Revisiting risk-weighted assets. International monetary fund (IMF).

- Ledo, M., 2012. Towards more consistent, albeit diverse, risk-weighted assets across banks. Rivista de Estabilidad Financiera 21, 43–61.

- Magnus, M., Duvillet-Margerit, A.A.C., Mesnard, B., 2016. Upgrading the Basel standards: from Basel III to Basel IV? (Briefing No. PE 587.361). European Parliament - Directorate-General for Internal Policies - Economic Governance Support Unit, Brussels.

- Mariathasan, M., Merrouche, O., 2013. The Manipulation of Basel Risk- Weights.

- The Economist, 2012. DIY capital - An edifice of modern bank regulation comes under scrutiny. The Economist.

Европейски парламент   Parlamento Europeo   Evropský parlament   Europa-Parlamentet   Europäisches Parlament
Euroopa Parlament   Ευρωπαϊκό Κοινοβούλιο   European Parliament   Parlement européen   Parlaimint na hEorpa
Europski parlament   Parlamento europeo   Eiropas Parlaments   Europos Parlamentas   Európai Parlament
Parlament Ewropew   Europees Parlement   Parlament Europejski   Parlamento Europeu   Parlamentul European
Európsky parlament   Evropski parlament   Euroopan parlamentti   Europaparlamentet

IPOL | DIRECTORATE-GENERAL FOR INTERNAL POLICIES
EGOV | ECONOMIC GOVERNANCE SUPPORT UNIT

Contact: egov@ep.europa.eu
For more information: http://www.europarl.europa.eu/committees/en/ECON/home.html