THE NEW "BASEL IV" WHAT CHANGED?

Standardised Approach for Credit Risk

The revision by BCBS seeks to improve the granularity and risk sensitivity of the standardised approach. In summary:

Improvements

- **Exposure to Banks** – introduction to the Standardised Credit Risk Assessment Approach (SCRA)
- **Exposure to Corporates** – introduction of risk weights for Small and Medium-sized Enterprise (SME) and investment grade corporates
- **Residential Real Estate Exposure** - risk weights will vary based on the LTV ratio of the mortgage to replace a flat weighting of 35%
- **Retail Exposure** – a more granular table have been introduce to distinguish different type of regulatory retail exposures
- **Exposure to Commercial Real Estate** – introduction of the LTV ratio approach to replace a flat weighting of 100%
- **Exposure to Subordinated Debts and Equity** – existing flat risk weight of 100% or 250% will be replaced by 150% subordinated debt and capital other than equities, 100% for equity holdings made pursuant to national legislated programmes, 400% to speculative unlisted equity exposures and 250% for all other equity exposures
- **Exposure to Off-Balance Sheet Items** – A 100% CCF will now apply for commitment referring to any contractual arrangement that has been offered by the bank and accepted by the client to extend credit, purchase assets or issue credit substitutes. This is compared to the 20% and 50% set out in BSBC 128 for one year and more than one year maturity respectively. A 10% CCF will replace the 0% CCF for commitments that are unconditionally cancellable at any time by the bank without prior notice, or that effectively provide for automatic cancellation due to deterioration in a borrower's creditworthiness.

New

- **Exposure to Covered Bonds** – new risk weights for rated and unrated exposure
- **Exposure to Project Finance, Object and Commodities Finance** - risk weights for rated exposures will follow the general corporates and three subcategories of specialised lending is introduced to improve granularity

Exposure to Banks

Rating approach is permitted:

- For exposures rated A+ to A- and BBB to BBB- is adjusted from 50% to 30% and 100% to 50% respectively.
- Risk weights for unrated exposures will be based on the Standardised Credit Risk Assessment Approach (SCRA) below.

External Rating	AAA to AA-	A+ to A-	BBB+ to BBB-	Bb+ to B-	Below B-
Risk weight	20%	30%	50%	100%	150%
Risk weight (Short Term exposure)	20%	20%	20%	50%	150%

Rating approach is not permitted and unrated exposure where rating approach is permitted:

- The existing flat risk weight of 50% (excluding short term exposure) and 20% (short term exposure) will be replaced by three different risk weights according to their grade.
- For SCRA grade A, exposures may receive a risk weight of 30%, provided that the counterparty bank has a CET1 ratio which meets or exceeds 14% and a Tier 1 leverage ratio which meets or exceeds 5%.

SCRA	A	B	C
Risk weight	40%	75%	150%
Risk weight (Short Tem exposure)	20%	50%	150%

Exposure to Corporate

Rating approach is permitted:

- A more granular approach was introduced to split the risk weights for credit ratings BBB+ to BB- at 100% to 75% for BBB+ to BBB- and 100% to BB+ to BB-
- The risk weighted treatment for unrated exposures will be determined using the SCRA grade.

External rating	AAA to AA-	A+ to A-	BBB+ to BBB-	Bb+ to B-	Below B-	Unrated
Risk weight	20%	50%	75%	100%	150%	100%

Rating approach is not permitted and unrated exposure where rating approach is permitted:

- For general corporates, a 65% risk weight to exposure to "investment grade" corporates, compared to a flat risk weight of 100% previously, can be applied if it meets the definition. An "investment grade" corporate is defined by the committee as a corporate entity that has adequate capacity to meet its financial commitments in a timely manner and its ability to do so is assessed to be robust against adverse changes in the economic cycle and business conditions.

SCRA Grade	Investment Grade	Others
Non-SME	65%	100%
SME	85%	

Retail Exposure

- Risk weights for retail exposures was based on separate assessments of PD and LGD as inputs to the risk-weight functions. A more granular table have been introduce to distinguish different type of regulatory retail exposures

	Regulatory retail (non-revolving)	Regulatory retail (revolving) Transactors	Regulatory retail (revolving) Revolvers	Other Retail
Risk weight	75%	45%	75%	100%

Residential Read Estate Exposure

- A more risk sensitive approach has been taken. Instead of a single risk weight of 35%, risk weights will vary based on the LTV ratio of the mortgage. Depending on the type of residential real estate, whether repayments are materially dependent on cash flows generated by the property, financial institution can select the Whole Loan Approach or Loan-Splitting Approach with different risk weights.

LTV bands	<50%	50% - 60%	60% - 70%	70% - 80%	80% - 90%	90% - 100%	>100%	Criteria not met
General RRE								
Whole loan approach RW	20%	25%	30%	30%	40%	50%	70%	RW of counterparty
Loan Splitting approach	20%	RW of counterparty						
Income producing residential real estate (IPRRE)								
Whole loan approach RW	30%	35%	45%	45%	60%	75%	105%	150%

Commercial Real Estate Exposure

- A more risk sensitive approach will replace the existing flat risk weight of 100%.

General RRE			
Whole loan approach	LTV <= 60%	LTV > 60%	Criteria not met
	Min (60%, RW of counterparty)	RW of counterparty	
Loan Splitting approach	LTV <= 55%	LTV > 50%	Criteria not met
	20%	RW of counterparty	

Income producing residential real estate (IPRRE)				
Whole loan approach	LTV <= 60%	60% < LTV <= 80%	LTV > 80%	Criteria not met
	70%	90%	110%	150%
Land Acquisition, Development and Construction (ADC) exposures				
Loan to Company/SPV	150%			
Residential ADC Loan	100%			

Exposure to Project Finance, Object and Commodities Finance *(New)*

As defined by the committee, specialised lending exposure is:

- not related to real estate and is within the definitions of object finance, project finance or commodities finance
- typically to an entity that was created specifically to finance and/or operate physical assets and has few or no other material assets or activities. Hence, they have little or no independent capacity to repay the obligation, apart from the income that it receives from the asset(s) being financed. The primary source of repayment derives from income generated by the assets.
- The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates.

Issue-specific ratings available and permitted

External rating	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to BB-	Below B-	Unrated
Risk weight	20%	50%	75%	100%	150%	100%

Rating approach is not permitted and unrated exposure where rating approach is permitted:

Exposure excluding real estate	Project Finance	Object and Commodity Finance
Rating not available or not permitted	130% Pre-operational phase 100% Operation Phase 80% operational phase (high quality)	100%

Internal Rating-Based Approach for Credit Risk

PD floors were recalibrated and LGDs and EAD floors were introduced.

1. Recalibration of PD floors for the F-IRB and A-IRB approaches

2. Introduction of LGDs and EAD floors for the A-IRB approach for corporate and retail exposures

	Probability of Default Before (BCBS 128)	Probability of Default After	Loss-given-default (LGD) Unsecured	Loss-given-default (LGD) Secured	Exposure at Default (EAD)
Corporate	For corporate exposures, the PD is the greater of the one-year PD associated with the internal borrower grade to which that exposure is assigned, or 0.03%.	5bp	25%	Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical	EAD subject to a floor that is the sum of (i) the on-balance sheet exposures and; (ii) 50% of the off-balance sheet exposure using the applicable Credit Conversion Factor (CCF) in the standardised approach
Retail Classes: Mortgages QRRE Transactors QRRE Revolvers Others	PD for retail exposures is the greater of the one year PD associated with the internal borrower grade to which the pool of retail exposures is assigned or 0.03%.	5bp 5bp 10bp 5bp	N/A 50% 50% 30%	5% N/A N/A Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical	

3. Adjustments to LGD was made for the F-IRB approach

Type of Collateral	LGDs (Before) BCBS 128	LGDs (After)
Eligible financial Collateral	0%	0%
Eligible Receivables	35%	20%
Eligible Residential Real estate/commercial real estate	35%	20%
Other eligible physical collateral	40%	25%
Ineligible collateral	N/A	N/A

- LGD parameter for unsecured exposures to non-financial corporate are adjusted from 45% to 40%.
- For exposure secured by non-financial collateral, LGD exposures are reduced and haircuts applying to collateral are increased.

In addition to the removal of the 1.06 scaling factor currently applied to risk weighted assets, the revision by BCBS also removed the internal rating based approach for some of the exposures.

Exposure	Before	After – Basel "IV"
Large and Mid-Sized Corporates (with consolidated revenue of > 500 Million)	Advanced IRB Approach, Foundation IRB Approach, Standardised Approach	Foundation IRB Approach, Standardised Approach
Banks and Other Financial Institutions	Advanced IRB Approach, Foundation IRB Approach, Standardised Approach	Foundation IRB Approach, Standardised Approach
Equities	IRB Approaches	Standardised Approach
Specialised Lending	Advanced IRB Approach, Foundation IRB Approach, Standardised Approach, Slotting *(to be reviewed)*	No change

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Market Risk

More Defined Regulatory Boundary Between Banking and Trading Book

The committee have further set our guidance to help banks with the classification of the instruments in the trading and banking book based on liquidity of instruments and the ability to value them on a daily basis. **Additional classification guidelines were introduced.**

Trading Book	Banking Book	Stringent approach for the movement of instruments between books
A instrument have to be included in the trading book if it: • is in the correlation trading portfolio • is managed on a trading desk • results to a net short credit or equity position in the banking book • results from underwriting commitments and used for the following purpose(s): • short-term resale • profiting from short-term price movements • locking in arbitrage profits • hedging risks	Instruments classified under the banking book: • Unlisted equities • Instrument designated for securitisation warehousing • Real estate holdings • Retail and SME credit • Equity investments in a fund • Derivative instruments that have the above instrument as underlying asset • Hedging instrument	• Capital benefit from re-designation is not allowed. Bank must calculate the total capital charge (across banking book and trading book) before and immediately after the switch and the difference will be imposed on the bank as a disclosed Pillar 1 capital surcharge where surcharge will be allowed to run off as the positions mature or expire subjected to agreement with the supervisor. • Approval by senior management, documented and in compliance with policies and procedures that are updated yearly. • Approval by the supervisor based on supporting documentation provided by the bank • Publicly disclosed

Capital recognition for internal transfer from the trading book to the banking book. However, clearly defined requirements for treatment of risk transfers from the banking book to the trading book were outlined by the committee:

- Banking book credit risk exposures using internal risk transfer with trading book
- Banking book interest risk exposures using internal risk transfer with trading book
- Banking book equity risk exposures using a hedge instrument purchase from the marker through its trading book

Standardised Approach for Market Risk (Revised)

Using elements from the former standardised measurement method, the Sensitivities based method builds on the elements and expand the use of delta, vega and curvature risk to factor sensitivities. The standardised approach capital charge is the sum of the sensitivities Based Method capital charge, default risk charge and residual add on.

Sensitivities Based Method

	Delta Risk	+	Vega Risk	+	Curvature Risk
Classification of instrument into risk class and risk factor	A risk measure based on sensitivities of a bank's trading book to regulatory delta risk factors		A risk measure based on sensitivities to vega risk factors to be used as inputs to a similar aggregation formula as for Delta risk		A risk measure based on two stress scenarios per risk factor involving an upward and downward shock where the worst loss is accounted in the capital charge
Step 1: Risk Factor Level	Calculate the weighted net sensitivity across all instruments to their respective risk factor k: $WS_k = RW_k S_k$				Calculate the curvature risk charge for curvature risk factor k. $CVR_k = -\min\left[\begin{array}{l}\sum_i \{V_i(x_k^{(RW(curvature)+)}) - V_i(x_k) - RW_k^{(curvature)} \cdot s_{ik}\} \\ \sum_i \{V_i(x_k^{(RW(curvature)-)}) - V_i(x_k) + RW_k^{(curvature)} \cdot s_{ik}\}\end{array}\right]$
Step 2: Bucket Level	Aggregate weighted sensitivities within each bucket $K_b = \sqrt{\sum_k WS_k^2 + \sum_k \sum_{k \neq 1} \rho_{kl} WS_k WS_l}$				Aggregate the curvature risk exposure within each bucket $K_b = \sqrt{\max\left(0, \sum_k \max(CVR_k, 0)^2 + \sum_k \sum_{k \neq l} \rho_{kl} CVR_k CVR_l \psi(CVR_k, CVR_l)\right)}$
Step 3: Risk Class Level	Aggregation of risk capital charge on risk level class: Delta (respectively Vega) $= \sqrt{\sum_b K_b^2 + \sum_b \sum_{c \neq b} \gamma_{bc} S_b S_c}$				Aggregate the curvature risk positions across bucket within each risk class: Curvature Risk $= \sqrt{\sum_b K_b^2 + \sum_b \sum_{c \neq b} \gamma_{bc} S_b S_c \psi(S_b, S_c)}$

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Default Risk Charge – Non Securitisations

A risk measure that measures the jump-to default risk of an instrument using three independent capital charge computation.

The Default Risk Charge is distinct from a Counterparty to a trade defaulting, which is capitalised under Credit Risk and not Market Risk

1. Gross JTD risk positions (Gross JTD)

- JTD (long) = max (LGD x face value + P&L, 0)
- JTD (short) = min (LGD x face value + P&L, 0)   where P&L = marked to market gain/loss = market value – face value
- JTD for all exposures of maturity less than one year and their hedges are scaled by a fraction of a year. No scaling is applied to the JTD for exposures of one year or greater.

$$WtS = \frac{\sum net\ JTD_{Long}}{\sum net\ JTD_{Long} + \sum |net\ JTD_{Short}|}$$

2. Net JTD risk positions (Net JTD)

Offsetting rules: a short exposure in an equity may offset a long exposure in a bond, but a short exposure in a bond cannot offset a long exposure in the equity.

Compute hedge benefit ratio for the long and short positions within a bucket:

3. Default risk charge (DRC) for non-securitisations

With the hedge benefit ratio and the risk weighted JTD, the default capital charge for each bucket can be calculated as:

$$DRC_b = \max\left[\left(\sum_{i \in Long} RW_i \bullet netJTD_i\right) - WtS \bullet \left(\sum_{i \in Short} RW_i \bullet |netJTD_i|\right); 0\right]$$

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Residual Add-on

A risk measure to capture residual risk that are not covered by the components of this approach

The committee have set forth criteria to determine residual risks:

- Instruments subject to vega or curvature risk capital charges in the trading book and with pay-offs that cannot be written or perfectly replicated as a finite linear combination of vanilla options with a single underlying equity price, commodity price, exchange rate, bond price, CDS price or interest rate swap
- Instruments which fall under the definition of the correlation trading portfolio (CTP), except for those instruments which are recognised in the market risk framework as eligible hedges of risks within the CTP
- Examples: Gap risk, Correlation risk, Behavioural risk

Residual Add On = Sum of gross face value of instruments with residual risks x risk weight
Where risk weight = 1% for instruments with exotic underlying and 0.1% for others

Internal Model Approach for Market Risk

The main changes for the internal model approach for FRTB are:

More stringent approval process by supervisory authority

Trading Desk Definition

- The desk must have a head trader
- Well defined and documented business strategy
- Clear risk management structure
- Proposed by banks and approved by supervisors

→ **Quantitative Study** → **Standardised or Internal Model Approach? Initial and on-going quantitative validation criteria for model approval**

1. **Internal model approval is broken down to desk-level instead of current bank-wide approval process.** Banks must also calculate the standardised capital charge for each trading desk as the calculation will serve as an indication of the fall back capital if the eligibility test for IMA failed and as a benchmark to facilitate comparison.

2. Initial and on-going quantitative validation criteria for model approval

P&L Attribution Testing	Back Testing
1. Mean unexplained daily P&L over the standard deviation of hypothetical daily P&L **(must not exceeds -10% to +10%)** 2. Ratio of variances of unexplained daily P&L and hypothetical daily P&L **(must not exceed 20%)** 3. Calculated monthly and reported prior to the end of the following month. If the desk **experiences four or more breaches** within the prior 12 months, it must be capitalised under the standardised approach	If any given desk experiences either **more than 12 exceptions** at the 99th percentile or 30 exceptions at the 97.5th percentile in the most recent 12-month period, all of its positions must be capitalised using the standardised approach

More consistent identification of material risk factors across banks

Total Market Capital Requirement

	Modellable	Non-Modellable
Risk Factors	• Definition of "real" prices • Test for continuously available prices for a sufficient set of representative transactions	• Illiquid products • Prudent stress scenario • liquidity horizon is the greater of the longest time interval between two consecutive price observations and the liquidity horizon assigned to the risk factor. • No correlation or diversification effect
Risk Measurement	**Expected Shortfall** The expected shortfall formula, computed on a daily basis based on one tailed, 97.5% confidence level. $ES = \sqrt{(ES_T(P))^2 + \sum_{j \geq 2}\left(ES_T(P,j)\sqrt{\frac{(LH_j - LH_{j-1})}{T}}\right)^2}$ Where liquidity risk is captured and defined at risk level. The expected shortfall for a liquidity horizon must Be calculated from an expected shortfall at a base liquidity horizon of 10 days with scaling applied to this base horizon result. **Introduction of Stress Capital Add On** • ES is calibrated to the **most severe 12-month period of stress** available over the observation horizon. • "indirect" approach using a reduced set of risk factors and scaled up by the ratio of the current expected shortfall using the full set of risk factors (ESF,C) to the current expected shortfall measure (ESR,C) $ES = ES_{R,S} \times \frac{ES_{F,C}}{ES_{R,C}} = IMCC(c)$ and $IMCC = p(IMCC(c)) + (1-p)(\sum_{i=1}^{R} IMCC(C_i))$ • The aggregate capital charge for modellable risk factors (IMCC) is based on the weighted average of the constrained and unconstrained expected shortfall charges.	Capitalised using a stress scenario that is calibrated to the ES calibration used for modelled risk A loss calibrated to a 97.5% confidence threshold over a period of extreme stress applies to a given risk factor Regulatory capital measure: $SES = \sqrt{\sum_{i=1}^{L} ISES_{NM,i}^2} + \sum_{j=1}^{K} SES_{NM,j}$ Where: L non-modellable idiosyncratic credit spread risk factors that can be aggregated with zero correlations K risk factors in model eligible desks that are non-modellable ISESnm,I stress scenario capital charge for idiosyncratic credit spread non-modellable risk i from the L risk factors aggregated with zero correlations SESnm,j stress scenario capital charge for non-modellable risk j

Risk Factor Category (j)	Liquidity Horizon (LHj)
1	10
2	20
3	40
4	60
5	120

Aggregated charge associated with approved desks (CA) is equal the maximum of the most recent observation and a weighted average of the previous 60 days scaled by a 1.5 multiplier factor (mc).

$$C_A = \max\{IMCC_{t-1} + SES_{t-1}; m_c \bullet IMCC_{avg} + SES_{avg}\}$$

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Default Risk Charge

-Must be measured using VaR Model where calculation has to be done weekly and based on a one-year horizon at a one tail, 99.9% confidence level.
-Include all positions subject to the market risk framework e.g. sovereign exposure, equity positions and defaulted debt positions.
-Default risk charge model capital requirement is the greater of: (a) the average of the default risk charge model measures over the previous 12 weeks. (b) the most recent default risk charge model measure.
-PDs are subject to a floor of 0.03% and market implied PDs are not acceptable.
-Impact of correlations between defaults, reflect all significant basis risk and also material non-linear impacts of options and other positions must be recognised in model

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Standardised Approach – Sensitivities Based Method

Leverage Ratio Framework

Changes made to the Leverage Ratio Framework includes refinements to the leverage ratio exposure measure and introduction of a new leverage ratio bugger for G-SIBs.

$$\text{Leverage Ratio} = \frac{\text{Tier 1 Capital}}{\text{Exposure Measure}} >= 3\%$$

\+ **Leverage Ratio Buffer**

Refinements to the Leverage Ratio Exposure Measure

The leverage ratio will restrict the accumulation of leverage that risk downward pressure on asset prices as banks rush to deleverage in times of financial crisis and strengthen the risk based capital requirements with a simple measure providing a last resort security.

Various refinements were made to the definition of the leverage ratio exposure measure:

1. **Treatment for derivatives exposure**
   (a) Treatment of derivatives: for the purpose of the leverage ratio exposure measure, exposures to derivatives are included by means of two components:
   (i) replacement cost (RC) and (ii) potential future
2. **Treatment of off-balance sheet exposures to ensure consistency with their measurement in the standardised approach to credit risk.**
   (a) On-balance sheet, non-derivative assets are included in the leverage ratio exposure measure at their accounting values less deductions for associated specific provisions. General provisions or general loan loss reserves as defined in paragraph 60 of the Basel III framework which have reduced Tier 1 capital may be deducted from the leverage ratio exposure measure
   (b) Single account balance or the individual participating customer accounts for cash pooling
   (c) Banks using trade date accounting must reverse out any offsetting between cash receivables for unsettled sales and cash payables for unsettled purchases of financial assets that may be recognised under the applicable accounting framework, but may offset between those cash receivables and cash payables
3. **Traditional securitisations** that do not meet the operational requirements for the recognition of risk transference or synthetic securitisations, the securitised exposures must be included in the leverage ratio exposure measure
4. Jurisdictions may exercise national discretion in periods of exceptional macroeconomic circumstances to exempt central bank reserves from the leverage ratio exposure measure on a temporary basis. They would be required to recalibrate the minimum leverage ratio requirement commensurately to offset the impact of excluding central bank reserves, and require their banks to disclose the impact of this exemption on their leverage ratios.

Introduction of New Leverage Ratio Buffer for G-SIBs

The **leverage ratio buffer** seeks to mitigate externalities created by G-SIBs and is in line with the risk-weighted G-SIB buffer. The table below shows how to calculate the leverage ratio buffer:

G-SIB		
	CET1	CET 1 Risk Weight Requirements 4.5% by 2019
		2.5% Capital Conservation Buffer
		Higher Loss Absorbency Requirement
	Leverage Ratio	Minimum Tier 1 Leverage Ratio at 3%
		Leverage Ratio Buffer for G-SIBs 50% of Risk Weighted Higher Absorbency Requirement

Determine Leverage Ratio Buffer

Bucket	HLA requirement	Leverage Ratio Buffer
1	+1.0% CET1	+0.50%
2	+1.5% CET1	+0.75%
3	+2.0% CET1	+1.00%
4	+2.5% CET1	+1.25%
5	+3.0% CET1	+1.50%

- The minimum capital conservation standards for the CET1 risk-weighted requirements and Tier 1 leverage ratio requirements of a G-SIB in the first bucket of the higher loss-absorbency requirements is **8%** and **3.50%**.
- If the G-SIB **does not meet one of these requirements**, it will be subject to the associated minimum capital conservation requirement (expressed as a percentage of earnings).
- If the G-SIB **does not meet both requirements**, it will be subject to the higher of the two associated conservation requirements.

CET1 Risk Weighted Ratio	Tier 1 Leverage Ratio	Minimum Capital Conservation Ratios
>8.00%	>3.50%	0%
8.000% - 7.125%	3.500% - 3.375%	40%
7.125% - 6.250%	3.375% - 3.250%	60%
6.250% - 5.375%	3.250% - 3.125%	80%
5.375% - 4.500%	3.125% - 3.000%	100%

Operational Risk Framework

Advanced Measurement Approach → Removed

Basic Indicator Approach (BIA) | The Standardised Approach (TSA) | Alternative Standardised Approach (ASA) → **New Standardised Measurement Approach (SMA)**

The new standardised approach is an accounting measure based on the bank's income (business indicator component) and historical losses experience (internal loss multiplier). It assumes that the operational risk increases in an increasing rate with bank's income and the likelihood of incurring operational risk losses increases in the future if the bank has higher historical operational risk losses.

Therefore, the operational risk capital requirement formula defined as:

Operational Risk Capital = **Business Indicator Component (BIC)** x **Internal Loss Multiplier (ILM)**

Business Indicator Component (BIC)

Business Indicator

Interest, Leases and Dividend Component (ILDC) =
Min [Abs (Interest Income – Interest Expense); 2.25%*Interest Earning Assets] + Dividend Income

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Service Component (SC) =
Max [Other Operating Income ; Other Operating Expense] + Max [Fee Income ; Fee Expense]

This solution still enhances the risk sensitivity of the SMA in respect to the current simple approaches because the "Fee" and "Other Operating" components are not netted. Thus, the treatment differs with volume.

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Financial Component (SC) =
Abs (Net P&L Trading Book + Abs (Net P&L Banking Book)

x

Marginal BI Coefficients (α_i)

αi is multiplied by the BI based on three buckets to derive BIC:

BI Bucket	BI Range	Marginal BI Coefficient αi
1	First €1 billion	0.12
2	Next €1 billion to €30 billion	0.15
3	Above €30 billion	0.18

x

Internal Loss Multiplier (ILM)

A bank's internal operational risk loss experience affects the calculation of operational risk capital.

Loss Component = 15 x average annual operational risk losses incurred over the past ten years.

Internal Loss Multiplier =

$$Ln\left(\exp(1) - 1 + \left(\frac{\text{Loss Component}}{\text{BIC}}\right)^{0.8}\right)$$

LC < BIC	ILM =< 1, lower operational risk capital required
LC = BIC	ILM = 1, operational risk capital is equal to BIC
LC < BIC	ILM => 1, higher operational risk capital required as internal losses are incorporated into the calculation methodology.

Credit Valuation Adjustment

The revised framework will account for the exposure component of CVA risks that was previously not covered and will be consistent with the approach set out by the revised market risk framework, Fundamental Review of Trading Book.

Internal Model Approach → Removed

Basic approach (B-CVA)

The reduced version is designed to simplify BA-CVA implementation for banks that do not hedge CVA. The reduced BA-CVA is also part of the full BA-CVA capital calculations as a conservative means to restrict hedging efficiency, so all banks using the BA-CVA must make these calculations.

1. **Reduced version eliminates hedging recognition**

$$K_{reduced} = \sqrt{\left(\rho \cdot \sum_c SCVA_c\right)^2 + (1-\rho^2) \cdot \sum_c SCVA_c^2}$$ where the supervisory risk weights (RWc) are given by:

Sector of counterparty	Credit Quality IG	Credit Quality HY and NR
Sovereigns including central banks, multilateral development banks	0.5%	3.0%
Local government, government backed non financials, education and public administration	1.0%	4.0%
Financials including government backed financials	5.0%	12.0%
Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying	3.0%	7.0%
Consumer goods and services, transportation and storage, administrative and support service activities	3.0%	8.5%
Technology, telecommunications	2.0%	5.5%
Healthcare, utilities, professional and technical activities	1.5%	5.0%
Others	5.0%	12.0%

2. **Full version recognise counterparty spread hedges**
   Banks that intend to use the full version of BA-CVA must calculate $K_{reduced}$ as well. Under the full version, capital requirement for CVA risk K_{full} is calculated as follows:

$$K_{full} = \beta \cdot K_{reduced} + (1-\beta) \cdot K_{hedged}$$

Where:

$$K_{hedged} = \sqrt{\left(\rho \cdot \sum_c (SCVA_c - SNH_c) - IH\right)^2 + (1-\rho^2)\sum_c (SCVA_c - SNH_c)^2 + \sum_c HMA_c}$$ and $$SNH_c = \sum_{h \in c} r_{hc} \cdot RW_h \cdot M_h^{SN} \cdot B_h^{SN} \cdot DF_h^{SN}$$

Standardised approach (SA-CVA)

The SA-CVA capital requirement is calculated as the sum of the capital requirements for delta and vega risks calculated for the entire CVA portfolio (including eligible hedges).

The capital requirement for delta risk is calculated as the simple sum of delta capital requirements calculated independently for the following six risk types: (i) interest rate (IR); (ii) foreign exchange (FX); (iii) counterparty credit spreads; (iv) reference credit spreads (i.e. credit spreads that drive exposure); (v) equity; (vi) commodity. Note that there is no vega capital requirement for counterparty credit spread risk.

1. Obtain the weighted sensitivities CVA WSk and Hdg WSk for each risk factor k by multiplying the net sensitivities by the corresponding risk weight
   $WS_k = WS_k^{CVA} + WS_k^{Hdg}$ Where $WS_k^{CVA} = RW_k \cdot s_k^{CVA}$ and $WS_k^{Hdg} = RW_k \cdot s_k^{Hdg}$
2. Weighted sensitivities must be aggregated into a capital charge Kb within each bucket b (the buckets and correlation parameters pkl applicable to each risk type
   $K_b = \sqrt{\left[\sum_{k \in b} WS_k^2 + \sum_{k \in b}\sum_{l \in b; l \neq k} \rho_{kl} \cdot WS_k \cdot WS_l\right] + R \cdot \sum_{k \in b}\left[(WS_k^{Hdg})^2\right]}$
3. Bucket-level capital charges must then be aggregated across buckets within each risk type (the correlation parameters γ bc applicable to each risk type
   $K = m_{CVA} \cdot \sqrt{\sum_b K_b^2 + \sum_b \sum_{c \neq b} \gamma_{bc} \cdot K_b \cdot K_c}$

Introduction of new eligibility criteria for CVA hedges

BA-CVA	SA-CVA
• Only transactions used for the purpose of mitigating the counterparty credit spread component of CVA risk • Single-name CDS, single-name contingent CDS and index CDS • Single-name credit instruments must: (i) reference the counterparty directly; (ii) reference an entity legally related to the counterparty; or (iii) reference an entity that belongs to the same sector and region as the counterparty	• Whole transactions that are used for the purpose of mitigating CVA risk • Hedges of both the counterparty credit spread and exposure components of CVA risk can be eligible. • Instruments that cannot be included in the Internal Model Approach for market risk under the revised market risk standard (e.g. tranched credit derivatives) cannot be eligible CVA hedges.

Introduction of a materiality threshold

Banks that has an aggregate notional amount of non-centrally cleared derivatives less than or equal to €100 billion may choose to set it's CVA capital equal to 100% of the bank's capital requirement for Counterparty Credit Risk

Securitisation Framework

The Securitisation Framework sets out revised methodologies for the calculation of regulatory capital requirements for securitisation exposures held by banks in their banking book.

Introduction of Simple, Transparent and Comparable Criteria

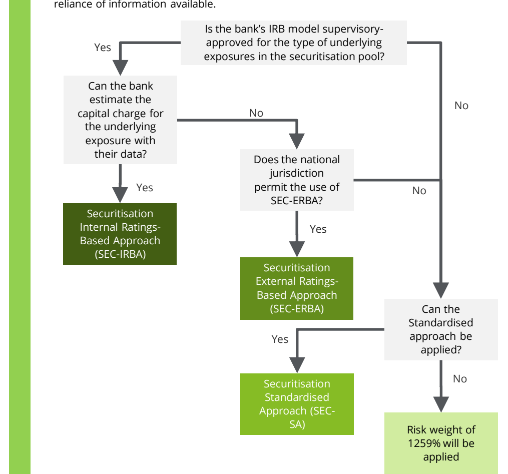
The criteria covers asset risk, structural risk, fiduciary and servicer risk in a securitization as well as for capital purposes.

Asset Risk	Structural Risk	Fiduciary and Servicer Risk
• Nature of assets • Asset performance history • Payment status • Consistency of underwriting • Asset selection and transfer • Initial and ongoing data	• Redemption cash flows • Currency and interest rate asset and liability mismatches • Payment priorities and observability • Voting and enforcement rights • Documentation disclosure and legal review • Alignment of interests	• Fiduciary and contractual responsibilities • Transparency to investors **Capital Purpose** • Credit risk of underlying exposures • Granularity of the pool

For securitization that meets the STC criteria above may enjoy lower regulatory capital requirements using the new approaches. However, the determination of the approach will rely heavily on the amount of data available as well as national jurisdiction.

Revised Hierarchy of Approaches

Multiple approaches streamlined into **three approaches** and the criteria for determining the approach shifted from the role of the bank to the reliance of information available.



Securitisation Internal Ratings-Based Approach (SEC-IRBA)

Key Inputs

1. Tranche attachment point A
2. Tranche detachment point D
3. Parameter p (SEC-IRBA formula has been amended to include a factor of 0.5 in the supervisory parameter p for STC compliant securitizations)

Non-STC Securitization: p=max [0.3; (A + B*(1/N) + C*KIRB + D*LGD + E*MT)]

STC Compliant Securitization: p=max [0.3; (A + B*(1/N) + C*KIRB + D*LGD + E*MT)*0.5]

where:
0.3 denotes the p-parameter floor, N is the effective number of loans in the underlying pool, KIRB is the capital charge of the underlying pool, LGD is the exposure-weighted average loss-given-default of the underlying pool, MT is the maturity of the tranche.

4. Capital requirements per unit of securitization exposure

$$K_{SSFA(KIRB)} = \frac{e^{a \cdot u} - e^{a \cdot l}}{a(u-l)} \quad \text{and} \quad K_{IRB} = \frac{\text{IRB capital requirement for the underlying exposures in the pool}}{\text{the exposure amount of the pool}}$$

where: a = –(1 / (p * KIRB)), u = D – KIRB, l = max (A - KIRB; 0)

Risk weights assigned to a securitization exposure subject to a floor of 15%.
When D for a securitisation exposure is less than or equal to KIRB, RW = 1250%
When A for a securitisation exposure is greater than or equal to KIRB, the risk weight of the exposure: $RW = K_{SSFA(KIRB)} * 12.5$

When A is less than KIRB and D is greater than KIRB, the applicable risk weight is a weighted average of 1,250% and 12.5 times KSSFA(KIRB) according to the following formula:

$$RW = \left[\left(\frac{K_{IRB} - A}{D - A}\right) * 12.5\right] + \left[\left(\frac{D - K_{IRB}}{D - A}\right) * 12.5 * K_{SSFA(KIRB)}\right]$$

Securitisation External Ratings-Based Approach (SEC-ERBA)

SEC-ERBA risk weight look-up tables for long-term and short-term ratings have been adjusted to provide lower risk weights for STC securitisations

The credit rating threshold at which a 1,250% risk weight is automatically required for longer-maturity senior tranches has been adjusted to below "CCC-".

The risk weights must be adjusted for:

- Tranche maturity - MT has a floor of one year and a cap of five years and risk weights are linearly interpolated for maturities between one and five years
- Thickness (Non senior tranches) - subject to the lower of 15% floor and risk weight corresponding to a senior tranche of the same securitization with the same rating and maturity.

RW = [RW from table after adjusting for maturity] * (1-min(D-A;50%)]

In addition, banks must meet the operational criteria for use of external credit assessments or for inferred ratings.

The final standard have specified that Internal Assessment Approach may be used if the bank have obtained supervisory approval and meets the required operational requirements. The equivalent external ratings of an External Credit Assessment Institution (ECAI) will be used for such cases.

Securitisation Standardised Approach (SEC-SA)

The risk weight assigned to a securitisation exposure when applying the SEC-SA would be calculated as follows:

- When D for a securitisation exposure is less than or equal to KA, RW = 1,250%.
- When A for a securitisation exposure is greater than or equal to KA, the risk weight of the exposure is $RW = K_{SSFA(K_A)} * 12.5$
- When A is less than KA and D is greater than KA, the applicable risk weight is a weighted average of 1,250% and 12.5 times KSSFA(KA) according to the following formula:

$$RW = \left[\left(\frac{K_A - A}{D - A}\right) * 12.5\right] + \left[\left(\frac{D - K_A}{D - A}\right) * 12.5 * K_{SSFA(K_A)}\right]$$

Where:

$$K_{SSFA(K_A)} = \frac{e^{a \cdot u} - e^{a \cdot l}}{a(u-l)}$$ and a = –(1 / (p * KA)), u = D – KA, l = max (A - KA; 0)

The supervisory parameter p in the SEC SA approach formula has been set at 0.5 for STC securitisations (as opposed to 1 for non-STC securitisations).

K_A (delinquency status is known) = $(1 - W) \cdot K_{SA} + W \cdot 0.5$

K_A (delinquency status is unknown for >5% of the securitisation exposure) = $\left(\frac{EAD_{Subpool\ 1\ where\ W\ known}}{EAD\ Total} * K_A^{Subpool\ 1\ where\ W\ known}\right) + \frac{EAD_{Subpool\ 2\ where\ W\ unknown}}{EAD\ Total}$

Capital Floor

To allow better comparison between the standardised and internal model approach and increase credibility of risk weighted calculations, banks using the internal model approach will face a limit on the calculation of capital relative to the standardised approach under the revised capital floor.

The new approach will allow banks to calculate their risk weighted assets as the higher of

(a) total risk weighted assets calculated under the approach approved by their regulator
(b) 72.5% of the total risk weighted assets calculated using the standardised approach; the total risk weighted assets calculated cannot be less than 72.5% RWA determined by the SA approach.

The standardised approach used for calculation of (b) are as follows:	
Credit Risk	SA
Counterparty Credit Risk	Exposure for derivatives, calculated using the SA-CCR, will be multiplied with the relevant borrow risk weight, calculated using the SA for credit risk.
Credit Valuation Adjustment Risk	SA-CVA, Basic –CVA or 100% of the bank's counterparty credit risk capital requirement.
Securitisation Framework	SEC-SA, external rating-based approach)SEC-ERBA) or 1250% risk weight.
Market Risk	SA or Simplified SA outline in the market risk framework. For securitisation held in the trading book, the default risk charge will be determined by the SEC-ERBA, SEC-SA or a 1250% risk weight.
Operational Risk	SA

Transitional arrangement for phasing in the aggregate output floor	
1 January 2022	50%
1 January 2023	55%
1 January 2024	60%
1 January 2025	65%
1 January 2026	70%
1 January 2027	72.5%

Subject to national discretion, regulators may cap the increase in total RWA at 25% of the bank's RWAs as banks adjust for the output floor during the transitional period. The diagram below is describe the amount of RWA when (a) > (b) with a 25% cap in the increase of RWA.