Basel III: Finalising post-crisis reforms
The impact of "Basel IV"

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Agenda

High Level Impact of Basel III: Finalising post-crisis reforms

The Road to Basel III: Finalising post-crisis reforms

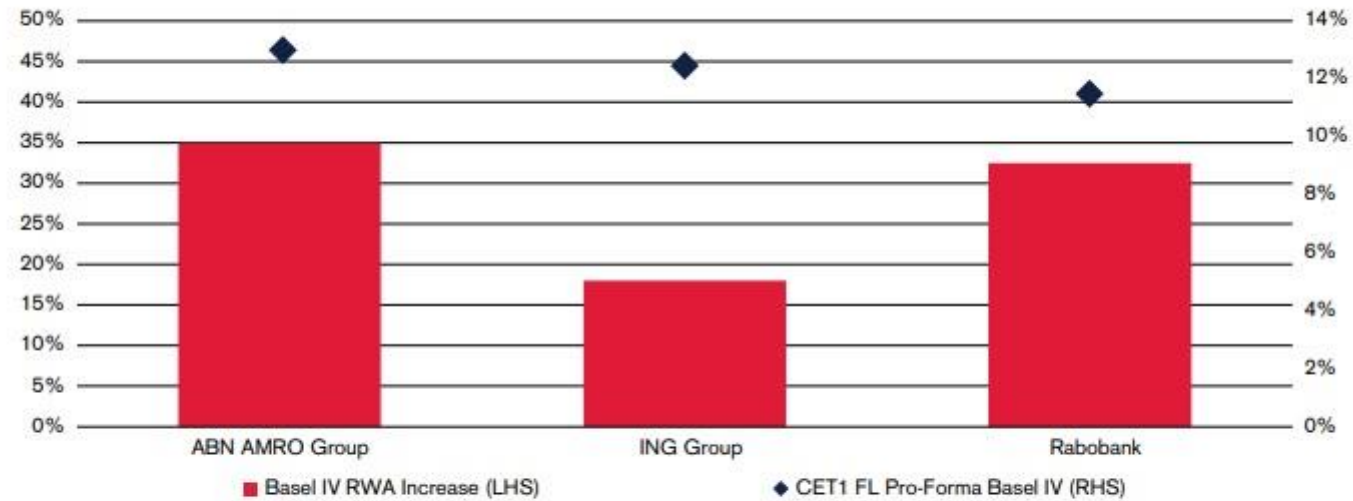High level impact of reforms on Credit Risk RWA and main changes

Takeaways from the new Basel III framework

Impact on CVA

Impact on Operational Risk RWA

High Level Impact of Basel III: Finalising post-crisis reforms

Basel IV Impact on RWAs (% Change) and DBRS's Estimates of Basel IV CET1 Ratios Fully Loaded (%)[1]
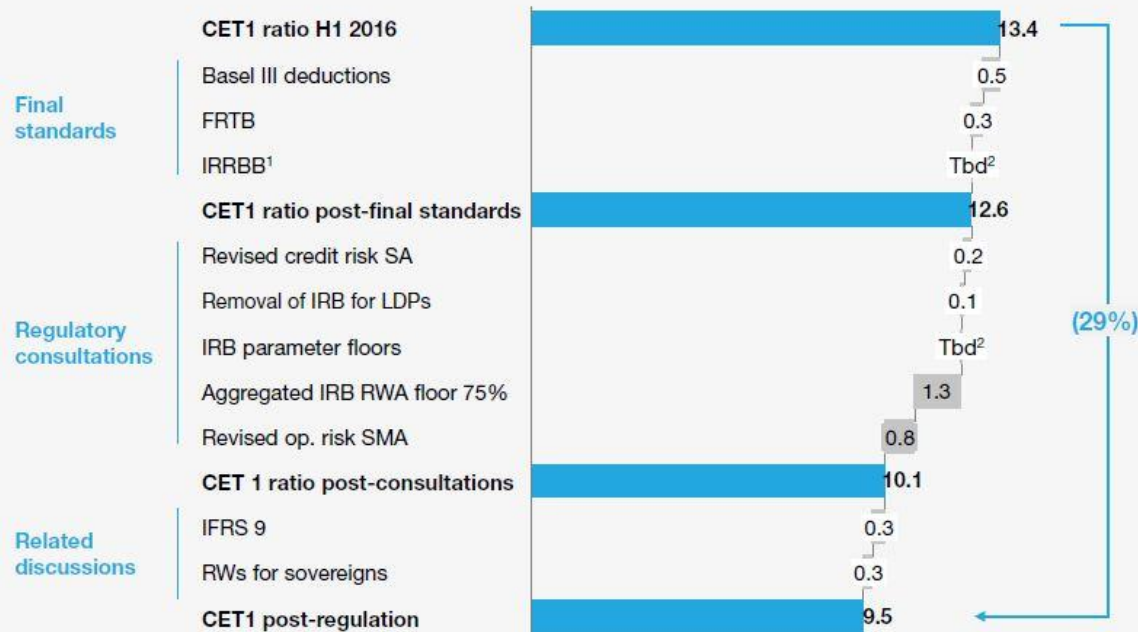

1. DBRS's Estimates for Basel IV CET1 ratios are based on static balance sheets at year-end 2017 and do not consider management actions, future earnings retention or regulatory developments.
Source: Company data, DBRS Calculations.

High Level Impact of Basel III: Finalising post-crisis reforms

Exhibit 2: Analyzed regulatory scenario with substantial impact on the capitalization of the European banking industry
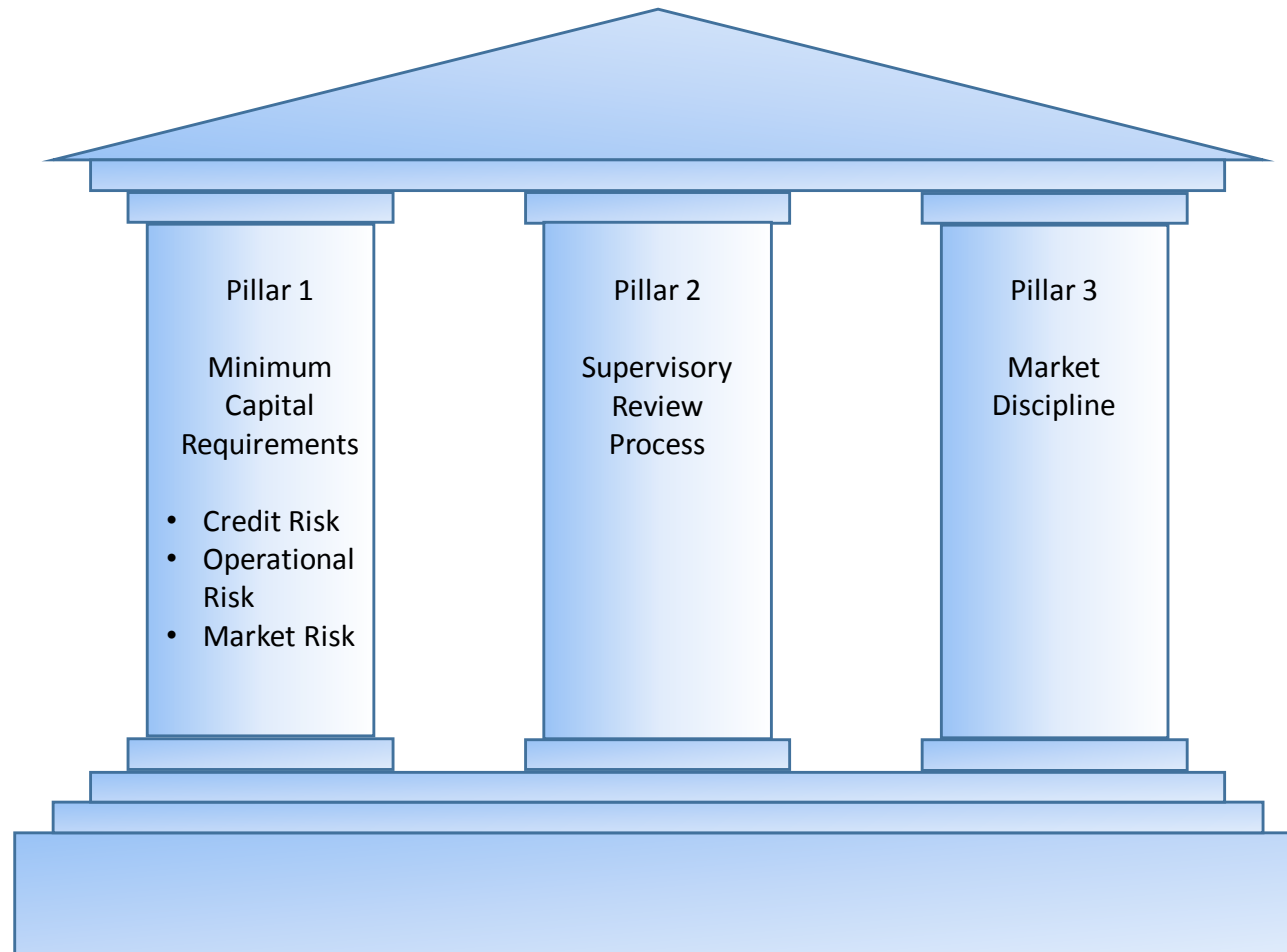
Implicit weighted average CET1 ratio of 130 banks participating in EBA transparency exercise as of H1 2016
Percent

	CET1 ratio H1 2016	13.4
Final standards	Basel III deductions	0.5
	FRTB	0.3
	IRRBB[1]	Tbd[2]
	CET1 ratio post-final standards	12.6
Regulatory consultations	Revised credit risk SA	0.2
	Removal of IRB for LDPs	0.1
	IRB parameter floors	Tbd[2]
	Aggregated IRB RWA floor 75%	1.3
	Revised op. risk SMA	0.8
	CET 1 ratio post-consultations	10.1
Related discussions	IFRS 9	0.3
	RWs for sovereigns	0.3
	CET1 post-regulation	9.5

(29%)

1 Captured under Pillar 2
2 Impact assessment outside-in hardly possible given reporting granularity
SOURCE: McKinsey Analysis, European Banking Authority (EBA) (incl. EBA "2016 EU-wide transparency exercise results" and EBA "2016 EU-wide stress test results"), S&P Global Market Intelligence (SNL Financial and S&P Capital IQ)

The Basel Framework

Pillar 1

Minimum Capital Requirements

- Credit Risk
- Operational Risk
- Market Risk

Pillar 2

Supervisory Review Process

Pillar 3

Market Discipline

- The three pillar framework as introduced in Basel II is the successor of the rule based Basel I
- Basel III is an enhancement and strengthens the Basel II framework and added additional capital requirements (CET1 ratio), leverage ratio and two liquidity ratios (LCR, NSFR)

Proposed revisions and proposed implementation dates

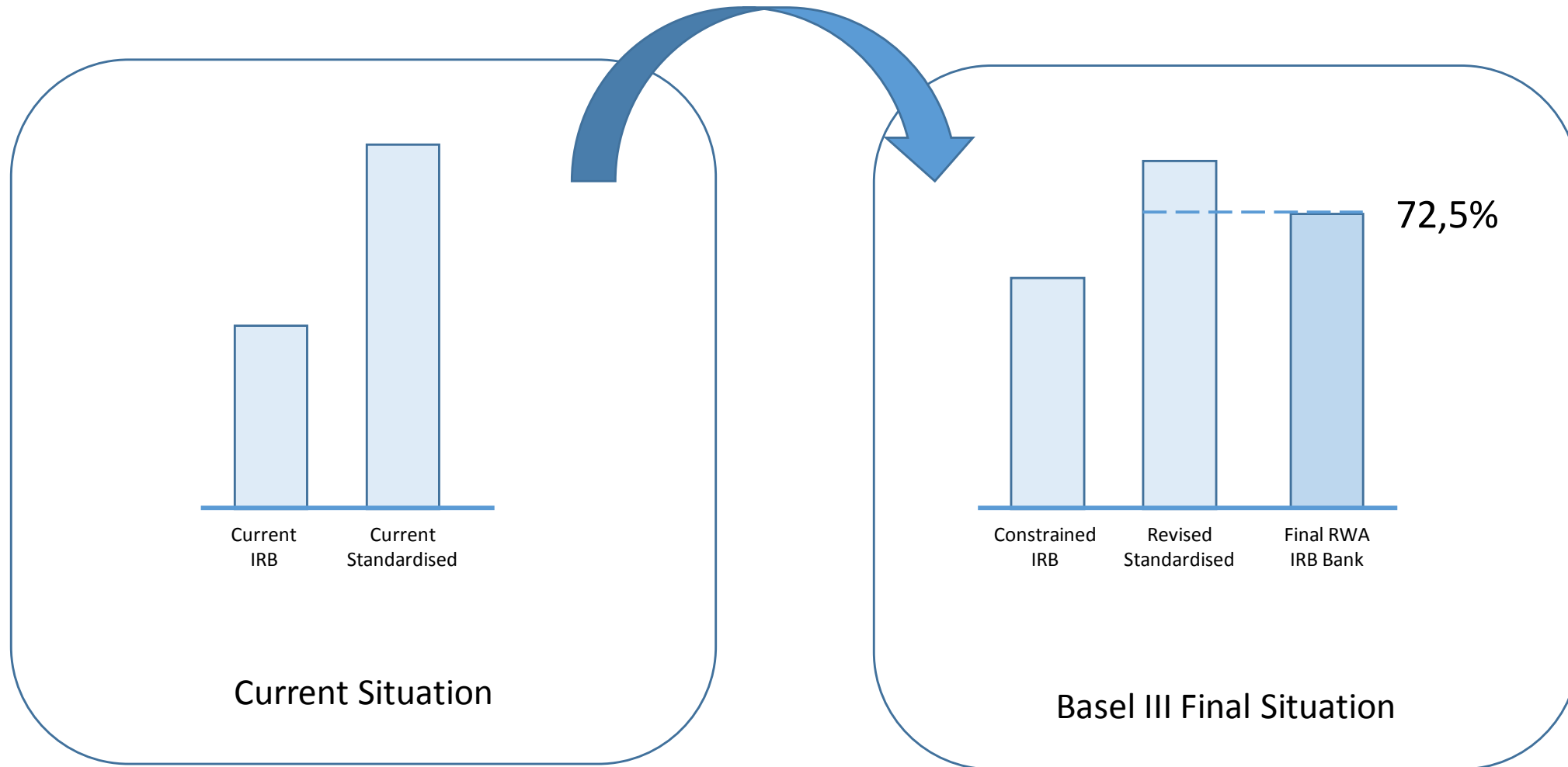| Revision	Implementation data
Revised standardised approach for credit risk	• 1 januari 2022
Revised IRB framework	• 1 januari 2022
Revised CVA framework	• 1 januari 2022
Revised operational risk framework	• 1 januari 2022
Revised market risk framework	• 1 januari 2022
Leverage Ratio	• Existing exposure definition:7 1 January 2018 • Revised exposure definition: 1 January 2022 • G-SIB buffer: 1 January 2022
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%

The output floor of Basel III: finalising post-crisis reforms

- Basel III introduces a new output floor
- Minimum capital requirements are calculated for:
    - Credit Risk
    - Counterparty credit risk
    - Credit valuation adjustment risk
    - Securitisation framework
    - Market risk
    - Operational risk
- If an advanced approach is used for the calculation of the capital requirements the respective standardised approach need to be calculated
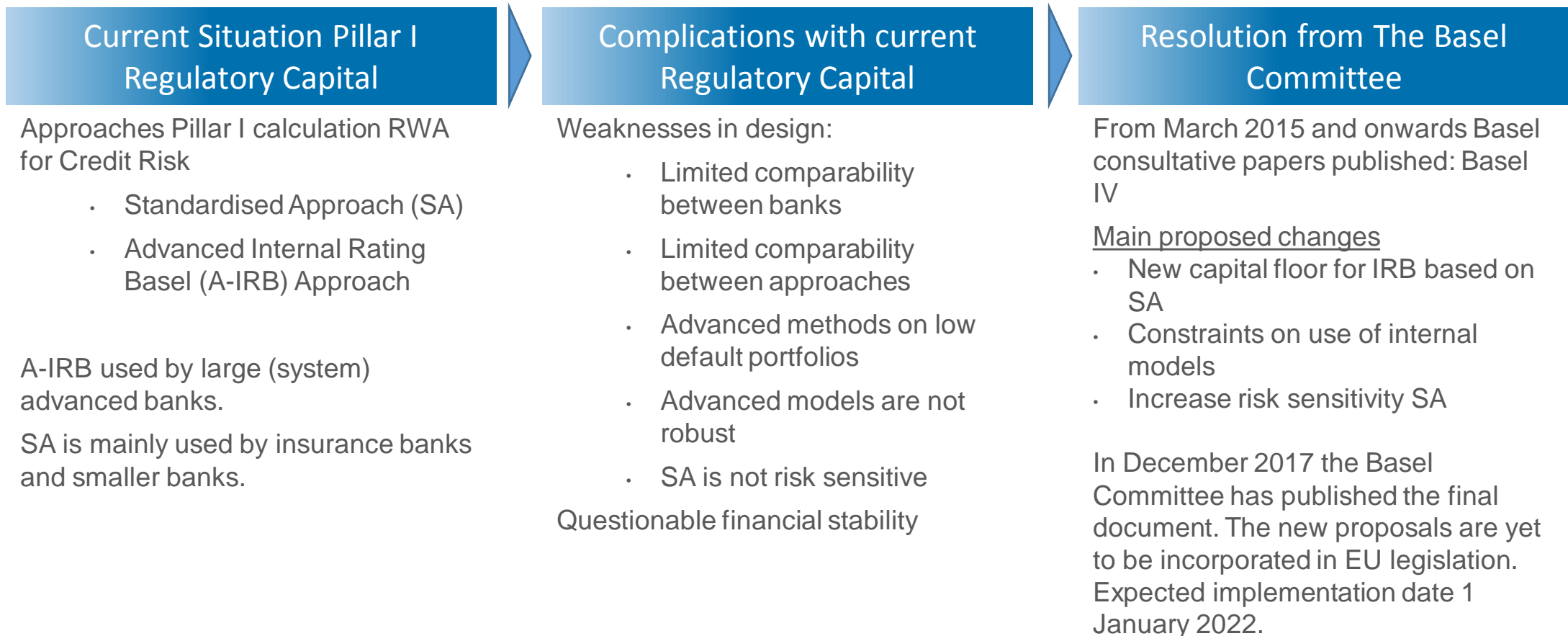- The minumum capital requirement is given by (on bank total)

$$RWA = min(RWA_{Bank}, 72,5\% \times RWA_{Standardised})$$

High level impact of reforms: Impact of the floor

Current IRB   Current Standardised

Current Situation

Constrained IRB   Revised Standardised   Final RWA IRB Bank

72,5%

Basel III Final Situation

The Road to Basel III: Finalising post-crisis reforms for Credit Risk

Current Situation Pillar I Regulatory Capital

Approaches Pillar I calculation RWA for Credit Risk

- Standardised Approach (SA)
- Advanced Internal Rating Basel (A-IRB) Approach

A-IRB used by large (system) advanced banks.

SA is mainly used by insurance banks and smaller banks.

Complications with current Regulatory Capital

Weaknesses in design:

- Limited comparability between banks
- Limited comparability between approaches
- Advanced methods on low default portfolios
- Advanced models are not robust
- SA is not risk sensitive

Questionable financial stability

Resolution from The Basel Committee

From March 2015 and onwards Basel consultative papers published: Basel IV

Main proposed changes
- New capital floor for IRB based on SA
- Constraints on use of internal models
- Increase risk sensitivity SA

In December 2017 the Basel Committee has published the final document. The new proposals are yet to be incorporated in EU legislation. Expected implementation date 1 January 2022.

Main changes from SA to Revised SA

- New risk weights for the majority of the asset classes
- Higher granularity of risk-weights (mostly depending on the LTV)
- New methodologies for bank exposures (external and standardized credit risk assessments, CET1 ratio category removed)

Example Higher Granularity RSA: Exposures Secured by Residential Property

Current Standardised Approach

- Residential Mortgages (occupied or rented) is risk weighted at 35%

- National supervisor may increase risk weight

New Revised Standardised Approach

- Residential Mortgages are risk weighted according to LTV
- Risk weights are differentiated by repayment of loan being materially dependent on cash flow generated by the property
- Possible approaches non income producing Real Estate: Whole Loan approach or Loan-splitting approach

	LTV ≤ 50%	50% < LTV ≤ 60%	60% < LTV ≤ 80%	80% < LTV ≤ 90%	90% < LTV ≤ 100%	LTV > 100%
Risk Weight Whole Loan Approach	20%	25%	30%	40%	50%	70%
Risk Weight Loan-splitting Approach	20%	RW Counterparty				
Risk Weight (Income Producing)	30%	35%	45%	60%	75%	105%

Table 1: Source: Basel III: Finalising post-crisis reforms (BCBS 424)

Main changes to the A-IRB

- Removing use of A-IRB for specific asset classes (e.g. Large and mid-sized corporates (consolidated revenues > €500m), banks)

- Input floors on the IRB parameters.

- Expert models are no longer allowed.

- Removal of the scaling factor.

Consequences of the changes of the Basel Framework

- IRB approach also requires the RSA approach calculations for comparison. Possible complications:
  - Data requirements are severe (e.g. sourcing 2 LTV's, Income Producing)
  - Data quality standards can be problematic (e.g. collateral data)
  - Removal of Expert models in favor of statistical models

- SA requires prescribes risk drivers. Possible complications:
  - Data requirements are severe (e.g. Income Producing)
  - Data quality standards are low

Business models with high impact due to Basel IV under IRB

A large deviation from a "average" amount of risk.

- Mortgages in The Netherlands traditionally have a low PD and low LGD.

- Asset based finance: The LGD of Asset based finance is very low since the underlying collateral is monitored very strictly.

- Qualifying Retail Exposures

Exercise: Comparison IRB vs. SA

- Example:
  - Mortgage loan of € 250.000 with a tenor of 10 years (repayment not materially dependent on cash flows generated by the property)
  - IRB parameters: PD = 0,1%, LGD = 20%
  - LtV 95%.

$$RWA_{IRB} = 12{,}5 \times EAD \times \left(LGD \times N\left[\frac{G(PD)}{\sqrt{1-R}} + \sqrt{\frac{R}{1-R}} \times G(0.999) \right] - PD \times LGD \right)$$

$$= 4{,}75\% \times €250.000 = €11.877$$

$$RWA_{RSA} = 50\% \times €250.000 = €125.000$$

- Additional Regulatory Capital (contract level) $= 72{,}5\% \times €125.000 - €11.877 = €78.748$

- Capital requirements for this mortgage increase by a factor 7

Portfolio implications

- Example:
  - Mortgage loan of € 250.000 with a tenor of 10 years
  - IRB parameters: **PD = 1%**, LGD = 20%
  - **LtV 50%**

$$RWA_{IRB} = 25,07\% \times €250.000 = €62.665 \text{ and } RWA_{RSA} = 20\% \times €250.000 = €50.000$$

- Which implies no extra capital for the contract
- For a portfolio containing the mortgages of both examples we have

$$RWA_{IRB} = €11.877 + €62.665 = €74.542 \text{ and } RWA_{RSA} = 72,5\% \times (€125.000 + €50.000) = €126.875$$
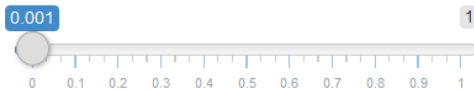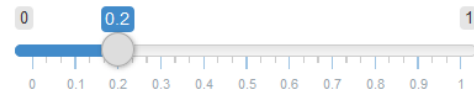
- Additional capital of the first mortgage has "decreased". The portfolio composition determines if there is an impact of the new legislation.
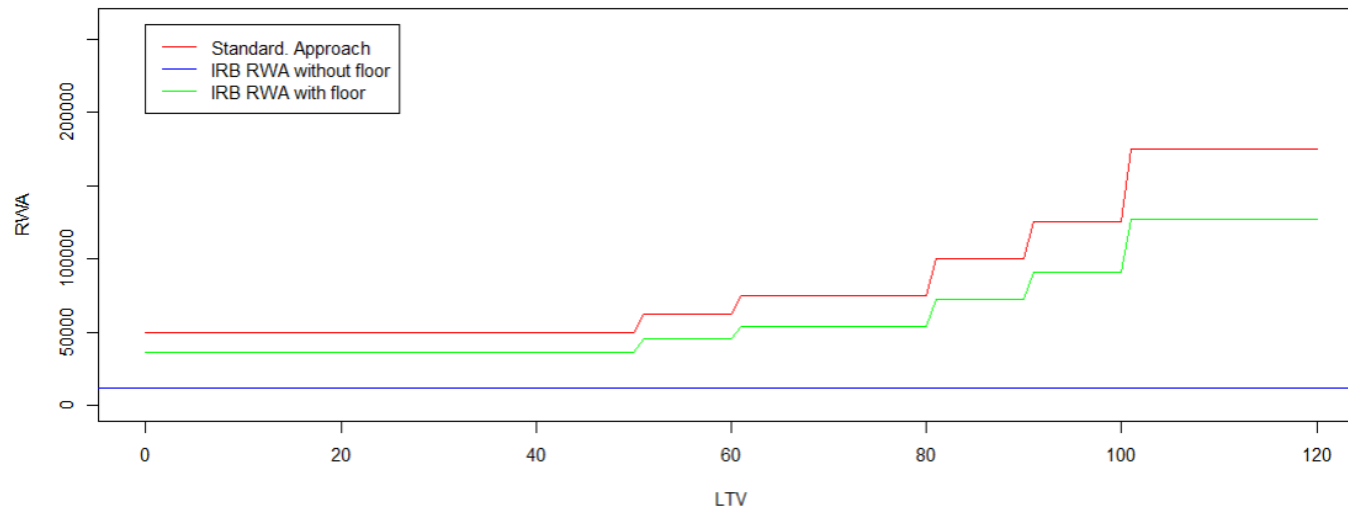
Takeaways from Basel III finalising post-crisis reforms

- Calculate two approaches for A-IRB Banks

- Portfolio composition determines impact

- Changes in modelling
  - No possibility for expert models
  - Move from A-IRB approach to RSA or Foundation IRB (F-IRB)

- Non level playing field banks vs. Insurers and Pension funds

What is Credit Valuation Adjustment (CVA)? (1)

The risk of losses arising from changing CVA values in response to changes in counterparty credit spreads and market risk factors that drive prices of derivative transactions and Securities Financing Transactions (BCBS, 2017).

In other words

Imagine, I earn EUR 5,000 monthly and you earn EUR 3,000 monthly. You're more likely to default. We sign a contract which says that in 1 year, if I win in a coin flip (1/2 chance of win), you'll pay me EUR 100. Otherwise, I'll pay you EUR 100. **In the meantime, your salary decreases to EUR 2,000.** Does the contract has the same value?

Well... This is why we need CVA to account for such risks.

What is Credit Valuation Adjustment (CVA)? (2)
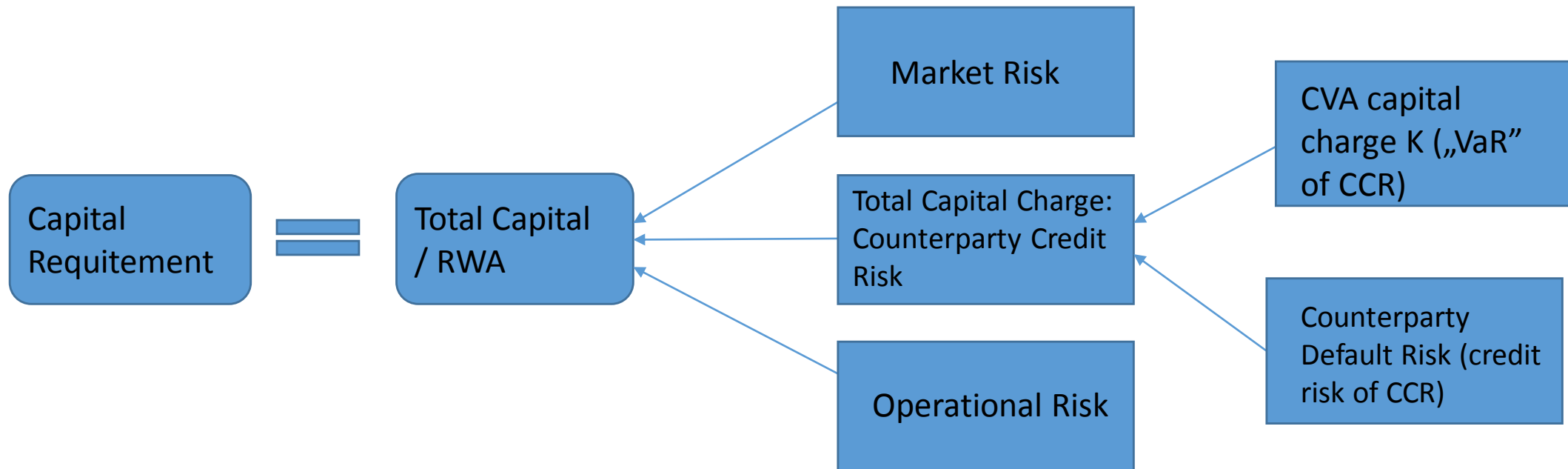
- About two-thirds of CCR losses were due to CVA losses and only one-third were due to actual defaults. (BCBS, 2009)
- RWA = K * 12.5 where K is the capital requirement which is CVA in this case
- CVA introduced after the 2009 crisis to let banks hold capital for losses due to price movements of derivatives

What has been changed? (1)

- The main reason that drives the changes in approaches is to increase the transparency and comparability of CVA for regulators
- It's become less flexible but it doesn't mean less work for banks!

	Basel III	Revised Basel III
Internal Based Approach	Yes	No
Standardised Based Approach	Yes	Yes
Basic Reduced Approach	No	Yes (New)
Basic Full Approach	No	Yes (New)

New approaches CVA

- **No Approach**
  - CVA is equal to 100% EAD value calculated in the „credit risk" of CCR part
- **Basic reduced approach**
  - Excludes hedges
  - Requires correlation, risk weight, maturity, EAD and supervisory discount factor
- **Basic full approach**
  - Same as above but it also allows for reduction in CVA due to hedging (limited to 25% of the capital charge)
- **Standardised Approach**
  - Similar to Basic Full Approach but allows to measure CVA more precisely due to bucketing of exposures and allocating risk drivers more accurately (= more cases to consider)
  - Risk weights are multiplied by sensitivities what is not possible for basic approaches
  - Sensitivities should be measured as indicated in Basel regulations. Example: what's the change in CVA if we change the risk-free yield in a given currency by 1bp?

What has been changed? (2)

- Simple approaches are now available to allow smaller banks (e.g. Those who do not hedge) and banks unable to calculate sensitivities to calculate CVA easily

- Current CVA didn't cover the exposure component of CVA. CVA will now not only use the hedges but also will depend directly on the risk factors that influence the price of the relevant transactions

- No more PD and exposure modelling for internal models for CVA. However, banks will have to measure sensitivities by shifting the relevant risk factors and measuring the effect

- Changes can be summarized as follows: Regulators will tell banks how to measure CVA and which factors they should use. Banks must know well which factors/sensitivities/weights they have to use and how they should be applied

New data challenges and problems

- A decision has to be made whether to use basic or standardized approach

- Much new data has to be added (e.g. Risk factors, buckets) to a database and much of that have to be removed (i.e. Related to internal approach)

- New mapping algorithms should be developed to map risk factors and buckets efficiently

Basel definition of operational risk

"Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk"

(source: Basel III Finalising post-crisis reforms)

Minimum Capital Requirements Operational Risk

- For the calculation of the minimum capital requirements associated with operational risk the following approaches are possible under the current Basel Framework:
  - Basic Indicator Approach (BIA)
  - The Standardised Approach (TSA)
  - Alternative Standardised Approach (ASA)
  - Advanced Measurement Approach (AMA)

- The current standardised approaches (BIA, TSA, ASA) are undercalibrated and the advanced approach (AMA) has a inherent complexity and leads to a large variability in RWA calculations

- Basel III finalising post-crisis reforms introduces a new more risk-sensitive standardised approach which replaces all former approaches

RSA for operational risk: Operational risk capital (ORC) calculation

Operational risk capital is given by

$$ORC = BIC \times ILM = (\alpha_i \times BI) \times \ln\left(\exp(1) - 1 + \left(\frac{LC}{\alpha_i \times BI}\right)^{0.8}\right)$$

Where:

- BIC = Business Indicator Component
- BI = Business Indicator = ILDC + SC + FC
- ILDC = Interest, leases and dividend component (income)
- SC = Services component (income)
- FC = Financial component (net P&L tranding book)
- ILM = Internal Loss Multiplier
- α_i = Marginal coefficient (depending on the BI between 12% and 18%)
- LC = Loss component (15 times annual operational risk losses over previous 10 years)

Data, disclosure and supervisory requirements Operational Risk

- Internally generated loss data calculations must be based on a 10-year observation period
- Minimum threshold is €20.000 (or possible €100.000 at supervisory discretion for large banks)
- Large amount of data requirements
- Total loss amount and number of exclusions have to be disclosed
- Divested activities can be excluded with supervisory approval
- BI and losses of acquisitions must be included in the calculation
- All BI's and losses in the 10 year window must be disclosed

Thank you!

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Appendix: SA for Exposures Secured by Commercial Real Estate

Current Standardised Approach (Basel II)

- Commercial Real Estate has a risk weight of 100%
  - In Exceptional cases a preferential risk weight of 50% can be given for a tranche of the loan

New Revised Standardised Approach (Basel III)

- Commercial real estate is also weighted with LTV

	LTV ≤ 60%	LTV > 60%	Criteria not met
Risk Weight Whole Loan Approach	Min (60%, RW of counterparty)	RW of counterparty	RW of counterparty
	LTV ≤ 55%	**LTV > 55%**	**Criteria not met**
Risk Weight Loan-splitting Approach	Min (60%, RW of counterparty)	RW of counterparty	RW of counterparty
	LTV ≤ 60%	**60% < LTV ≤ 80%**	**LTV > 80%**	**Criteria not met**
Risk Weight IP	70%	90%	110%	150%

Table 2: Source: Basel III: Finalising post-crisis reforms (BCBS 424)

Appendix: Input floors on the A-IRB

Minimum parameter values in the revised IRB framework				
	Probability of default (PD)	Loss given default (LGD)		Exposure at default (EAD)
		Unsecured	Secured	
Corporate	5 bp	25%	Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical	EAD is 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	5 bp	N/A	5%	
QRRE transactors	5 bp	50%	N/A	
QRRE revolvers	10 bp	50%	N/A	
Other Retail	5 bp	30%	Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical	