

Basel IV

Readiness





The Basel Committee for Banking Supervision (BCBS) proposed finalization of Basel III encompasses so many changes that the industry started referring to it as Basel IV. Basel IV changes the calculation of risk-weighted assets (RWA) which will have a significant impact on business models and forces banks to rethink their capital allocation strategies.

BCBS published its final documents on the reform of Basel III in December 2017, which are now commonly referred to as “Basel IV.” In the interim, implementation of Basel IV has been deferred to January 2023, and the US Federal Reserve has yet to publish their final ruling. However, understanding the potential impacts of Basel IV now is key, and will give firms a head start in implementation efforts once the final ruling is published.

How can you manage the uncertainty?

PwC can help.

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Key changes to Basel III and considerations for Basel IV



Credit Risk-SA

Credit Risk - Standardized Approach



Credit Risk-IRB

Credit Risk - Internal Ratings Based Approach



SA-CCR

Standardized Approach - Counterparty Credit Risk



FRTB/CVA

Fundamental Review of the Trading Book / Credit Valuation Adjustment



Operational Risk

Key changes to Basel III

- Introduces due diligence requirements for certain types of counterparties
- Adds more granular counterparty types (e.g. specialized lending), with distinct risk-weighting rules
- Increases requirements for meeting certain treatments (e.g. real estate secured)
- Segregates real estate exposure risk weights based on Loan-To-Value (LTV)

- Introduces restrictions on which type of counterparties the IRB Approach may be used
- Applies floors to Probability of Default (PD), Loss Given Default (LGD) and Credit Conversion Factor (CCF) to the portfolios that remain eligible for the use of the advanced approach

- Replaces the Current Exposure Method (CEM)
- Introduces hedging sets for specific asset classes
- Provides better recognition of secured and cleared trades
- Introduces increased risk sensitivity by addressing over-collateralisation and negative market values

- Introduces risk sensitivity-based Standardized Approach (SA) calculations for market risk capital floor
- Internal Model Approach (IMA) requires enhanced considerations
- CVA Internal Model Method (IMM) will not be allowed
- Introduces product-based banking boundary versus trading book

- Introduces a new SA to replace the Advanced Measurement Approach (AMA) for calculating operational risk capital requirements
- Calculates capital requirements using financial statement-based proxies and an Internal Loss Multiplier (scaling factor based on average historical losses)

Key considerations for Basel IV

- Credit card impact will be driven by customer behavior
- Real Estate exposure may receive relief
- Corporate impact will be driven by counterparty type
- New exposure classes require system changes
- Impact will vary based upon business model

- Uncertain if US regulators will allow F-IRB approach
- IRB approach may become the RWA floor
- A reduced scope in IRB may lead to higher RWA

- Increased data granularity results in more precise calculations
- Optimization focuses on net exposure rather than gross notional reduction
- Allocation of netting set level Exposure At Default (EAD) to trades and “what-if” analysis can improve capital management

- Infrastructure and growth plans dictate IMA versus SA election
- Systems/operational overhaul may be more optimal
- IMA risk factor governance is a significant hurdle
- CVA-SA suited for sophisticated CVA models and hedging
- Reoptimization of banking vs trading designation

- Amplification of operational Risk losses
- Keeping up with operational loss data requirements
- System enhancements to capture and log operational events



Credit Risk- Standardized Approach

Key considerations when implementing Credit Risk-SA



Credit card impact will be driven by customer behavior

The CCF for unused consumer credit balances will increase from 0% to 10%.

Credit limit increases and customer spend behavior (e.g., “transactor” vs “revolving”) will directly impact capital requirements.

The ability to forecast expectations on both of these aspects should be a part of capital planning.



Real Estate exposure may receive relief

Introduction of risk weights scaled based on LTV band for commercial and residential real estate mortgages will likely provide a significant RWA benefit for banks’ real estate portfolios with lower LTVs.



Corporate impact will be driven by counterparty type

A reduced risk weight is proposed for Investment Grade (IG) corporate exposures with public securities (100% to 65%) and for Small and Medium Sized (SME) (100% to 75% or 85%) enterprises.



New exposure classes require system changes

New exposures classes to the US SA for Credit Risk introduced, including retail, specialized lending and commercial real estate.

New exposure classes require banks to update their exposure classification systems, processes and data.



Impact will vary based upon business model

Meaningful insights require more granular impact analysis to identify business impacts, refine capabilities, and identify opportunities and challenges.

Overcoming Credit Risk-SA implementation challenges



Common issues achieving Credit Risk-SA requirements

- Certain exposure classes see **significant changes in RWA** (e.g. Credit cards). There will be significant impacts on the banks' business models
- Historically, the **US regulators have deviated from BCBS proposed rules**. Determining the full impact to your business model requires more certainty from regulators.

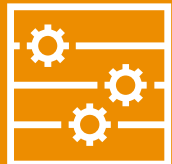


Approach to addressing these issues



Business model impact

- Start with **regular impact assessments with a range of outcomes**. Meaningful insights require more granular impact analysis to identify business impacts, refine capabilities, and identify opportunities and challenges
- Implementation of the known and stable elements of the proposed rules offers earlier **insight into your capabilities and accelerates identification** of where your system and data infrastructure may be lacking and **start building flexible capabilities** which allow for implementation of different outcomes



Technology and operational processes

- More granular requirements for counterparties to be eligible for favorable risk weightings, **requiring incremental analysis and data** (e.g., Transactors vs. revolving for credit credit cards, LTV for CRE, CET1 ratio for banks)
- **Reclassification of counterparties** to align to more granular risk weight categories, new categories and corresponding updates to systems
- Updates to systems to reflect **more granular calculation logic** for banks, corporations, real estate and specialized lending

- Start collecting **essential data elements** for areas where the most relief can be achieved (e.g. 12 month repayment data for credit cards)
- The **rules incentivize having the required data elements**, investing in a proper data infrastructure may be worth it
- System enhancements, business rule changes and data requirements associated with Basel IV implementation should be **coordinated with other critical in-flight programs** enhancing data, infrastructure and regulatory reporting capabilities



Interaction with other rules and Capital Planning

- **Interacting parts of the rule** (e.g. SA-CCR, Securitizations, IRB approach) mean full impact will only be known when all parts have been implemented.
- Changes will impact **other regulations** besides RWA (e.g. Single Counterparty Credit Limits, Leverage Ratio). Changes have to be assessed comprehensively
- SA-CR is the starting point for **CCAR stress tests**. Understanding the full impact of the changes requires assessing the impact on CCAR as well

- **Business engagement and ownership** in the implementation process is essential for effective capital planning and development of mitigation strategies
- **Centralized and comprehensive impact studies** allow for a thousand foot view on impact to the combined impact of the changes

Credit Risk-SA - US Basel III versus Basel IV - summary of differences

Exposure Class

Sovereigns and Related Entities

Banks and Financial Institutions

Residential Real Estate

Commercial Real Estate (NEW)

Retail Exposures (NEW)

Corporates

Off Balance Sheet Exposures

Specialized Lending (NEW)

Subordinated Debt and Equity

Other

BASEL III

- US government: 0%
- Foreign governments: Based on OECD CRC 0%-150% RW
- MDB: 0% RW for exposures to certain MDBs and supranational organisations
- GSEs: 20% RW for exposures to GSE' and 100% RW for preferred stock issued by a GSE

- US Banks: 20%
- Foreign banks: Based on CRC 20%-150% RW
- Financial Institutions as corporates, so 100% RW

- RW of 50% if certain certain requirements are met
- RW of 100% if those requirements are not met and to junior liens
- RW of 50% for statutory multifamily mortgages
- RW of 50% for Pre-sold construction loans, 100% if the purchase contract is cancelled

- RW of 150% for high-volatility commercial real estate
- RW of 100% tol corporate exposures
- RW of 50% for Pre-sold construction loans

- No separate exposure class for Retail exposures, therefore 100% RW

- All corporate exposures: 100%

- CCF for unconditionally cancellable commitments increases from 0% to 10%
- CCF for Unused commitments with a maturity < 1 year will increase from 20% to 40%
- CCF for Unused commitments with a maturity > 1 year will decrease from 50% to 40
- No changes to other off balance sheet commitments

No separate exposure class for Specialized Lending, therefore treatment based on the counterparty type, but generally a 100% RW for corporate exposures

- Sovereign and related equity: 0%
- PSE: 20%
- Community Development Investment (CDI) and non-significant investments: 100%
- Significant investments in unconsolidated entities: 250%
- Publicly traded equity: 300%
- Non-publicly traded equity: 400%
- Certain investment firms qualifying as traditional securitization: 600%

- Introduction of a 1.5 multiplier in case of currency mismatch between exposure and income currency
- Several detailed changes to credit risk mitigation techniques, e.g. changes to financial collateral haircuts

BASEL IV

- In jurisdictions where external ratings are not allowed, MDB's are assigned a 50% RW
- No other changes

- RWs based on risk weight buckets, depending on certain criteria:
 - Long Term: 30%(Grade A+), 40%(Grade A), 75%(Grade B), 150%(Grade C)
 - Long Term: 20%(Grade A+), 20%(Grade A), 50%(Grade B), 150%(Grade C)
- Certain Financial Institutions which are equivalently supervised may be treated as banks, otherwise 100%

- General Treatment:**
- RW based on LTV: RW from 20% (LTV ≤ 50%) to 70% (LTV ≥ 100%)
 - Loan Splitting Approach: RW = 20% for up to 55% of property value, counterparty RW for the residual
- Income Producing PRE:**
- RW based on LTV (30% to 105%)

- LADC:**
- W = 150%
 - RW = 100%, if significant pre-sale/pre-lease contracts, or equity at risk

- General Treatment:**
- RW based on LTV: RW 60% if LTV ≤ 60%, if LTV ≥ 60%, RW of counterparty
 - Loan Splitting Approach: RW = 60% for up to 55% of property value, counterparty RW for the residual

- Income Producing CRE:**
- RW based on LTV (70% to 110%)

- LADC:**
- RW = 150%

- Regulatory retail: RW = 75%
- Transactors (specific credit and charge cards): RW = 45%
- Other retail: RW = 100%

- Investment grade: RW = 65%
- SME: RW = 85% or 75%
- Other corporates: RW = 100%

- Object / commodity finance: RW = 100%
- Pre-operational project finance: RW = 130%
- Operational project finance: RW = 100% (80% if high quality)

- Subordinated debt incl. other TLAC liabilities: RW = 150%
- Speculative unlisted equity exposures: RW = 400%
- All other equity: RW = 250%

Potential material impacts of Credit Risk-SA

	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
Real Estate Exposures	↘	<ul style="list-style-type: none"> Introduction of risk weights scaled based on LTV band for both residential and commercial mortgages 	<ul style="list-style-type: none"> Resi mortgage with 80% LTV proposed to receive a Risk Weight (RW) of 40%, down from 50% and can fall to 20% if LTV > 50% CRE with LTV ≤ 60% to decrease from 100% to 60%
Corporate Exposures	↘	<ul style="list-style-type: none"> Introduction of reduced risk weight for investment grade corporate exposures with public securities on an exchange. Investment grade cannot reference external credit ratings and will need to be defined based the borrower's risk profile. 	<ul style="list-style-type: none"> Investment grade corporate (including insurance companies) exposures meeting the new definition, which could be principles-based or prescribed by quantitative criteria, can be risk weighted at 65% instead of 100%
Retail Exposures	↘	<ul style="list-style-type: none"> Introduction of the retail exposure class in the SA will reduce risk weights for retail and credit card balances 	<ul style="list-style-type: none"> Certain retail products <\$1M and not material to the portfolio will be assigned a 75% RW instead of 100% Balances for customers that repaid their credit balance in full every month over the past 12 months are assigned 45% instead of 100%
Unused Commitments	↗	<ul style="list-style-type: none"> The Credit Conversion Factors for certain off balance sheet commitments are adjusted, generally up 	<ul style="list-style-type: none"> The CCF for Unused Credit Card lines of credit will increase from 0% to 10%, and unused commitments with a maturity < 1 year will increase from 20% to 40%
Banks	↗	<ul style="list-style-type: none"> RW for long-term bank exposures will increase since Basel IV introduces four grades of RW% (30%, 40%, 75% and 150%) based on counterparty's compliance with certain regulatory requirements and the bank's CET 1 Ratio and Leverage Ratio 	<ul style="list-style-type: none"> LT exposure to Bank A will increase from 20% to 40% LT exposure to Bank B will increase from 20% to 30% if CET 1 >14% and Tier 1 Leverage Ratio >5%
Financial Collateral	↗	<ul style="list-style-type: none"> Haircuts applied to non-sovereign financial collateral for credit risk mitigation increase in certain cases 	<ul style="list-style-type: none"> The haircut for equities listed on a main index increases from 15% to 20% in Repo Style transactions A floor on haircuts for repo style transactions is introduced for transactions with non prudentially supervised counterparties
Capital Floors	↘	<ul style="list-style-type: none"> A capital floor as a percentage of the SA for Advanced Approach banks is introduced 	<ul style="list-style-type: none"> The output floor will be phased-in between 2023 (50%) and 2028 (72.5%), meaning that for certain banks the Advanced Approach may become the higher capital requirement

Other impacts of Credit Risk-SA

	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
Financial Institutions	↘	<ul style="list-style-type: none"> RWA for Certain financial institutions will decrease because they may now potentially be treated as bank exposures 	<ul style="list-style-type: none"> Short term exposures exposures to “grade A” Asset Managers will decrease from 100% to 20% Long Term exposures to “grade B” Asset Managers will decrease from 100% to 75%
Securitizations	...	<ul style="list-style-type: none"> Simple, Transparent and Comparable (STC) securitizations are introduced The RW% floor is decreased from 20% to 10% (STC) and 15% (Non-STC) Risk weights for credit card and RMBS securitizations will decrease based on the risk weights of the underlying securitized exposures 	<ul style="list-style-type: none"> STC securitizations will see RWA go down due to lower floors Non-STC will see increased correlation parameter from 0.5 to 1, increasing the RWA in the Simplified Supervisory Formula Approach calculation Risk weights for securitizations are based on the risk weights of the underlying exposures, credit card and residential mortgage risk weights generally decrease
Project Financing	...	<ul style="list-style-type: none"> The introduction of an exposure class for project financing increases RWA for pre-operational projects High Quality operational projects see RWA decrease 	<ul style="list-style-type: none"> The RW for Pre-operational projects (e.g. bridge construction) will increase from 100% to 130% The RW for High quality operational projects decreases to 80% from 100%
Step-In Risk	↗	<ul style="list-style-type: none"> Guidelines introduced for Step-In Risk management may increase capital requirements 	<ul style="list-style-type: none"> BCBS introduced guidelines for Step-In Risk. It is up to local supervisors to decide if and how these guidelines should be implemented. Regulators could decide to include requirements for Step-In Risk as capital requirements in pillar I or as a requirement under SCB.



Credit Risk- Internal Ratings Based Approach

Key considerations when implementing Credit Risk-IRB



Uncertain if US regulators will allow Foundation IRB (F-IRB) approach

BCBS proposes to discontinue Advanced IRB (A-IRB) for Equities, Large Corporates and Banks.

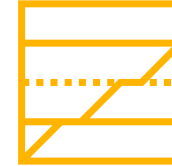
US regulators never implemented F-IRB under Basel II, so there is significant uncertainty regarding implementation.



IRB approach may become the RWA floor

Increase of PD and LGD floors and introduction of Supervisory-set LGD's, may result in higher RWA under the Advanced Approach.

Changes in PDs, LGDs resulting in higher RWA may result in the Advanced Approach becoming the RWA floor under the Collins Amendment, shifting capital planning and allocation practices.



A reduced scope in IRB may lead to higher RWA

Basel IV narrows the applicability of the Advanced IRB approach for Equities, Large Corporates and Banks.

Using the F-IRB approach or SA generally leads to higher RWA.

Overcoming Credit Risk-IRB impact implementation challenges



Common issues achieving IRB requirements

- **Revised approach to capital allocation and optimization for portfolios** for which IRB will still be eligible
- **Allocation of capital may become a mix** of the SA, F-IRB, A-IRB, CCAR and Economic Capital models
- Global banks will have to **deal with local regulators** implementing rules differently, making business model impact geographically specific



Approach to addressing these issues

- Start with **regular impact assessments**. Meaningful insights require more granular impact analysis to identify business impacts, refine capabilities, and identify opportunities and challenges.
- Assess per exposure class the **incremental effort and benefit** of using SA, A-IRB or F-IRB.
- Constraints to the use of IRB allows banks to apply IRB per exposure class. This allows for **optimization of exposures classes in effort and capital requirements**, within supervisory expectations.

- **Additional data requirements on collateral type for calibration of LGD** for secured corporate and retail exposures
- **Redundant historical databases and models** used for parameters estimation of observations.
- Historically, the **US regulators have deviated from BCBS** proposed rules. Determining the full impact to your business model requires more certainty from regulators.

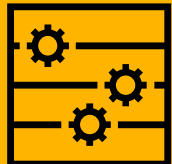
- Implementation of the known and stable elements of the proposed rules offers earlier **insight into your capabilities and accelerates identification** of where your system and data infrastructure may be lacking.
- **Build infrastructure** components that allow for flexible implementation of new rules
- Establish roll-out plans for exposure classes where the approach changes and **assess the need for systems, processes, data and reporting requirements going forward**.

- Due to the greater specification in the rules about how to determine model parameters, **reassessment and recalibration of PD, LGD and EAD** may be needed.
- **Re-thinking of model structure** for segments with issues on collateral recovery data for LGD estimates based on a mix of own LGD – for unsecured part – and regulatory LGDs for the secured part of exposure.
- Under A-IRB, **guarantees and credit derivatives must apply method used to determine the RW %** for a direct exposure to the guarantor or protection seller.

- **Assess current modeling practices** against updated parameter requirements for A-IRB and F-IRB to determine potential gaps.
- **Change models**, e.g. insured / guaranteed products might need to be out-scoped from LGD model development activities.



Capital Allocation and Planning



Technology and Operational processes



Modeling Practices

Changes related to the Credit Risk-IRB approach

- The Collins Amendment sets the Capital floor as the higher of the SA or the Advanced Approach
- Currently, the SA is generally the higher Capital Requirement, however, this may change under Basel IV
- Rationale for changes:
 - Reduction of complexity of the regulatory framework
 - Improve the comparability of models used by banks
 - Reduction of excessive variability in capital requirements for credit risk

CHANGES

Reduced scope of internal models

Reduced scope of IRB approaches for asset classes

The current US Basel III rule does not allow the use of the F-IRB approach for any exposure classes

Increased floors on model parameter

Increase of floors for PD/LGD/CCF (Current: 0.03% PD for Retail and 10% LGD for Residential Mortgages)

Changes to the estimation of parameters and requirements

Several specifications on estimation practices and requirements around rating processes, governance of models, data and documentation standards

DETAILS

Portfolio/Exposure	Basel II	Basel IV
Large and mid-sized corporates (consolidated revenues > € 500m)	A-IRB, F-IRB, SA	F-IRB, SA
Banks and other financial institutions	A-IRB, F-IRB, SA	F-IRB, SA
Equities	Various IRB approaches	SA
Specialized lending (new exposure class)	A-IRB, F-IRB, slotting, SA	A-IRB, F-IRB, slotting, SA
Retail	A-IRB, SA	A-IRB, SA

<ul style="list-style-type: none">• Corporates: PD 0.05%, LGD unsecured 25% and LGD secured 0%, 10% or 15% (depending on collateral type)• Retail: PD 0.05%, LGD unsecured 30% or 50% and LGD secured 0%, 5%, 10% or 15% (depending on collateral type)• EAD: Use CCF of F-IRB as benchmark• Removal of IRB scaling factor of 1.06
<ul style="list-style-type: none">• Greater specificity is provided for the practices that banks may use to estimate their model parameters (e.g. Every legal entity needs to be rated separately for wholesale exposures, minimum risk drivers for retail exposures)• Stability of ratings (Through-the-cycle)• PD estimation is based on historical average one year default rates• The use of internal models for the estimation of CCFs for non-revolving commitments is no longer allowed



Consequence

Changes to the Advanced Approach for Credit Risk may be significant in certain cases, potentially making the Advanced Approach the new floor.

Potential impacts of the Credit Risk-IRB approach

		Potential RWA impact	DESCRIPTION	ANALYSIS AND EXAMPLES
POTENTIAL MATERIAL IMPACT	Increase of PD and LGD floors	↗	<ul style="list-style-type: none"> Increase of PD and LGD floors will increase RWA across the board (except sovereign exposures) 	<ul style="list-style-type: none"> Increase of floors for of PD (0.03% vs. 05%) and LGD ($\geq 5\%$, $\geq 10\%$ or $\geq 15\%$, depending on collateral type) will lead to an increase of RWA for low-risk exposures
	Equity Exposures	↗	<ul style="list-style-type: none"> Equity exposures are placed out of the IRB scope and hence only the SA can be used 	<ul style="list-style-type: none"> Application of the SA for Equity exposures will increase RWA given the generally high RW% for equity exposures ($\geq 100\%$)
	Non-Revolving Undrawn Commitments	↗	<ul style="list-style-type: none"> RWA for non-revolving undrawn commitments will generally go up due to the use of Standardized CCFs 	<ul style="list-style-type: none"> Standardized CCF's are generally higher than internally modeled. Standardized CCF for non-revolving commitments will generally be at least 40% (except for trade letters of credit, these are assigned 20%)
OTHER CHANGES WITH A POTENTIAL IMPACT	Reduced Scope A-IRB	↗	<ul style="list-style-type: none"> Basel IV reduces the scope of application of the A-IRB approach for banks, other financial institutions and larger corporates 	<ul style="list-style-type: none"> The RWA for these exposures should instead be determined using the F-IRB approach or using SA. Which generally leads to higher RWA due to less tailoring to the bank's specific environment and portfolios.
	Removal of Scaling Factor	↘	<ul style="list-style-type: none"> The removal of the 1.06 scaling factor for Credit Risk RWA will offset some of the potential negative impacts to the IRB approach 	<ul style="list-style-type: none"> Currently a 1.06 scaling factor is applied to Credit Risk RWA for retail, wholesale, securitization and equity exposures under the Advanced Approach. Basel IV proposes to remove this factor.
	Potential Introduction of F-IRB	...	<ul style="list-style-type: none"> US regulators never implemented F-IRB under Basel II. There is uncertainty on how the regulator will deal with this. 	<ul style="list-style-type: none"> If F-IRB is introduced, this will increase RWA for exposures on A-IRB Regulators could also require the use of SA instead of F-IRB for exposure classes where Basel wants to limit to use of models
	Capital Floor	↘	<ul style="list-style-type: none"> A capital floor as a percentage of the SA for Advanced Approach banks is introduced 	<ul style="list-style-type: none"> The output floor will be phased-in between 2023 (50%) and 2028 (72,5%), meaning that for certain banks the Advanced Approach may become the higher capital requirement

Bringing Standardized and Advanced Approaches together

	Allowed Approaches	CHANGES TO STANDARDIZED APPROACH	CHANGES TO ADVANCED APPROACHES
Real Estate Exposures	<ul style="list-style-type: none"> Standardized F-IRB (Corporate) A-IRB (Retail) 	<ul style="list-style-type: none"> Introduction of risk weights scaled based on LTV band for both residential and commercial mortgages: e.g. Resi mortgage with 80% LTV proposed to receive a Risk Weight (RW) of 40%, down from 50% and can fall to 20% if LTV > 50% 	<ul style="list-style-type: none"> Removal of A-IRB for RE with Corporate counterparty PD Floor increases from 0.03% to 0.05% (F-RIB & A-IRB) LGD floor decreases to 5% for Residential Real Estate and remains 10% for real estate exposures with Corporate Counterparty
Corporate Exposures	<ul style="list-style-type: none"> Standardized F-IRB 	<ul style="list-style-type: none"> Introduction of reduced risk weight (100% -> 65%) for investment grade corporate exposures with public securities on an exchange. Investment grade cannot reference external credit ratings and will need to be defined based the borrower's risk profile. 	<ul style="list-style-type: none"> Removal of A-IRB for large Corporates PD Floor increases from 0.03% to 0.05% (F-RIB & A-IRB) Introduction of LGD floor (A-IRB 25%, F-IRB 40%) for unsecured exposures LGD floor for secured exposures depends on collateral type (A-IRB 0%-15%; F-RIB 0%-25%)
Retail Exposures	<ul style="list-style-type: none"> Standardized A-IRB 	<ul style="list-style-type: none"> Certain retail products <\$1M and not material to the portfolio will be assigned a 75% RW instead of 100% Balances for customers that repaid their credit balance in full every month over the past 12 months are assigned 45% instead of 100% 	<ul style="list-style-type: none"> PD Floor increases from 0.03% to 0.05% Introduction of LGD floor of 30% for unsecured exposures LGD floor for secured exposures depends on collateral type (0%-15%)
Unused Commitments	<ul style="list-style-type: none"> Standardized F-IRB A-IRB 	<ul style="list-style-type: none"> The CCF for Unused Credit Card lines of credit will increase from 0% to 10%, and unused commitments with a maturity < 1 year will increase from 20% to 40% 	<ul style="list-style-type: none"> RWA for non-revolving undrawn commitments will generally go up due to the use of Standardized CCFs (F-RIB & A-IRB)
Banks	<ul style="list-style-type: none"> Standardized F-IRB 	<ul style="list-style-type: none"> RW for long-term bank exposures will increase since Basel IV introduces four grades of RW% (30%, 40%, 75% and 150%) based on counterparty's compliance with certain regulatory requirements and the bank's CET 1 Ratio and Leverage Ratio 	<ul style="list-style-type: none"> Removal of A-IRB LGD prescribed by F-IRB formulas LGD floors depending on collateral type (0%-25%) Introduction of PD Floor of 0.05%
Equity Exposures	<ul style="list-style-type: none"> Standardized 	<ul style="list-style-type: none"> Limited changes 	<ul style="list-style-type: none"> Equity exposures are placed out of the IRB scope, only the SA can be used Application of the SA for Equity exposures will increase RWA given the generally high RW% for equity exposures ($\geq 100\%$)
Securitizations	<ul style="list-style-type: none"> Supervisory Formula Approach (IRB) Simplified Supervisory Formula Approach (Standardized) 	<ul style="list-style-type: none"> Simple, Transparent and Comparable (STC) securitizations are introduced, with different correlation factors The RW% floor is decreased from 20% to 10% (STC) and 15% (Non-STC) 	<ul style="list-style-type: none"> Simple, Transparent and Comparable (STC) securitizations are introduced The RW% floor is decreased from 20% to 10% (STC) and 15% (Non-STC) Introduction of a correlation coefficient (floored at 0.3)



Standardized Approach - Counterparty Credit Risk

Key considerations when implementing SA-CCR



Increased data granularity results in more precise calculations

SA-CCR's EAD calculation is based on over 100 data elements that include trade, collateral, hedging set and counterparty information.

Robust data management practices for sourcing this granular data can improve the precision of the calculation and reduce exposure.



Optimization focuses on net exposure rather than gross notional reduction

Netting of offsetting exposures will shift the focus of portfolio optimization from reducing gross notional exposures to reducing net exposure.

Netting of offsetting exposures may change the relative costs of some products, e.g., reducing the exposure from interest rate swaps but increasing the exposure from foreign exchange products.



Revised netting set and “what-if” analysis improves capital management

Netting of offsetting transactions makes it no longer possible to see the capital charge associated with each trade.

Development of an allocation methodology and the ability to run “what-if” analysis can help to understand the capital charge of a trade before it is booked.

Overcoming SA-CCR implementation challenges



Common issues achieving SA-CCR requirements



Approach to addressing these issues



Data requirements

- **Increased complexity** with multiple data sources
- **Lack of standard nomenclature** of derivative and long dated settlement product types to map to SA-CCR requirements
- **Data redundancy** within risk systems
- **Linkage of transaction data to client reference data** such as netting, collateral, margin information, etc.
- **Decomposition of complex products** such as digital options

- **Enhance and streamline data governance** across front-office and risk systems
- Create a **standardized nomenclature** across all derivative and long dated settlement products to facilitate integration with the rest of the ecosystem
- **Normalize database** layers to remove data redundancy and develop a data lineage document to identify single source of truth for a data element



Technology and Operational processes

- **Inconsistent and redundant data** infrastructure and lack of data lineage across market risk, credit risk, business unit risk and profit / loss controller groups.
- Organize and streamline **data storage and pipelines** in order to accommodate increased data volume demands
- **Ineffective document governance** leads to increased time in locating correct version of data transformation documentation

- **Build a SA-CCR data interface layer** with a standardized list of data elements for standard derivative and long dated settlement product types from all data sources
- **Assess and develop a plan** to procure additional computing resources to manage the data volume demands
- Implement **development framework** to accelerate release process



Calculator Documentation and validation

- **Lack of end-to-end testing plan** buildout for User Acceptance Testing of all product type from each data source
- **Increased complexity** with calculation of EAD for complex products at an aggregated and disaggregated level
- **Lack of an effective challenger calculator** to validate test results from the SA-CCR calculator

- Develop an **end-to-end testing plan** for all product types from each data source
- Leverage a third party Challenger SA-CCR calculator to **validate test results** from the SA-CCR calculator

Overview of the SA-CCR framework

Objectives of the SA-CCR framework

1

Enhance risk sensitivity:

New methodology for calculating EAD for derivatives, improves risk-sensitivity of the capital framework by using risk factors that are calibrated to reflect the level of volatilities observed over a recent stress period

2

Address deficiencies of CEM and Standardized Method:

Unlike prior methodologies, SA-CCR differentiates between margined and unmargined transactions, accounts for variation margin agreements and hedging benefits within netting sets

3

Applicable to a wide variety of derivatives:

SA-CCR approach is suitable to be applied to a wide variety of derivative transactions (margined and unmargined, as well as bilateral and centrally cleared) and long settlement transactions

Benefits

- Recognizes **benefits of margining** (unlike CEM) in the Replacement Cost (RC) calculation
- Allows for meaningful, risk-reducing **relationships between derivative contracts** within a balanced derivative portfolio
- Is more **risk sensitive** than CEM (supervisory factor calibrated to stress period)

Shortcomings

- Proposes **flat add-on and correlation factors** applicable to broad asset classes
- Requires add-on component to be calculated at the hedging set level which **adds complexity**
- Includes potential floor of 5% to CCR capital requirement that **limits effectiveness of initial margin**

Calculation of Exposure At Default (EAD) under SA-CCR

$$EAD_{SA-CCR} = \text{Alpha} \times \text{Replacement Cost} + (\text{Multiplier} \times \text{Add-on})$$

Alpha

- Supervisory parameter with a fixed value of 1.4 or 1.0 (for commercial end-users)
- Analogous to Alpha value set for Internal Model Method (IMM)

X

Replacement Cost (RC)

- Current replacement costs (current fair value of the trade)
- Considers collateral and margining
- Formula to calculate replacement cost is different for **(1) unmargined** and **(2) margined** transactions (trades)

1 Replacement Cost for Unmargined Transactions

$$RC = \text{MAX} [V - C; 0]$$

V: Current market value of derivative contract

C: Net haircut collateral held by bank

2 Replacement Cost for Margined Transactions

$$RC = \text{MAX} [V - C; TH + MTA - NICA; 0]$$

TH: Threshold

MTA: Minimum Transfer Amount

NICA: Net Independent Collateral Amount

+

Potential Future Exposure (PFE)

$$\text{Multiplier} \times \text{Add-On}$$

- PFE represents a potential increase in counterparty credit exposure in the future
- Calculated for 5 different asset classes: credit, commodities, equity, foreign exchange, and interest rate
- Accounts for over-collateralisation and negative mark-to-market values
- Reduces add-on in these cases
- ¹ $\text{Multiplier} = \text{MIN}\{1; \text{Floor} + (1 - \text{Floor}) \times \exp((V - C) / (2 \times (1 - \text{Floor}) \times [\text{Add-on}]^{\text{aggregate}}))\}$
- Depends on volatility of the underlying

¹ The next page will provide a focus on the calculation of Potential Future Exposure multiplier

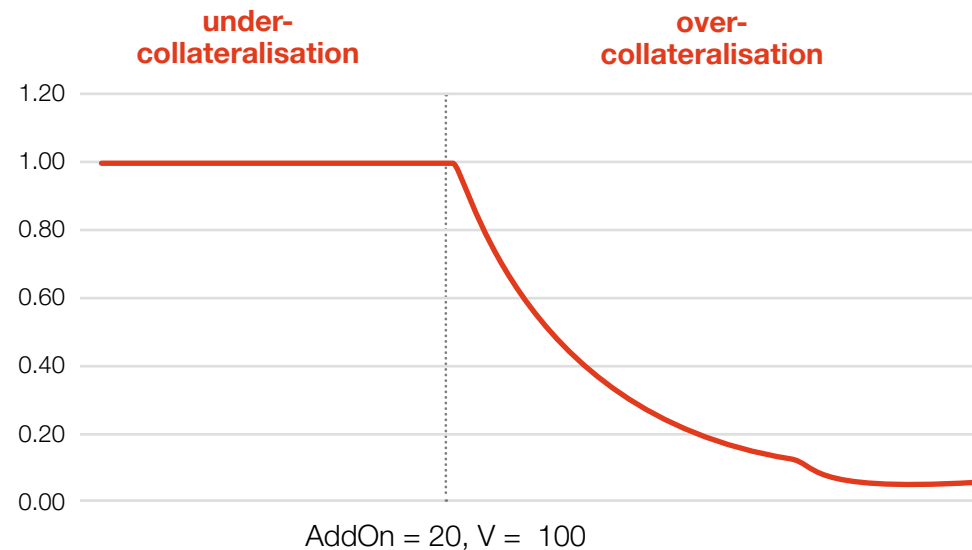
Calculation of Potential Future Exposure (PFE) multiplier

Potential Future Exposure (PFE)

Multiplier \times Add-On

- PFE represents a potential increase in counterparty credit exposure in the future
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- Accounts for over-collateralisation and negative mark-to-market values
- Reduces add-on in these cases
- $\text{Multiplier} = \text{MIN}\{1; \text{Floor} + (1 - \text{Floor}) \times \exp\left(\frac{V - C}{2 \times (1 - \text{Floor}) \times \text{AddOn}^{\text{aggregate}}}\right)\}$
- Depends on volatility of the underlying

$$\text{Multiplier} = \text{MIN} \left\{ 1; \text{Floor} + (1 - \text{Floor}) \times \exp \left(\frac{V - C}{2 \times (1 - \text{Floor}) \times \text{AddOn}^{\text{aggregate}}} \right) \right\}$$



- Multiplier reduces PFE in case of over-collateralisation (excess collateral, $C > V$) and negative market values ($V < 0$).
- The higher the over-collateralisation the lower the multiplier.
- If there is no over-collateralisation the multiplier is 1.
- Floor of 5%, such that the PFE > 0

Derivation of the add-on

Add-On corresponds to the amount of potential change in the current replacement cost within one year or during margin period of risk.

Assignment to Asset class and Hedging set	
Determination of Supervisory Duration	A supervisory duration factor is applied to adjust position-level notional (converted to domestic currency) depending on the maturity of the contract
Maturity Factor	A maturity factor is applied to reflect the length of exposure period over which the defaulted portfolio is exposed to changes in value
Net Effective Notional under Variance - Covariance Sum	The net effective notional for each bucket k is calculated as the sum of the adjusted notionals for each trade i in the bucket, multiplied by the supervisory delta factor to reflect directionality
Supervisory Factor	The netting-set level net effective notionals are multiplied by 0.5% to obtain the Add-On
Aggregation of Asset classes and Hedging sets	The Add-On for a portfolio is the sum of the Add-Ons for each hedging set in the portfolio



$$D_k = \sum_{i \in \text{bucket } k} \text{Notional}_i \times SD_i \times \frac{3}{2} \sqrt{\frac{\text{MPOR}}{1Y}} \times \delta_i$$



$$\text{AddOn}_{\text{Aggregate}} = \sum_j \text{AddOn}_j$$

Overview of the hedging set concept


- BCBS incorporated the effects and impacts of hedging mechanisms in the development of SA-CCR requirements
- The methodology for calculating the add-on's for each asset class hinges on the key concept of a supervisory "hedging set"
- The methodologies for "building" hedging sets according to SA-CCR are summarised in the table below

ASSET CLASS	HEDGING SET	OFFSET
Interest Rate	Given Maturity Buckets (MB) per Currency 1. [MB < 1 year] 2. [1 year ≤ MB ≤ 5 years] 3. [MB > 5 years]	<ul style="list-style-type: none"> • Full within same MB • Partially across different MBs
Foreign Exchange	Currency pair	<ul style="list-style-type: none"> • Full
Equity	Entity	<ul style="list-style-type: none"> • Full, if same Entity • Partially across different Entities
Credit	Entity	<ul style="list-style-type: none"> • Full, if same Entity • Partially across different Entities
Commodity	Categories of commodity derivatives (Energy, Metal, Agricultural and Other)	<ul style="list-style-type: none"> • Full, if same commodity type • Partially across commodity types



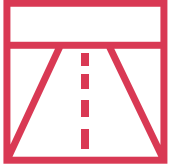
Consequence

The add-on will vary based on the number of hedging sets that are available within an asset class.



Fundamental Review of the Trading Book / Credit Valuation Adjustment

Key considerations when implementing FRTB/CVA



Infrastructure and growth plans dictate IMA versus SA election

Electing IMA can be costly and costs depends on trading desk.

For larger/growing flow businesses with liquid underlying products, investing in infrastructure to get IMA approval is recommended.

For smaller desks and/or less liquid and complex desks, IMA approval is too costly.



Systems/operational overhaul may be more optimal

FRTB is significantly more complex in calculations, governance and data needs, especially for IMA trading and CVA-SA.

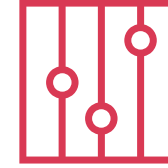
Depending on current state and scope of infrastructure, it may be more optimal to overhaul operating model of current risk/modeling/PnL infrastructure and process for long term sustainability.



IMA risk factor governance is a significant hurdle

Getting and maintaining IMA approval requires careful selection of risk factors that has appropriate depth to explain PnL in PLA/ backtesting and also has sufficient market observable price discovery per FRTB prescription (RFET).

Governance around market data will require upgrades to related processes and potential streamlining of front-to-back market data.



CVA-SA suited for sophisticated CVA models and hedging

CVA-SA allows for more capital efficiency if the bank can demonstrate proper governance around CVA trading desk set up and models/calculations on par with industry standard.

If bank has material CVA hedging program, investing in upgrading infrastructure and governance to utilize CVA-SA is desirable.



Reoptimization of banking vs trading designation

FRTB requires reclassification of banking and trading book based on highly prescriptive product-based designations, which can lead to significant added governance.

This change may require re-optimization of strategy and hedges, as needed.

Overcoming FRTB/CVA implementation challenges



Common issues achieving FRTB/CVA requirements

- For IMA, increased **operational complexity** with multiple data sources e.g. improve RFET eligibility, including tracking internal trade quotes.
- For SA, **harmonizing sensitivity calculations** across all systems/ business units and conforming to BCBS prescribed risk buckets.

- **Inconsistent and redundant data infrastructure** across market risk, credit risk, BU Risk and PnL controller groups.
- **Computational needs**, e.g. PLA full revaluation enhancements.
- **Increased data volume** demand.

- New PLA test requires **significant governance** and front office pricing models to synchronize with back office risk models.
- Products with pricing gaps during **stress periods** are problematic.

- FRTB implementation will **compete for same resources** at same time as LIBOR transition, creating significant overload and delivery risks during 2021-23.
- For new interest rates risk factors associated with LIBOR transition, there may not be **sufficient history of market data**.



Approach to addressing these issues

- **Enhance and streamline data governance** across front-office and risk systems.
- Create a **standardized nomenclature** across all reference products.
- **Normalize database layers** to enable cloud computing and add elasticity.

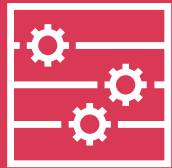
- Ensure that risk **systems are streamlined/updated** and are consumable by downstream models (e.g., Market/Credit/BU Risk, PnL controller).
- Implement **development framework** to accelerate upgrade process.
- Reassess depth and timeliness of **business processes and governance**.

- **Gap analysis** for PLA tests for key products/desks/models.
- Improve **front to back governance processes**, e.g create process to monitor cliff effects if desk become IMA ineligible during stress period.

- **Anticipate overload and delivery risks** and dedicate resources to simultaneously implement FRTB and LIBOR transition.
- **Develop data** as needed for new interest rate risk factors per FRTB requirements



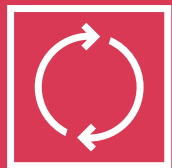
Data requirements



Technology and Operational processes



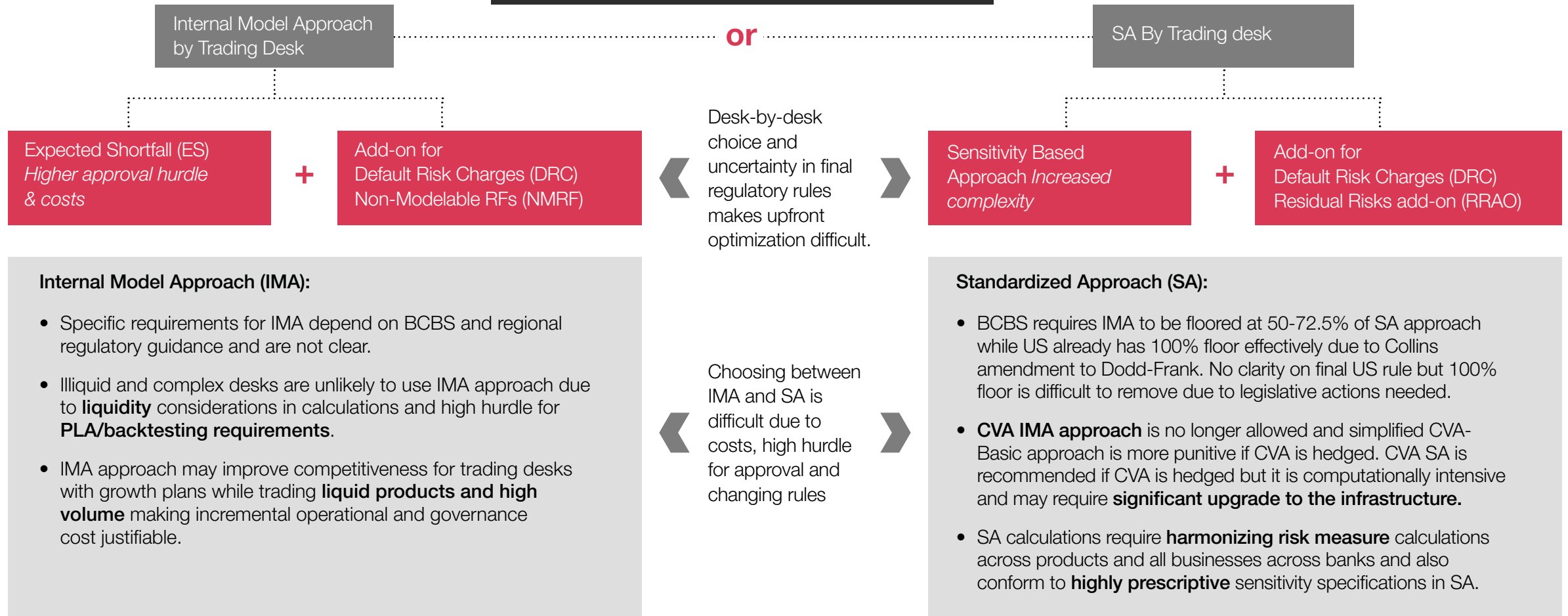
Model Documentation and Validation



Overlap with LIBOR transition

FRTB permits a choice between SA and IMA

FRTB - Market Risk and CVA



Potential impacts of FRTB/CVA

MARKET RISK

	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
IMA: Replace VaR and SVaR with ES	...	<ul style="list-style-type: none"> Double counting in current RWA calculations (VaR + Stressed VaR) is removed by using single Expected Shortfall calculation The size of ES could be higher or lower compared to VaR 	<ul style="list-style-type: none"> For 100MM S&P, 99% 10d VaR+SVaR is (21mm+26mm=47mm) but 97.5% ES is 24mm (i.e. half) It is possible however that ES for some portfolios could be higher than VaR+SVaR if the tail risk (extreme loss scenario) is huge
Switch to SA (IMA is costly)	...	<ul style="list-style-type: none"> IMA approval is a high hurdle and is reassessed on monthly basis Sensitivity based SA improve alignment of economic hedging in regulatory capital requirements 	<ul style="list-style-type: none"> Structured desk may be difficult to get approved for IMA and illiquid desk IMA may be too high compared to SA SA RWA can be less punitive if desk hedges based on sensitivities
IMA: complex models	↗	<ul style="list-style-type: none"> Untested risk measures (e.g., ES, sensitivity correlation matrix) Intraday reporting and limit management is required 	<ul style="list-style-type: none"> VaR is used by banks for 25yr+ and is well understood. New FRTB risk measures are theoretical and may behave unexpectedly with market/portfolio shifts
IMA: Increase in liquidity horizon	↗	<ul style="list-style-type: none"> Current product-agnostic 10d liquidity horizon is replaced by product-specific FRTB liquidity horizons of 10d to 120d. Impact depends on business mix 	<ul style="list-style-type: none"> HY portfolio hedged with SPX put hedges will receive significantly less hedging benefit due to liquidity mismatch
CVA double count	↗	<ul style="list-style-type: none"> Banks with IMM CVA approval currently are required to switch to more conservative SA-CVA (standard or basic) approach causing a potential double count with stressed counterparty losses in CCAR 	<ul style="list-style-type: none"> BCBS has already shown some flexibility on multiplier scalar given significant increase by reducing multiplier from 1.25 to 1 for SA and from 1 to 0.65 for BA-CVA.
SA CVA: Exposure hedges benefit	↘	<ul style="list-style-type: none"> SA-CVA allows near-full hedging benefit for proxy credit spread hedge as well as underlying exposure hedges 	<ul style="list-style-type: none"> ~90% of CVA at most banks is driven by long-dated interest rates swaps; allowing underlying rates hedges in SA-CVA will align RWA with economic hedging on CVA desk
IMA: Model validation more difficult	↗	<ul style="list-style-type: none"> In addition to VaR backtesting currently required, FRTB requires P&L Attribution (PLA) testing with quantitative hurdles 	<ul style="list-style-type: none"> For less liquid and more exotic desks, it may be unrealistic to maintain IMA approval given strict PLA test requirement on monthly basis as model often deviate from actual P&L significantly

Considerations for selecting an approach to CVA

	SIMPLE CVA	BA-CVA	SA-CVA (BASEL IV)
Key characteristics	Not applicable for large banks (uses 8% of CCR RWA)	Simple (Exposure based; similar to Basel III SA calculations)	Complex (uses model sensitivities, excludes default)
Regulatory Approval	Eligibility criteria <100Bn OTC notional	Not Required	Required (model validation, CVA desk set up regulations, standardized risk factors)
Hedge benefit	No Hedge benefit	Partial (Allows partial credit spread hedge offset for CDS but no underlying exposure hedge benefits)	Significant (Allows near-full hedge benefit for credit AND exposure hedges (e.g. IR))
Election considerations	No incremental operational cost (simply double CCR capital charge)	Appropriate if: Model/governance approval is a challenge Using CCR calculation for CVA is cost effective CVA underlying exposure is not materially hedged	Appropriate if: CVA is well-hedged as BAU practice and models/governance meet regulatory expectations (CVA models need to be robust and should produce (linear-only) FRTB risk sensitivities)

CVA Stressed Capital Buffer (SCB) double counting: Banks are required to shift from IMA to new SA calculations effectively increasing RWA by 100% of SA. Inclusion of CVA risks in SA RWA (ratio denominator), as well as CCAR SCB (ratio numerator), double counts CVA through SCB.



Operational Risk

Key considerations when implementing Operational Risk in Basel IV



Amplification of operational risk losses

There is considerable uncertainty around implementation of the operational risk framework into the US rules.

Operational risk RWA under the SA may be greater than the current AMA due to Internal Loss multiplier; The impact of operational risk losses on capital may be amplified due to capital requirements driven by the SCB through CCAR operational risk losses.



Keeping up with operational loss data requirements

Banks should have robust processes for appropriately capturing operational risk loss data, including loss dates, accounting dates and recovery (legal and insurance) data.

High-quality operational loss data must extend back 10 years



System enhancements to capture and log operational events

Technology systems should be comprehensive and linked to the General Ledger to facilitate the capture of operational loss data, including the required operational loss data elements.

Banks need to have independent assurance that operational loss tracking systems, processes, and controls provide for high-quality data.

Overcoming Operational Risk implementation challenges



Common issues achieving operational risk requirements

- Banks must continue to implement **robust processes** for appropriately **capturing operational risk loss data**, including loss dates, accounting dates and recovery (legal and insurance) data.
- Banks may not have a full ten years of **high-quality operational loss data**.

- Many banks have developed **homegrown systems for capturing operational loss data**. These systems may need to be enhanced to capture all of the required operational loss data elements.
- Banks need to continue to have **independent assurance** that operational loss tracking systems, processes and controls provide for high-quality data.

- **Required capital under Basel IV may increase** due to potential amplification of operational losses between Basel IV and CCAR/ DFAST.



Approach to addressing these issues

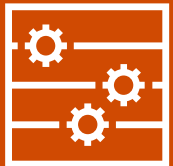
- **Refine suite** of existing operational risk capital policies and procedures
- Develop data governance model for operational loss data
- **Perform lookback reviews** to review and cleanse historical operational loss data
- **Request regulatory approval** for using five years of operational loss data, if needed

- **Develop capabilities within existing operational loss systems** to capture required data elements
- **Include annual assessments** of operational risk capital modeling within the scope of internal audit plans, model validation plans and third-party assessments

- **Clearly articulate operational risk RWA calculation methodologies** and assumptions for Basel IV and CCAR/ DFAST in Basel Pillar III disclosures, 10-Qs, 10-Ks and CCAR/DFAST annual stress tests
- **Benchmark operational risk RWA against peer institutions** to confirm efficacy of operational loss modeling



Data requirements



Technology and Operational processes



Capital Requirements

Calculating operational risk capital under Basel III

Advance Approach banks must calculate regulatory capital using both the SA and the Advanced Approach. The lower of the resulting regulatory capital CET1 ratios is then used for determining Basel III regulatory capital.

Basel III Standardized Approach

$$\text{CET}_1 \text{ ratio} = \left(\frac{\text{CET}_1 \text{ capital}}{(\text{credit risk RWA} + \text{market risk RWA})} \right) \times 100$$

Basel III Advanced Approach

$$\text{CET}_1 \text{ ratio} = \left(\frac{\text{CET}_1 \text{ capital}}{(\text{credit risk RWA} + \text{market risk RWA} + \text{operational risk RWA})} \right) \times 100$$

- Operational risk RWA is not included in the denominator of the CET1 ratio.
- Banks use the SA when performing annual CCAR stress tests. Stressed operational risk losses under different Fed scenarios are incorporated into PPNR. Current period operational losses flow through retained earnings into CET1 capital.

- Operational risk RWA is included in the denominator of the CET1 ratio.
- Operational risk RWA is calculated using the AMA, which is a combination of historical internal and external operational loss data, BECIFs and forward-looking scenario analysis of low probability/high severity operational loss events. Each bank has generous latitude in using the four AMA components to model operational risk RWA.

Under the Collins Amendment, banks subject to annual CCAR tests must hold minimum capital via the SCB equal to the peak-to-trough decrease in the CET1 ratio under the Fed's severely adverse scenario, subject to a floor of 2.5% with an unbound maximum. This effectively makes CCAR (not Basel III) the mechanism for determining required operational risk capital for these banks.



Calculating operational risk capital under Basel IV

Basel IV introduces a new SA for determining operational risk RWA

Basel IV
Standardized
Approach

$$\text{CET}_1 \text{ ratio} = \left(\frac{\text{CET}_1 \text{ capital}}{(\text{credit risk RWA} + \text{market risk RWA} + \text{operational risk RWA})} \right) \times 100$$

- Operational risk RWA is included in the denominator of the CET1 ratio.
- Banks use the SA when performing annual CCAR stress tests. Stressed operational risk losses under different Fed scenarios are incorporated into PPNR. Current period operational losses flow through retained earnings into CET1 capital.

Calculation of
Operational
Risk RWA

Calculation of Operational Risk RWA

- 1

Calculate Interest, Leases and Dividend Component (ILDC)
DLDC = min (Abs (interest income - interest expense), 2.25% x interest earning assets) + dividend income
- 2

Calculate Services Component (SC)
SC = max (other operating income, other opening expense) + max (fee income, fee expense)
- 3

Calculate Financial Component (FC)
FC = Abs (Net P & L trading book) + Abs (Net P & L banking book)
- 4

Calculate BI
BI = ILDC + SC + FC
- 5

Calculate BI Component (BIC)
BIC = BI x BI marginal coefficient (12%, 15%, 18%)
- 6

Calculate Loss Component (LC)
LC = 15 x average annual operational risk losses over the previous 10 years
- 7

Calculate Internal Loss Multiplier (ILM)
ILM = ln (exp(1) - + (LC/BIC)^{0.8})
- 8

Calculate Operational Risk RWA
RWA = 12.5 (BIC x ILM)

Average annual operational risk losses over the preceding 10 years and other financial statement data are used to derive operational risk RWA. The impact of the SCB under the Collins Amendment is expected to remain the same under Basel IV.



Calculating operational risk capital under Basel IV

Under the new SA, operational risk losses may be amplified between Basel IV operational risk RWA and CCAR PPNR projections.

Illustrative Example

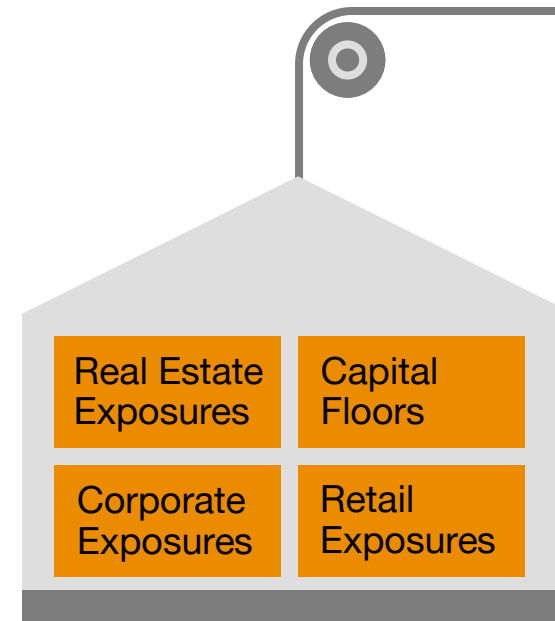
	Year 0	Stress period CCAR	
		Year 1	Year 2
Credit Risk exposure	2,500	2,500	2,500
Allowance for Expected Credit Losses	-50	-55	-60
Increase Allowance due to stress losses		-5	-5
Exposure at Default for RWA	2,450	2,440	2,435
RWA (50% RW)	1,225	1,220	1,218
Operational Risk RWA under Basel III SA	-	-	-
Operational Risk RWA under Basel IV SA	200	200	200
Total RWA	1,425	1,420	1,418
CET 1 Capital	150	150	125
- Stress losses Credit Risk		-5	-5
- Stress losses Operational Risk		-20	-20
CET 1 Capital after stress losses	150	125	100
CET1 Ratio (without Operational Risk RWA)	12.24%	10.25%	8.21%
CET1 Ratio (with Operational Risk RWA)	10.53%	8.80%	7.05%
Difference	-1.72%	-1.44%	-1.16%

- Basel IV introduces operational risk RWA in 2023, and a **concern exists that operational risk RWA increases capital requirements already captured in the SCB**
- This potentially **amplifies operational risk losses** captured CET1 capital ratio through PPNR that flows through retained earnings and reflected in CET1 capital (the numerator) and operational risk RWA (the denominator))
- There is no corresponding balance sheet mechanism for reducing CCAR stressed operational risk losses.

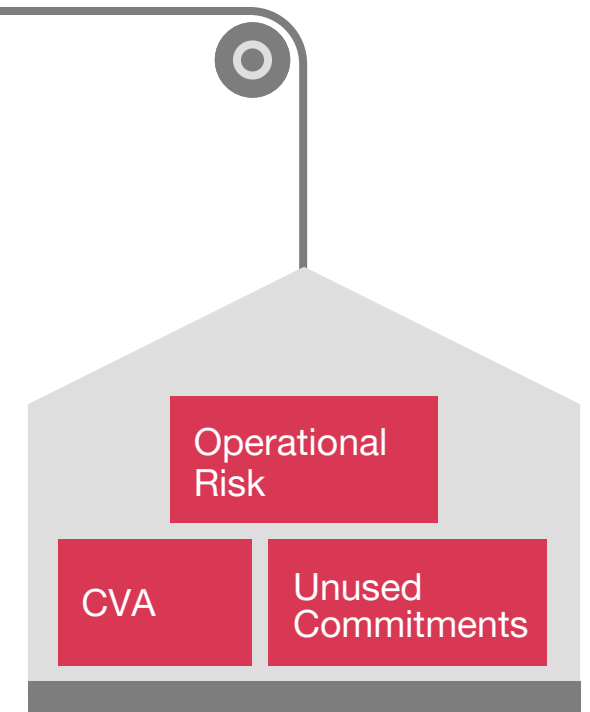
Regulators can pull many levers to keep Basel IV capital neutral

These are the most impactful:

- ⊕ **Real Estate Exposures**
Maintain BCBS proposed risk weights for loan-to-value bands
- ⊕ **Corporate Exposures**
Align the definition of investment grade with current industry practices and internal processes for evaluating and measuring risk
- ⊕ **Retail Exposures**
Maintain BCBS proposed risk weights for retail and credit card balances
- ⊖ **Capital Floors**
Align Collins Amendment with proposed capital floors to effectively keep capital neutral
- ⊕ **CVA**
Address potential double count of market risk losses between Standardized Approach (SA) and CCAR by further reducing the multiplier in the SA
- ⊖ **Unused Commitments**
Decrease the proposed Credit Conversion Factor (CCF) of 10% or maintain the current 0% CCF for unused unconditionally cancelable commitments
- ⊕ **Operational Risk**
Address potential double count of operational risk RWA in the SA and stress losses in CCAR through the SCB



What reduces capital










What increases capital

Likelihood of Incorporation

⊕ High ⊕ Medium ⊖ Low

Details on most impactful capital neutrality levers in Basel IV

	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
CREDIT RISK		<ul style="list-style-type: none"> Introduction of risk weights scaled based on LTV band for both residential and commercial mortgages 	<ul style="list-style-type: none"> Resi mortgage with 80% LTV proposed to receive a Risk Weight (RW) of 40%, down from 50% and can fall to 20% if LTV > 50% CRE with LTV ≤ 60% to decrease from 100% to 60%
		<ul style="list-style-type: none"> Introduction of reduced risk weight for investment grade corporate exposures with public securities on an exchange. Investment grade cannot reference external credit ratings and will need to be defined based the borrower's risk profile. 	<ul style="list-style-type: none"> Investment grade corporate (including insurance companies) exposures meeting the new definition, which could be principles-based or prescribed by quantitative criteria, can be risk weighted at 65% instead of 100%
		<ul style="list-style-type: none"> Introduction of the retail exposure class in the Standardized Approach will reduce risk weights for retail and credit card balances 	<ul style="list-style-type: none"> Certain retail products <\$1M and not material to the portfolio will be assigned a 75% RW instead of 100% Balances for customers that repaid their credit balance in full every month over the past 12 months are assigned 45% instead of 100%
		<ul style="list-style-type: none"> The Credit Conversion Factors for certain off balance sheet commitments are adjusted, generally up 	<ul style="list-style-type: none"> The CCF for Unused Credit Card lines of credit will increase from 0% to 10%, and unused commitments with a maturity < 1 year will increase from 20% to 40%
MARKET RISK		<ul style="list-style-type: none"> Banks with IMM CVA approval currently are required to switch to more conservative SA-CVA (standard or basic) approach causing a potential double count with stressed counterparty losses in CCAR 	<ul style="list-style-type: none"> BCBS has already shown some flexibility on multiplier scaler given significant increase by reducing multiplier from 1.25 to 1 for SA and from 1 to 0.65 for BA-CVA.
OTHER AREAS		<ul style="list-style-type: none"> Introduction of new Operational Risk RWA requirements will be calculated based on a financial statement based proxy and an Internal Loss Multiplier, which is a scaling factor that is based on a bank's average historical losses 	<ul style="list-style-type: none"> Capital requirements for Operational Risk are currently considered through CCAR stress losses and are not in the SA. Introducing Operational Risk RWA in the SA creates another capital requirement for Operational Risk potentially double-counts risk
		<ul style="list-style-type: none"> A capital floor as a percentage of the Standardized Approach for Advanced Approach banks is introduced 	<ul style="list-style-type: none"> The output floor will be phased-in between 2023 (50%) and 2028 (72.5%), meaning that for certain banks the Advanced Approach may become the higher capital requirement

Other increases and decreases to RWA from Basel IV

(1 of 2)






MARKET RISK

	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
IMA: Replace VaR and SVaR with ES	↘	<ul style="list-style-type: none"> Double counting in current RWA calculations (VaR + Stressed VaR) is removed by using single Expected Shortfall calculation 	<ul style="list-style-type: none"> For 100MM S&P, 99% 10d VaR+SVaR is (21mm+26mm=47mm) but 97.5% ES is 24mm (i.e. half)
Switch to SA (IMA is costly)	...	<ul style="list-style-type: none"> MA approval is a high hurdle and is reassessed on monthly basis Sensitivity based SA improve alignment of economic hedging in regulatory capital requirements 	<ul style="list-style-type: none"> Structured desk may be difficult to get approved for IMA and illiquid desk IMA may be too high compared to SA SA RWA can be less punitive if desk hedges based on sensitivities
Banking vs Trading overhaul	↗	<ul style="list-style-type: none"> Banking vs Trading designation will be prescriptive based on underlying instrument and is more conservative 	<ul style="list-style-type: none"> Well-optimized banking book setup and hedges will need to be realigned in a less capital efficient manner per FRTB prescription
IMA: complex models	↗	<ul style="list-style-type: none"> Untested risk measures (e.g., ES, sensitivity correlation matrix) Intraday reporting and limit management is required 	<ul style="list-style-type: none"> VaR is used by banks for 25yr+ and is well understood. New FRTB risk measures are theoretical and may behave unexpectedly with market/portfolio shifts
IMA: Increase in liquidity horizon	...	<ul style="list-style-type: none"> Current product-agnostic 10d liquidity horizon is replaced by product-specific FRTB liquidity horizons of 10d to 120d. Impact depends on business mix 	<ul style="list-style-type: none"> HY portfolio hedged with SPX put hedges will receive significantly less hedging benefit due to liquidity mismatch
SA CVA: Exposure hedges benefit	↘	<ul style="list-style-type: none"> SA-CVA allows near-full hedging benefit for proxy credit spread hedge as well as underlying exposure hedges 	<ul style="list-style-type: none"> ~90% of CVA at most banks is driven by long-dated interest rates swaps; allowing underlying rates hedges in SA-CVA will align RWA with economic hedging on CVA desk
IMA: Model validation more difficult	↗	<ul style="list-style-type: none"> In addition to VaR backtesting currently required, FRTB requires P&L Attribution (PLA) testing with quantitative hurdles 	<ul style="list-style-type: none"> For less liquid and more exotic desks, it may be unrealistic to maintain IMA approval given strict PLA test requirement on monthly basis as model often deviate from actual P&L significantly

Other increases and decreases to RWA from Basel IV

(2 of 2)

CREDIT RISK

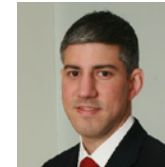
	Potential RWA impact	DESCRIPTION	EXAMPLES AND CONSIDERATIONS
Banks		<ul style="list-style-type: none"> RW for long-term bank exposures will increase since Basel IV introduces four grades of RW% (30%, 40%, 75% and 150%) based on counterparty's compliance with certain regulatory requirements and the bank's CET 1 Ratio and Leverage Ratio 	<ul style="list-style-type: none"> LT exposure to Bank A will increase from 20% to 40% LT exposure to Bank B will increase from 20% to 30% if CET 1 >14% and Tier 1 Leverage Ratio >5%
Financial Institutions		<ul style="list-style-type: none"> RWA for Certain financial institutions will decrease because they may now potentially be treated as bank exposures 	<ul style="list-style-type: none"> Short term exposures exposures to "grade A" Asset Managers will decrease from 100% to 20% Long Term exposures to "grade B" Asset Managers will decrease from 100% to 75%
Financial Collateral		<ul style="list-style-type: none"> Haircuts applied to non-sovereign financial collateral for credit risk mitigation increase in certain cases 	<ul style="list-style-type: none"> The haircut for equities listed on a main index increases from 15% to 20% in Repo Style transactions
Securitizations		<ul style="list-style-type: none"> Simple, Transparent and Comparable (STC) securitizations are introduced The RW% floor is decreased from 20% to 10% (STC) and 15% (Non-STC) 	<ul style="list-style-type: none"> STC securitizations will see RWA go down due to lower floors Non-STC will see increased correlation parameter from 0.5 to 1, increasing the RWA in the Simplified Supervisory Formula Approach calculation
Project Financing		<ul style="list-style-type: none"> The introduction of an exposure class for project financing increases RWA for pre-operational projects High Quality operational projects see RWA decrease 	<ul style="list-style-type: none"> The RW for Pre-operational projects (e.g. bridge construction) will increase from 100% to 130% The RW for High quality operational projects decreases to 80% from 100%

Contacts

**Charles Von Althann**

Partner, Basel IV Campaign Lead
Credit Risk-SA, and IRB Lead
(202) 674-8548

charles.vonalthann@pwc.com

**Alejandro Johnston**

Partner, Financial Services Risk and
Regulatory Practice
Capital Floors and Capital Planning Lead
(917) 715-6594

alejandro.johnston@pwc.com

**Justin Keane**

Partner, Financial Services Risk and
Regulatory Practice
FRTB/CVA Lead
(917) 514-6286

justin.keane@pwc.com

**Steve Pearson**

Managing Director, Financial Services Risk
and Regulatory Practice
SA-CCR Lead
(908) 619-7216

steve.pearson@pwc.com

**Dietmar Serbee**

Partner, Risk Advisory Leader
Operational Risk Lead
(646) 471-7270

dietmar.d.serbee@pwc.com

**Tojo Johnson**

Partner, Financial Services Data and
Analytics Practice
Data Lead
(925) 596-0189

tojo.johnson@pwc.com