www.pwc.de/basel-iv

Quo Vadis "Basel IV"

Overview of the latest Basel proposals

pwc

Contents

Preface 5
Motivation and context 6

The Basel IV Framework 9
Capital floors: the design of a framework based on standardised approaches 10
Revisions to the Standardised Approach for credit risk 14
An overview of impact on selected exposure classes 16
An overview of risk weight of all real estate exposure classes 17
Reducing variation in credit risk-weighted assets – constraints on the use of internal models 18
Revisions to the securitisation framework 20
The standardised approach for measuring counterparty credit risk exposures (SA-CCR) 22
Minimum capital requirements for market risk 24
Trading book boundary 25
Sensitivities-based method 26
Revised internal models approach 27
Standardised Measurement Approach for OpRisk 28
Review of the credit valuation adjustment (CVA) risk framework 30
Interest rate risk in the banking book 32
Supervisory framework for measuring and controlling large exposures 34
Pillar 3 disclosure requirements – consolidated and enhanced framework 36
Identification and measurement of step-in risk 38
The BCBS heatmap 40

Our Services 41

Preface

Motivation and context: Calibration of the regulatory package

"The post-crisis regulatory framework is now well established. We are clearly within reach of finalising the Basel III reform package. This is a significant achievement that will give much needed clarity to markets, banks and supervisors as they develop their work plans. ***But in order to do this, we need to finalise some outstanding reforms and also calibrate the whole package.*** *[…]*

The main elements of the Committee's ongoing policy reform agenda, address fault lines that emerge from these two dimensions. These reforms build on the Committee's strategic review of the risk-weighted capital framework, to assess whether it strikes the right balance in terms of simplicity, comparability and risk sensitivity. The reforms can be grouped into three broad categories:

(i) enhancing the risk sensitivity and robustness of standardised approaches;
(ii) reviewing the role of internal models in the capital framework; and
(iii) finalising the design and calibration of the leverage ratio and capital floors. […]

The Committee's ongoing policy reforms are grounded in trying to balance the simplicity, risk sensitivity and comparability of the risk-weighted framework."

Extracts from Speech by Mr. Stefan Ingves, Chairman of the Basel Committee and Governor of Sveriges Riksbank, at Unique Lecture at the 2015 Annual Convention of the Asociación de Mercados Financieros, 2 November 2015, Madrid, Spain.

Motivation and context: Basel IV focuses on the RWA

Basel IV will fundamentally change the calculation of risk weighted assets and capital ratios of all banks – independent of size and complexity of banks' business model.

Fig. 1 From Basel III to Basel IV

Capital requirements	Credit risk	Securitisation	Counterparty credit risk	Market risk	Operational risk	CVA risk	Interest rate risk	Other topics
Capital floors (BCBS 306)	SA (BCBS 307) (BCBS 347) IRBA (BCBS 362)	Revisions to the securitisation framework (BCBS 303)	SA counterparty credit risk (BCBS 279)	Minimum capital requirements for market risk (BCBS 305) (BCBS 352)	Standardised Measurement Approach for operational risk (BCBS 291) (BCBS 355)	Review of the CVA risk framework (BCBS 325) (BCBS 362)	Interest rate risk in the banking book (BCBS 319) (BCBS 368)	Large exposures (BCBS 283) Disclosure (BCBS 309) Step-in risk (BCBS 349)

The Basel IV Framework

Capital floors: The design of a framework based on standardised approaches

The Basel Committee on Banking Supervision (BCBS) published a consultative paper on December 22nd 2014 on the design of a capital floor framework based on revised standardised approaches for credit, market and operational risk.

This paper is part of a range of policy and supervisory measures targeting an enhanced reliability and comparability of risk-weighted capital ratios.

The new floor will replace the existing transitional capital floor based on the Basel I framework and it complements the leverage ratio introduced as part of Basel III.

$CR_{SA} = f * x\, RW_{SA}$

The first step in the determination of floor for the internal models is to calculate the capital requirements under standardised approach (CR_{SA}) by multiplying the bank's RWAs based on standardised approaches (RWA_{SA}) with a "**floor factor**" (***f***) which will be calibrated by the Committee soon.

Fig. 2 The objectives of capital floors

1. To ensure that the level of capital across banking system does not fall below a certain level,
2. To mitigate model risk and measurement error arising from internally modelled approaches,
3. To enhance the comparability of capital outcomes across banks,
4. To reduce the variation in capital ratios across banks due to bank-specific model assumptions,
5. To diminish the incentives for exploitation of internal models.

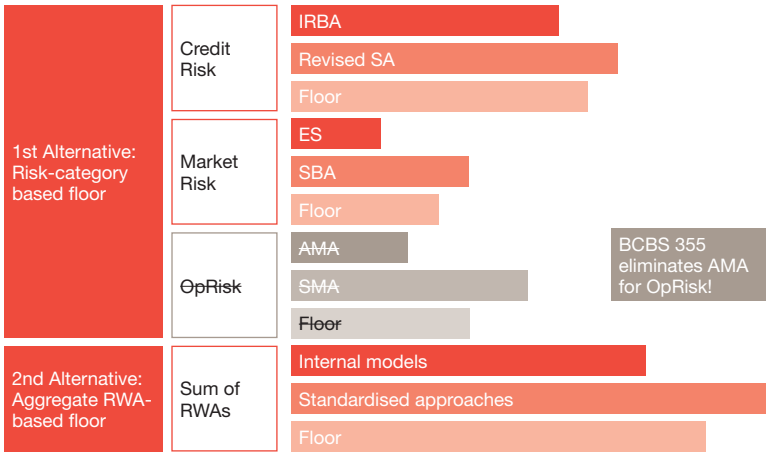
Capital floors: The design of a framework based on standardised approaches

1st Alternative: Risk-category based
A floor can be applied to each major risk category, such as credit risk, market risk and operational risk. The floor amount would be the sum of the higher of the capital amount required under the floored standardised approach (CR^j_{SA}) or the internally modelled approach (CR^j_{IM}) for each risk category (j).

$$Floor = \sum_{All\ j} max(CR^j_{SA}, CR^j_{IM})$$

2nd Alternative: Aggregate RWA-based
A floor can be based on total RWAs.

Fig. 3 Two alternatives for capital floors



Revisions to the Standardised Approach for credit risk

The BCBS has released a second consultative paper on *Revisions to the Standardised Approach for credit risk* on December 10th 2015. The revised proposals differ in many ways from the initial proposals and the main difference is the **reintroduction of external credit ratings for exposures to banks and corporates**. The calibrations are currently preliminary and will be reviewed following a quantitative impact study (QIS) in 2016.

Sovereigns, central banks and public sector entities are not within the scope of these proposals. The Committee is considering these exposures as part of a broader and holistic review of sovereign-related risks.

Other novelties at a glance

- Substantial differences in risk weighting between jurisdictions allowing and not allowing external ratings,
- New taxonomy regarding income-producing real estate (IPRE) and land acquisition, development and construction (ADC), which will be defined and categorised in the real estate exposure class,
- Modification of risk weights on real estate loans, where the main risk driver is set to be the loan-to-value ratio instead of a debt service coverage ratio,
- Implementation of due diligence and operational requirements,
- Proposals for exposures to multilateral development banks (MDB), retail and defaulted exposures, and off-balance sheet items,
- Adjusted CCF, replacing the 0 % CCF with a minimum CCF of 10 %–20 %
- Modified calculation formula for SFT
- Interdependencies with other regulatory requirements, such as LCR, Leverage Ratio and capital deductions.

An overview of impact on selected exposure classes

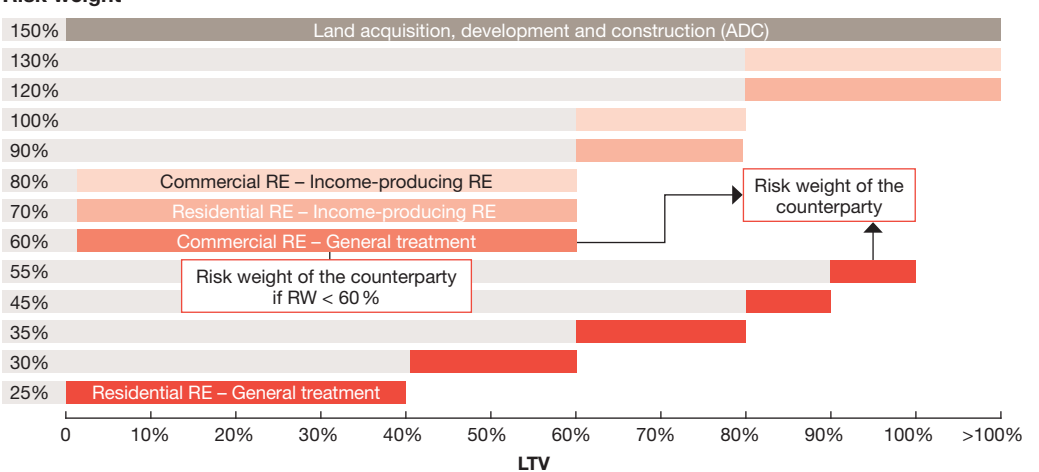
Tab 1 SA Risk weights of CRR/Basel compared to BCBS 347

	SA according to CRR/Basel	SA according to BCBS 347
Institutions	Rating: External **RW: 20%–150%**[1]	Rating: a) External, b) Unrated exposure, (due diligence in any case), **RW:** **a) 20–150%**, if higher risk based on due diligence at least one bucket higher; **b) 50%–150%**, three grades **A, B, C** depending on regulatory parameters, due diligence which comprises credit risk assessment of an exposure; i.e. Grade B if subject to substantial credit risk, Grade C if subject to material credit risk.
Corporates	Rating: External **RW: 20%–150%** **100%** if unrated	Rating: Jurisdiction a) allowing, b) not allowing external ratings, **RW:** **a) 20%–150%, 100%** if unrated, due diligence might raise RW, **85%** if SME; **b) 100%; 75%** if investment grade (if criteria met!), **85%** if SME.
Specialised lending	No rules	Rating: a) External b) If external ratings are not available, **RW:** **a)** As **Corporates**, **b) 120%** if unrated or permitted object and commodities finance; **100%** for operational project finance, **150%** for pre-operational project finance.[2]
Retail	**RW: 75%** Multiplier of 0.7619 for SME (EU only)	**RW**[3]: **75%** if criteria met (i.e. product, low value of exposure, granularity) **100%** if individuals do not meet criteria, unless secured by real estate If SMEs do not meet criteria, treated as corporate SMEs unless secured by real estate
MDB	Rating: External **RW: 0%** or as **Institutions**	Rating: External **RW:** **0%** based on certain criteria (I.e. quality, maturity, liquidity) **20–150 %** if rating based, **50 %** if unrated

[1] For unrated institutions ratings are based on credit quality steps of the central government ranging between 20 and 150%, if there is no central government rating available the counterparty is weighted 100%,
[2] Land acquisition, development and construction finance as well as income-producing real estate are now part of the real estate exposure class,
[3] Retail exposure, that is secured by real estate collateral will be treated according to the requirements of real estate exposure.

An overview of risk weight of all real estate exposure classes

Fig. 4 Real estate exposure class: RW-/LTV matrix



Reducing variation in credit risk-weighted assets – constraints on the use of internal models

The Committee proposed various changes to internal ratings-based approaches in its consultative paper on *reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches* – published on 24th March 2016. The goal of the proposals is to **reduce the complexity of the regulatory framework** and improve comparability, as well as addressing excessive variability in the capital requirements for credit risk.

BCBS plans to finalise the proposed changes to the IRB approach by the end of 2016. The proposals focus on three key points:

Fig. 5 Key points of proposed changes to IRB approach

1 Reducing the scope of internal models	• IRB no longer allowed for (i) banks and other financial institutions, (ii) large corporates (with assets > EUR 50bn), (iii) equities • A-IRB no longer allowed for corporates (with revenues > EUR 200m) • Use of own estimates of model parameters for specialised lending no longer allowed under IRB approach • Removing the IRB option for sovereigns is still being considered
2 Introducing model parameter floors	• Exposure level floors are introduced for PD/LGD/EAD parameters • BCBS is cautious about making the floors too high because it might incentivise banks to take part in risky activities not subject to floors
3 Changing parameter estimation practices	• Changes to the calculation of LGD for secured corporate exposures under F-IRB: (i) collateral haircuts are increased, minimum LGD values for secured exposures are decreased, (iii) minimum collaterisation requirements are removed, (iv) gross-up of exposure values is extended to non-cash exposures secured by non-financial collateral • Modelling LGD under A-IRB for corporate and retail exposures requires splitting the estimate into a long-term LGD component and a downturn add-on component, and setting a floor for the downturn component • Using models to estimate CCF for non-revolving commitments is not allowed, additional constraints on CCF modeling practices are proposed • Amendments to the credit risk mitigation framework are proposed, including removal of the double default treatment

Revisions to the securitisations framework

To **address weaknesses such as mechanistic reliance on external ratings**, lack of risk sensitivity, cliff effects and insufficient capital for certain exposures, the BCBS finalised the securitisation framework on 11th December 2014, which will come into effect in January 2018.

The Committee also finalised the *Capital treatment Criteria for "simple, transparent and comparable securitisations" (STC)* on November 10th 2015. Compliance with the expanded set of STC criteria provides additional confidence in the performance of the transactions and a range for the reduction in capital charges is suggested. Calibration is planned to follow in 2016.

Fig. 6 New calculation approaches for securitisations

General revisions as to regulatory capital for exposures to securitisations

- Floor risk weight of 15 % for securitisations and 100 % for re-securitisations
- Introduction of caps for senior and originator positions
- Hierachy of models; RW increase at each level down in the hierarchy
- If a bank cannot use any of the models mentioned: CET1 deductions or RW=1.250 %

1 **SEC-IRB** Securitisation Internal Ratings-Based Approach

- Supervisory formula to calculate capital requirements for a securitisation exposure to an IRB pool
- For at least 95 % of the portfolios, the calculation of IRBA parameters using IRB models should be possible

2 **SEC-ERBA** Securitisation External Ratings-Based Approach

- Assignments of risk weights according to the external ratings, seniority, thickness and maturity of the securitisation exposure

3 **SEC-SA** Securitisation Standardised Approach

- A supervisory formula that relies on SA for credit risk of underlying exposures to calculate capital requirements of securitisation tranche

Implications

- Significant increase in capital requirements in most portfolios
- Significantly increased data requirements for the calculation of risk weights

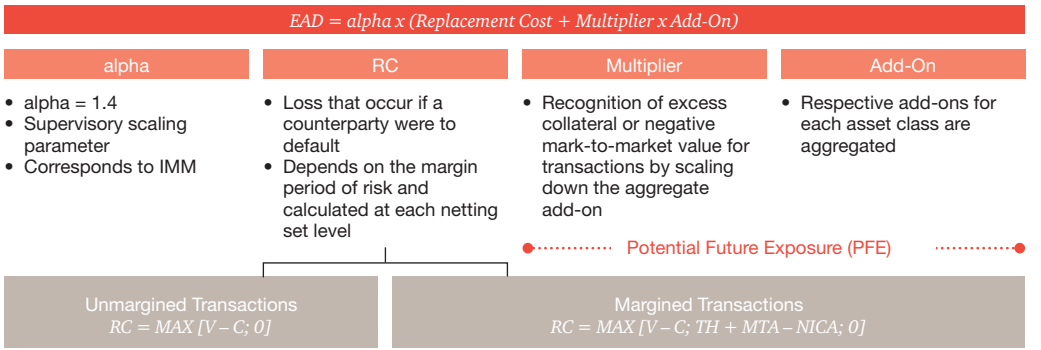
The standardised approach for measuring counterparty credit risk exposures (SA-CCR)

Main objectives of the SA-CCR are to devise an approach that ...

- is suitable to be applied to a wide variety of derivatives transactions (margined and unmargined, as well as bilateral and cleared),
- is capable of being implemented simply and easily,
- adresses known deficiencies of the CEM and the SM,
- draws on prudential approaches already available in the Basel framework,
- minimises discretion used by national authorities and banks,
- improves the risk sensitivity of the capital framework without creating undue complexity.

The document published on 31st March 2014 presents the Basel Committee's formulation for its standardised approach (SA-CCR) for measuring exposure at default (EAD) for counterparty credit risk (CCR). The SA-CCR will replace both current non-internal model approaches, the current exposure method (CEM) and the standardised method (SM), and is scheduled to become effective on January 1st 2017.

Fig. 7 Structure of the SA-CCR



Minimum capital requirements for market risk

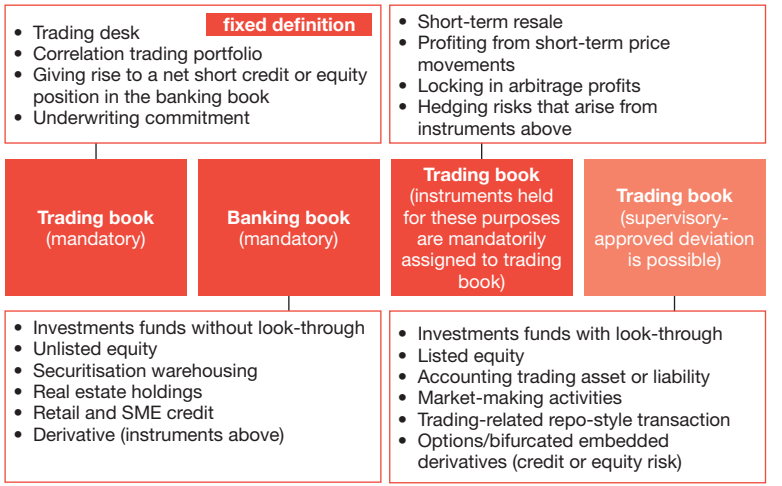
On January 16th 2016, the BCBS published standards for minimum capital requirements for market risk. The implementation of the revised market risk standards is expected to be finalised by January 2019, and banks will be required to report under the new standards by the end of 2019.

Fig. 8 The fundamental review of the trading book

Material weaknesses of current approaches …		… require fundamental review
Trading book – banking book boundary	Treatment of credit risk in the trading book	1 • Banking book/trading book boundary to be more objective • Additional tools for supervision
Weaknesses of VaR approach	Hedging and diversification	2 • New standardised approach increases risk sensitivity of RWA calculation • Significant increase of complexity
Liquidity of trading book positions	Transparency & comparability of RWA	3 • Internal model method using ES instead of VaR • Changes to model approval process • Floor based on standardised method

Trading book boundary

Fig. 9 Criteria for trading and banking book definition



Sensitivities-based method

Fig. 10 The sensitivities-based approach

Revised internal models method

Definition of 7 risk classes for the sensitivities-based approach

GIRR	Credit spread (non-SEC)	CS (SEC) and CS (CTP)
Equity	Commodity	FX

Delta risk	Vega risk	Curvature risk	Default risk	Residual risk add-on
	Options only			
Linear risk		Non-linear risk		
Delta: A risk measure based on sensitivities of a bank's trading book to regulatory delta risk factors. **Vega**: A risk measure that is also based on sensitivities to regulatory vega risk factors to be used as inputs.		A risk measure which captures the incremental risk not captured by the delta risk of price changes in the value of an option.	A risk measure that captures the jump-to-default risk in three independent capital charge computations.	A risk measure that ensures sufficient coverage of market risks.

- Calculation of three risk charge figures, based on three different scenarios on the specified values for the correlation parameter,
- The bank must determine each delta and vega sensitivity and curvature scenario based on instrument prices or pricing models that an independent risk control unit within a bank uses to report market risks or actual profits and losses to senior management.

Revised internal models approach

Fig. 11 Characteristics of the revised internal models approach

Revised internal models approach

New risk measure	• Value at risk replaced by expected shortfall as primary risk measure • 97.5 % instead of 99 % quantile	Theoretical concept
Calibration to stress market condition	• Single quantity calibrated to worst period since 2005 instead of VaR and SVaR	Challenging data requirements
Different liquidity horizons	• Individual holding periods for different risk factors instead of 10 days for all	Increased complexity
New DRC	• Captures only default risk (no migration)	Bank specific
New requirements for model approval	• Back testing on desk level • P&L attribution	Challenge in processes

Standardised Measurement Approach for OpRisk

The new *Standardised Measurement Approach for operational risk (SMA)*, which builds on the BCBS's earlier consultation paper published in October 2014, was introduced on March 4th 2016. The SMA aims to simplify the calculation of operational risk capital by replacing the three existing standardised approaches as well as Advanced Measurement Approach (AMA). The new methodology builds on a financial statement-based measure of operational risk – the „**Business Indicator**" (BI) – and an individual firm's past operational losses, exhibits enhanced risk sensitivity and promotes comparability of regulatory capital across banks and jurisdictions. Moreover, dividend incomes are considered to avoid arbitrage within a BI and a new parameter called "Unadjusted Business Indicator" (uBI) is introduced to address higher capital requirements for institutions with high net interest margin through the weighting factor.

Fig. 12 The "Business Indicator" as a new proxy indicator

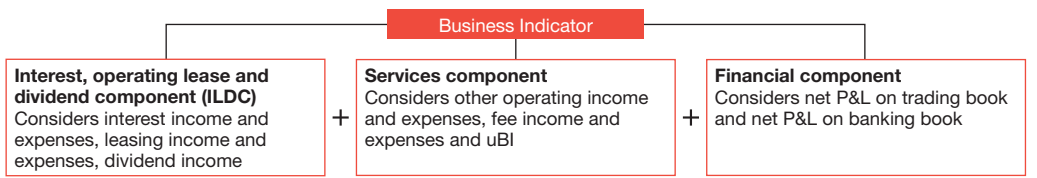


Fig. 13 Calculation of the SMA capital requirement

"Bucket"	Business Indicator (BI) Range (€ mln)	BI Component (BIC)
1	0–1.000	11% x BI
2	1.000–3.000	€ 110 mln + 15 % (BI – € 1.000 mln)
3	3.000–10.000	€ 410 mln + 19 % (BI – € 3.000 mln)
4	10.000–30.000	€ 1.740 mln + 23 % (BI – € 10.000 mln)
5	>30.000	€ 6.340 mln + 29 % (BI – € 30.000 mln)

Loss Component

7 * Average Total Annual Loss
+ 7 * Average Total Annual Loss only including loss events above € 10 mln
+ 7 * Average Total Annual Loss only including loss events above € 100 mln

SMA capital requirement

$$SMA\ Capital = \begin{cases} BI\ Component, if\ Bucket\ 1 \\ 110\ mln + (BI\ Component - 110\ mln)\ X\ Ln\left(exp(1) - 1 + \frac{Loss\ Component}{BI\ Component}\right), if\ Bucket\ 2-5 \end{cases}$$

Review of the credit valuation adjustment (CVA) risk framework

The BCBS reviewed the existing (credit valuation adjustment) CVA risk framework in a consultative paper published on July 1st 2015. The implementation date remains to be decided.

The objectives of the revision are

- Capturing all key drivers of CVA risk (incl. exposures) and CVA hedges in the regulatory capital standard.
- Consistency with the revisions to the "fundamental review of the trading book" (FRTB).
- Alignment with the fair value measurement of CVA under various accounting regimes, i. e. IFRS 13.

Fig. 14 The revised CVA framework

Revised framework

FRTB-CVA framework

- For banks which are capable to calculate sensitivities to regulatory CVA for a large set of risk factors and satisfy fundamental CVA risk management requirements
- Regulatory CVA is based on accounting CVA exposure models or IMM, market induced PDs and LGDs,
- Hedges for exposure and credit spread as well as proxy hedges are allowed.

Basic CVA framework

- For all banks which are not allowed/ willing to use the FRTB-CVA framework,
- Based on the revised SA-CCR or IMM,
- Single-name and index hedges are considered (credit spread risk hedges – direct or indirect)

~~IMA-CVA~~

- ~~Only banks that receive approval to use IMA-TB to calculate market risk,~~
- ~~Calculation of a simplified expected shortfall (ES),~~
- ~~Default risk is not considered,~~
- ~~P&L attribution, backtesting~~

BCBS 362 eliminates IMA-CVA!

SA-CVA

- For banks that use sensitivity based approach for market risk,
- Delta risk charge using SBA,
- Default risk and gamma risk charge are not considered,
- More conservative hedging and diversification than in IMA-CVA

BA-CVA

- Improved version of Basel III Standardised CVA risk capital charge
- Calculation of supervisory expected shortfall based on prescribed risk weight depending on asset classes (buckets), effective maturity and EAD
- Supervisory correlations are considered

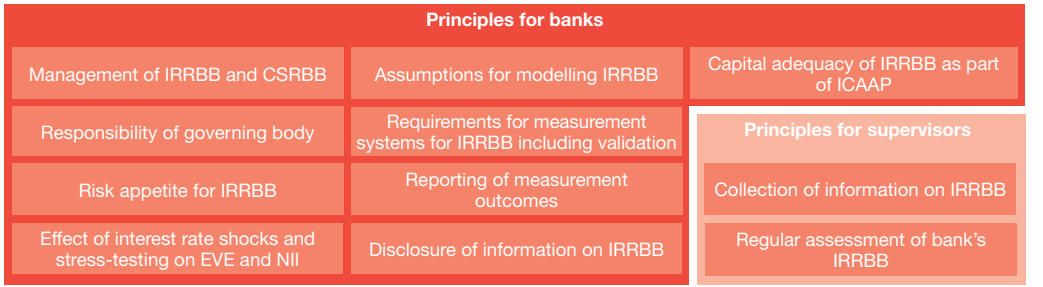
Interest rate risk in the banking book

On April 21st 2016 the Basel Committee issued Standards on "Interest rate risk in the banking book". These standards are based on the earlier consultative paper issued in June 2015 and update the IRR principles issued in 2004.

Unlike the consultative paper the **standards only address IRRBB from a pillar II perspective**.

Greater guidance has been added towards stress-testing, model validation, disclosure and the regular review of IRRBB by the supervisor.

Fig. 15 IRRBB – Principles for banks and supervisors



Supervisory framework for measuring and controlling large exposures

Purpose of large exposure limits is …

- to constrain the maximum loss a bank could face in the event of a sudden failure of a counterparty or a group of connected counterparties,
- to help ensure the bank remains a going concern.

The financial system has changed dramatically since the publication of the Basel Committee's standards on supervisory framework for measuring and controlling large exposures in 1991. The new standards on this topic released on 15 April 2014 will supersede the old ones, and take effect on 1 January 2019.

The revised framework will help ensure a common minimum standard for **measuring, aggregating** and **controlling single name concentration risk** across jurisdictions. Especially, if the bank's counterparty is another bank, large exposure limits can directly contribute towards the reduction of system wide contagion risk.

Fig. 16 Proposals for large exposure standards

An overview of the proposals on large exposure standards
1 The eligible capital base consists only of Tier 1 capital. Tier 2 capital cannot be considered in the eligible capital base anymore
2 The definition and reporting thresholds are 10 % of the eligible capital base
3 A general limit applied to all of a bank's exposures to a single counterparty (also groups of connected counterparties), which is set at 25 % of a bank's Tier 1 capital
4 A tighter limit set at 15 % of Tier 1 capital for exposures between banks that have been designated as global systemically important banks (G-SIBs)
5 Application of a look-through approach to identify those underlying assets for which underlying exposure value is equal to or above 0.25 % of bank's capital base
6 A treatment that recognises particular features of some covered bonds

Pillar 3 disclosure requirements – consolidated and enhanced framework

The BCBS issued a consultative paper entitled *"Pillar 3 disclosure requirements – consolidated and enhanced framework"* on March 11th 2016, which incorporates additions to the Pillar 3 framework to reflect ongoing regulatory reforms. The new proposals include disclosure requirements for the total loss-absorbing capacity regime for global systemically important banks, the proposed operational risk framework, and the final standard for market risk. **All existing Pillar 3 disclosure requirements of the Basel framework, including the leverage ratio and liquidity ratios disclosure templates, would be consolidated through these proposals**. The consultation continues until 10 June 2016.

Tab 2 Frequency and format of disclosure requirements

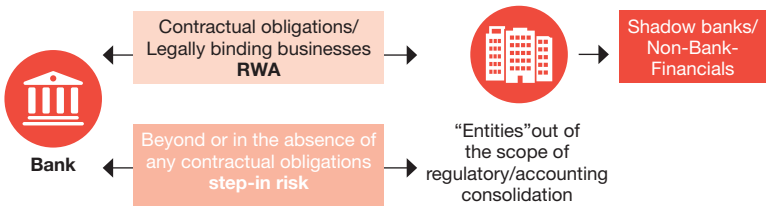
	Format		Frequency of the disclosure			Content	
Tables and Templates	fix	flexible	quarterly	semi ann.	annually	quantitative	qualitative
Risk management, key metrics and RWA	5	1	3	2	1	5	1
Linkages: financial statements & regulatory exposures	1	3	–	–	4	3	1
Own funds and TLAC	5	1	–	6	–	5	1
Macroprudential measures	1	1	–	1	1	2	–
Leverage ratio	2	–	2	–	–	2	–
Liquidity	2	1	1	1	1	2	1
Credit risk	8	7	1	8	6	10	5
Counterparty credit risk	6	3	1	7	1	8	1
Securitisations	2	3	–	4	1	4	1
Market risk	4	3	1	4	2	4	3
OpRisk	3	1	4	–	–	3	1
Interest rate risk in the banking book			Separate consultation paper (BCBS 368)				
Remuneration	–	4	4	–	–	3	1
Total 67	**39**	**28**	**17**	**33**	**17**	**51**	**16**

Identification and measurement of step-in risk

The BCBS consultative document released on 17th December 2015 proposes a conceptual framework, that could form the basis of an approach for identifying, assessing and addressing step-in risk potentially embedded in **banks' relationships with shadow banking entities** mainly, although without limiting the proposals to them.

The Committee defines "step-in risk" as the risk that a bank may provide financial support to an entity beyond or in the absence of any contractual obligations, should the entity experience financial stress. The focus of the paper is on identification of unconsolidated entities (out of the scope of regulatory and/or accounting consolidation) to which a bank may provide financial support to protect itself from any adverse reputational risk arising from its connection to the entities. A Quantitative Impact Study on step-in risk is scheduled in the first half of 2016.

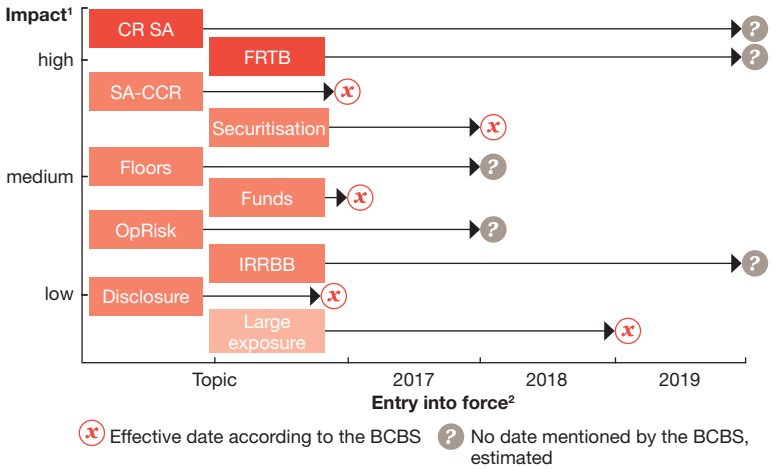
Fig. 17 Identification of step-in risk



! Step-in risk might have been reduced through the recent regulatory and accounting reform initiatives but not completely eliminated!

The BCBS heatmap

Fig. 18 The BCBS heatmap



[1] Estimated impact on capital requirements and implementation costs; depending on the business model
[2] According to the BCBS; without considering the time for EU-Implementation

Our Services

Our Expertise

Whether regarding the Basel Committee, EU-regulation or national legislation – we use our established know-how of the analysis and implementation of new supervisory regulation to provide our clients with high-quality services. Embedded into the international PwC network, we have access to the extensive knowledge of our experts around the world.

About us

Our clients face diverse challenges, strive to put new ideas into practice and seek expert advice. They turn to us for comprehensive support and practical solutions that deliver maximum value. Whether for a global player, a family business or a public institution, we leverage all of our assets: experience, industry knowledge, high standards of quality, commitment to innovation and the resources of our expert network in 157 countries. Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.

PwC. 9,800 dedicated people at 29 locations. €1.65 billion in turnover. The leading auditing and consulting firm in Germany.

Contact

Martin Neisen
Partner
Friedrich-Ebert-Anlage 35–37
60327 Frankfurt am Main
Tel: +49 69 9585-3328
Fax: +49 69 9585-947603
martin.neisen@de.pwc.com

PricewaterhouseCoopers Aktiengesellschaft Wirtschaftsprüfungsgesellschaft adheres to the PwC-Ethikgrundsätze/ PwC Code of Conduct (available in German at www.pwc.de/de/ethikcode) and to the Ten Principles of the UN Global Compact (available in German and English at www.globalcompact.de).

www.pwc.de