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Chapter: Unit 4 Chapter 1

Chapter Name: Basel III CAPITAL

Today's Agenda

1. Why was Basel III introduced?
2. Basel III Capital Requirements
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3. Buffers
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 3. Higher Loss Absorbency
 4. Leverage Buffer
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1 Why was Basel III introduced?

In addition to the need for more capital for risks in the trading book, the crisis revealed many other weaknesses of the Basel II framework:

- In the depths of the crisis, market participants **cared only about tangible Tier 1 common equity capital** (i.e., capital that could absorb losses and maintain a bank as a going concern). Many elements of the pre-crisis definition of capital proved limited in their ability to maintain banks as going concerns.
- The official sector came to believe that distress at some banks posed greater threats to society than distress at other banks and that those in the former category should be better able to manage distress. Categories of "**systemically important**" financial firms were created and embedded in a wide range of regulatory and supervisory practices.
- Risk-based capital ratios were thought to have been too susceptible to gaming. **Leverage-ratio capital requirements** were needed as a backstop, especially since market participants who focused only on tangible common equity tended to also focus only on leverage ratios.

1 Why was Basel III introduced?

- It was not enough for banks to remain solvent up to the point of maximum losses - they also had to be able to operate as a going concern thereafter, which meant they needed **substantial capital after absorbing the losses**. In many cases, governments provided capital, but such provision was unpopular. Buffers of capital above the minimum requirements were needed, as were means of recapitalizing failed banks.
- Entities that were thought to be solvent by regulators nevertheless suffered runs and, in some cases, failed. This was in part because their liquid reserves proved inadequate to cover withdrawn funding and in part because wholesale funding proved to be unstable. Thus, liquidity requirements were needed.
- Especially after the failure of Lehman, which did not honor its commitments as a counterparty in derivative contracts, it became clear that capital was needed to cover counterparty credit risk.

1 Why was Basel III introduced?

- In addition, a Large Exposures Framework was created in 2014 to set a common global standard to limit exposure concentrations to a single counterparty, particularly between systemically important institutions. Specifically, there limits are 25% of capital (and 15% between global systemically important banks). This framework assumes 100% probability of default and 100% loss given default (after netting and collateral adjustments), limited use of models that failed in the crisis, and aggregates across wholesale credit, trading and other books. LEF also addresses a limitation of the capital framework, which does not adjust capital requirements for significant concentrations under either the Standardized Approach or the Gordy Model used in IRB (which assumes exposures are granular, not concentrated).

Proposals to remedy the deficiencies were published in 2010 and 2011 and amended in later years.³

2 Basel III Capital requirements

Basel III eliminated Tier 3 Capital and divided Tier 1 Capital into Tier 1 Equity Capital (also known as Core Tier 1 Capital) and Additional Tier 1 Capital, restricting the former to high-quality capital.

Minimum capital requirements were also changed:

CET 1 /
Tier 1 Equity

- Core Tier 1 must be at least 4.5 percent of risk-weighted assets,
- Total Tier 1 (i.e., the sum of Core and Additional Tier 1) capital must be at least 6 percent of risk-weighted assets.
- The Total Capital requirement (Tier 1 plus Tier 2) was left unchanged at 8 percent.

1> QUALITY } Capital Improved
2> QUANTITY }

2.1 Capital Components

Tier 1 Equity Capital includes

- common equity,
- retained earnings, and
- a limited amount of minority interest and unrealized gains and losses.
Refined by regulator

Goodwill and other intangibles are deducted, as are deferred tax assets and any shortfall of reserves relative to IRB expected losses.

Additional Tier 1 Capital includes:

- Unsecured, unguaranteed, non-cumulative perpetual preferred equity instruments subordinated to depositors and subordinated debt, and callable only after five years or more.
- Debt with appropriate triggers that cause conversion to equity or write-downs. → CoCo's } *Contingent Convertibles*
- Approved minority interest not included in Core Tier 1.

2.1 Capital Components

Tier 2 capital is designed to absorb losses after failure, protecting depositors and other creditors. It includes:

- Subordinated debt. Specifically, unsecured, unguaranteed, debt instruments subordinated to depositors and subordinated debt, with five years or more original maturity, and callable only after five years or more.
- General loan loss reserves. These are reserves not allocated to absorb losses on specific positions. Reserves included in capital are capped at 1.25% of standardized approach RWAs, or 0.6% of IRB RWAs.

A number of other deductions are required, such as

- defined-benefit pension plan deficits,
- certain cross-holdings within a group, and
- mortgage servicing rights greater than 10 percent of common equity.

Overall, capital requirements were significantly increased relative to Basel 2 because minimum ratios were increased, and allowable capital was constricted. → Qty

BASEL III CAPITAL

Common
Equity
Tier 1

10.5% CCB

8% TOTAL MINIMUM CAPITAL

T2

BUFFERS

CET1

+2.5% CET1
1. CAPITAL CONSERVATION
BONUS / DIVIDEND / BUY SHARES

2. COUNTERCYCLICAL T1

3. G-SIB HLA (1% → 3.5%)

4. LEVERAGE 0.5 × HLA T1

6% T1
 ADDITIONAL
 COMMON EQUITY 4.5%

G-SIB's

GLOBAL SYSTEMICALLY
IMPORTANT BANKS
(30 BANKS)

1998

LTCM BAILED OUT
WHY?

SYSTEMIC RISK

1999

FINANCIAL

STABILITY

BOARD

→ EXTRA CAPITAL ^{up to} BASEL III
HIGHER LOSS ABSORBENCY

— LEVERAGE BUFFER
(BASEL III)

BASEL III LEVERAGE

G-SIB's
LEVERAGE
BUFFER
(0.5 x HLA)
E.G. 0.5 x 2%.

MIN 3%

L =

CET1 AT1 3
T1 EQUITY

GROSS EXPOSURE
AVE 100
ON B/S
OFF B/S

$$L = \frac{TA}{E} = \frac{100}{3}$$

2.2 Example

The CRO of Bank LGX, a non-dividend paying U.S.-based bank is preparing a report to the board of directors on the bank's capital adequacy and planning. Bank LGX is subject to both the Basel framework and the U.S. banking rules governing global systemically important banks (GSIBs). The bank claims that it was in compliance with all the capital requirements in January 2016 as all Basel III phase-ins have already occurred.

The CRO is conducting the analysis for January 2017 using selected and most recent annual performance data, which are shown in the table below:

Item	Value USD Millions as of January 2017
Common equity Tier 1 capital	1,515
Preferred stock (non cumulative)	100
Tier 2 capital	827
Risk weighted assets	26,395
Total assets	42,828
Total exposure	47,460

CALC. TIER 1 EQUITY,
TOTAL TIER 1,
TOTAL CAPITAL
LEVERAGE RATIO.

2.2 Example

	Leverage Ratio	CET 1 Ratio / Tier 1 Equity Capital	Total Tier 1 (CET 1 + AT 1)	Total Capital (Tier 1 + Tier 2)
FORMULA	$\frac{\text{Tier 1} + \text{Tier 2}}{\text{Gross Exp}}$	$\frac{\text{CET 1}}{\text{RWA}}$	$\frac{(\text{CET 1} + \text{AT 1})}{\text{RWA}}$	$\frac{\text{Total Capital}}{\text{RWA}}$
Numerator	1515 + 100	1515	1515 + 100	1515 + 100 + 827
Denominator	47460	26395	26395	26395
Ratio	3.40%	5.73%	6.17%	9.25%
BASEL III Minimum	3%	4.5%	6%	8%

3.1 Capital Conservation Buffer

- The capital conservation buffer is meant to protect banks in times of financial distress.
- Banks are required to build up a buffer of **Common Equity Tier 1** (CET 1) capital equal to 2.5% of risk-weighted assets in normal times, which will then be used to cover losses in stress periods. This means that in normal times a bank should have a minimum 7% **Tier 1 equity capital** ratio (i.e., 4.5% + 2.5% = 7.0%). Total Tier 1 capital must be 8.5% of risk-weighted assets and Tier 1 plus Tier 2 capital must be 10.5% of risk-weighted assets in normal periods.
- Banks need an extra cushion against loss during stress periods. **The idea behind the buffer is that it is easier for banks to raise equity capital in normal periods than in periods of financial stress.**
- The buffer will be phased in between January 1, 2016, and January 1, 2019.
- **Dividend payments, Bonuses, Buy-backs are constrained** when the buffer is wholly or partially used up. For example, if a bank's Tier 1 equity capital ratio is 6%, the bank must retain a minimum of 60% earnings, thus dividends cannot exceed 40% of earnings.

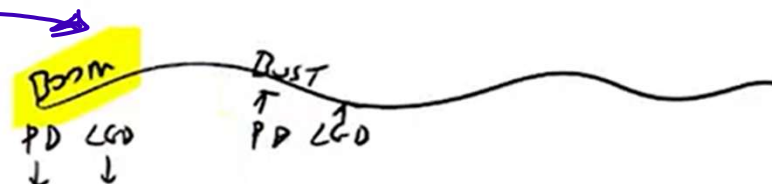
3.1 Capital Conservation Buffer

Dividend Restrictions Resulting From the Capital Conservation Buffer

Tier1 Equity Capital Ratio	Minimum Percentage of <u>Retained Earnings</u>
4.000% to 5.125%	100%
5.125% to 5.750%	80%
5.75% to 6.375%	60%
6.375% to 7.000%	40%
> 7.0%	0%

→ CUSHION

3.2 Countercyclical Buffer



- Basel III recommends that banks have a capital buffer to protect against the cyclical nature of bank earnings, called the counter-cyclical buffer. It is a DYNAMIC BUFFER set by the local supervisor.
- The countercyclical buffer can range from 0% to 2.5% of risk-weighted assets.
- Like the capital conservation buffer, it must be met with Tier 1 equity capital.
- The buffer will be phased in between January 1, 2016, and January 1, 2019.
- For countries that require the countercyclical buffer, dividend restrictions may apply.

3.2 Countercyclical Buffer

Dividend Restrictions Resulting From the Capital Conservation Buffer and a 2.5% Countercyclical Buffer

Tier 1 Equity Capital Ratio	Minimum Percentage of Retained Earnings
4.50% to 5.75%.	100%
5.75% to 7.00%.	80%
7.00% to 8.25%.	60%
8.25% to 9.50%.	40%
> 9.5%.	0%

3.3 Higher Loss Absorbency

HLA (only for G-SIBs) – 5 categories of 20% each

1. Cross-Jurisdictional Activity
2. Size
3. Interconnectedness
4. Substitutability / Financial Infrastructure
5. Complexity

Systemic Risk – Points / Indicator systems based on buckets

Buckets	Score Range	HLA %
Bucket 5	530 – 629	HLA = +3.0%
Bucket 4	430 – 529	HLA = +2.5%
Bucket 3	330 – 429	HLA = +2.0%
Bucket 2	230 – 329	HLA = +1.5%
Bucket 1	130 - 229	HLA = +1.0%

3.4 Leverage Ratio Buffer $\rightarrow$ ONLY FOR G-SIB's

- 50% of G-SIBs have Higher Loss Absorbency (HLA)
- Leverage Ratio Buffer is in addition to the minimum leverage requirements of 3%

BASEL III LEVERAGE

G-SIB's

LEVERAGE
BUFFER

(0.5 x HLA)

+1 = E.G. 0.5 x 2%

MIN 3% +1

$$L = 4$$

CET1 AT1 3

$$\frac{T1 \text{ EQUITY}}{\text{GROSS EXPOSURE}}$$

AVE

100

100

ON B/S

OFF B/S

$$L = \frac{TA}{E} = \frac{100}{3} = 33.3$$

4 Liquidity Risk Management

- In the wake of the 2007 - 2009 financial crisis, one of the primary goals of Basel III is to improve liquidity risk management in financial institutions. **Basel III specifies a minimum leverage ratio (capital / total exposure) of 3%.**
- As of the 2010 Basel III publication date, the type of capital required to calculate the ratio was not decided. Total exposure includes all items on the balance sheet, in their entirety (i.e., not risk-weighted). It also includes some off-balance sheet items such as loan commitments.
- Banks often finance long-term obligations with short-term funds such as commercial paper or repurchase agreements. This is fine during normal economic periods. However, in times of financial stress, this mismatched financing gives rise to liquidity risk. Banks find it difficult to roll over the short-term financing when they have, or are perceived to have, financial problems.
- During the 2007 - 2009 financial crisis, **liquidity risk, not a lack of capital, was the real problem for many banks** (e.g., Lehman Brothers).

4 Leverage Ratio Question

The CFO at a bank is preparing a report to the board of directors on its compliance with Basel requirements. The bank's average capital and total exposure for the most recent quarter is as follows:

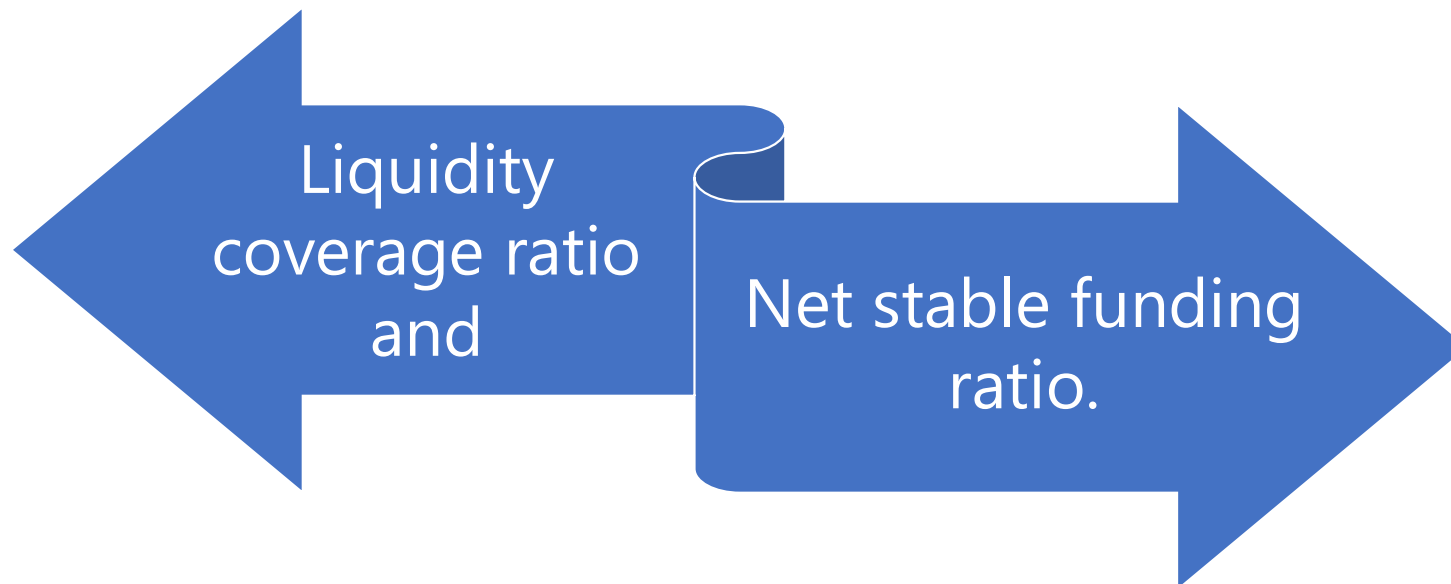
Regulatory Capital	USD Millions
Total common equity Tier 1 capital	250
Additional Tier 1 capital	66
Prior to regulatory adjustments	40
Regulatory adjustments	8
Total Tier 1 capital	316
Tier 2 capital	55
Prior to regulatory adjustments	63
Regulatory adjustments	8
Total capital	371
Average exposure	4,280

Using the Basel III framework, which of the following is the best estimate of the bank's current leverage ratio?

- A. 1.29%.
- B. 5.84%.
- C. 7.38%.
- D. 8.67%.

4 Liquidity Risk Management

Basel III requires banks to meet the following two liquidity ratios:



4.1 Liquidity Coverage Ratio (LCR)

The LCR focuses on the banks ability to weather a **30 day period** of reduced/disrupted liquidity.

The severe stress considered could be a three-notch downgrade (e.g., AA to A), a loss of deposits, a complete loss of wholesale funding, a devaluation of the value of collateral for funding agreements like repurchase agreements (i.e., increased haircuts), and potential draw downs on lines of credit.

The ratio is computed as:

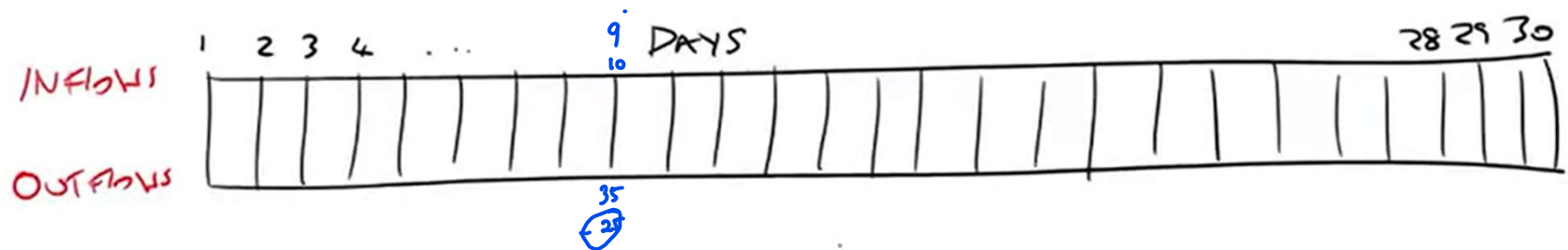
$$\text{high quality liquid assets} / \text{net cash outflows in a 30-day period} \geq 100\%$$

Liquid assets need to be at least as great as potential net cash outflows such that the bank can withstand one or more of the pressures described earlier.

UNENCUMBERED
HIGH QUALITY
LIQUID ASSETS

LIQUIDITY COVERAGE RATIO

$$LCR = \frac{UHQLA}{\text{NET OUTFLOW}_{30 \text{ DAYS}}}$$



4.2 Net Stable Funding Ratio (NSFR)

The NSFR focuses on the banks ability to manage liquidity **over a period of 1 year**

The ratio is computed as:

$$\text{amount of available stable funding} / \text{amount of required stable funding} \geq 100\%$$

To calculate the numerator, each source of funding (such as retail deposits, repurchase agreements, capital, and so on) is multiplied by a factor that *reflects the relative stability of the funding source*.

To calculate the denominator, each required amount of stable funding is multiplied by a factor that *reflects the relative permanence of the funding required*.

NSFR → 1 YEAR PERIOD

$$\text{NSFR} = \frac{\text{AVAILABLE STABLE FUNDING}}{\text{REQUIRED STABLE FUNDING}}$$

4.2 Net Stable Funding Ratio (NSFR)

AVAILABLE STABLE FUNDING (ASF) Factors in NSFR → LIABILITY & EQUITY

ASF Factor	Category
100%	Tier 1 and Tier 2 capital, preferred stock, debt with remaining maturity greater than one year.
90%	Stable demand and term deposits from individuals and small businesses with maturities less than one year.
80%	Less stable demand and term deposits from individuals and small businesses with maturities less than one year.
50%	Wholesale funding (demand and term deposits) from nonfinancial corporations, sovereigns, central banks, multi-lateral development banks, and public sector entities with maturities less than one year.
0%	All other liability and equity categories.

4.2 Net Stable Funding Ratio (NSFR)

REQUIRED STABLE FUNDING (RSF) Factors in NSFR → ASSETS

RSF Factor	Category
0%	Cash and short-term instruments, securities, and loans to financial entities with residual maturities of less than one year.
5%	Marketable securities with maturities of greater than one year, if claim is on a sovereign with 0% risk weight (e.g., U.S. Treasury securities).
20%	Corporate bonds with rating of AA or higher and residual maturity greater than one year. Claims on sovereigns or similar bodies with risk-weight of 20%.
50%	Equities, bonds rated A+ to A.
65%	Residential mortgages.
85%	Loans to small businesses or retail customers with remaining maturities less than one year, Gold
100%	All other assets.

NET STABLE FUNDING RATIO

REQUIRED STABLE FUNDING

ASSETS

0% CASH

5% MARKETABLE SECURITIES

20% CORPORATE BONDS AA-

50% EQUITIES, BONDS A±

65% MORTGAGES, 85% GOLD

AVAILABLE STABLE FUNDING

LIABILITIES & EQUITY

100% T1 & T2 CAPITAL

90% 'STABLE' RETAIL DEPOSITS

80% 'LESS STABLE' " "

50% WHOLESALE FUNDING

0% ALL OTHER LIABILITY & EQUITY

4.1 Example

A bank's liabilities consist of USD 500 of stable retail deposits with 9 months or less remaining maturity, USD 200 of 3-month wholesale certificates of deposit with one-third maturing each month, USD 200 of 10-year senior bonds with none maturing in the next year, and USD 100 of common equity. ASF factors for these categories of liability are 95%, 0%, 100%, and 100%, respectively.

The bank's assets consist of USD 100 of vault cash, USD 100 of the debt of its sovereign, USD 100 of corporate debt securities rated BBB in the trading account, and USD 700 of loans to businesses with more than one year of remaining maturity and risk weights of 50% or more. The RSF factors for these assets are 0%, 5%, 50%, and 85%, respectively. Thus,

$$NSFR = \left(\frac{475 + 0 + 200 + 100}{0 + 5 + 50 + 595} \right) = 1.19$$

4.2 Example

For the LCR, HQLA factors (1-haircut) are 100%, 100%, 50%, 0 %, presuming the supervisory allows inclusion of the corporate debt securities. Note that the corporate debt securities are Level 2 assets, which may not comprise more than 40% of HQLA after the haircut. This is satisfied since total HQLA is USD 250, of which USD 50 is the corporate debt securities.

Using a 5% runoff rate for the stable retail deposits, a 100% runoff rate for the one-third of wholesale CDs that mature in the next month, and a 0 % runoff rate for senior bonds and equity, net 30-day cash outflows are $25 + 67 = 92$, so

$$LCR = \left(\frac{250}{92} \right) = 2.72$$

Thus, the bank in this example would be in compliance with the LCR and NFSR. Note that a very large number of categories, factors and haircuts were not discussed in this example and the liquidity requirements are operationally complex.

4.3 Example

In viewing the results of this capital analysis report and other considerations for Bank LGX's capital planning, which of the following conclusions is correct?

- A. The capital conservation buffer can be met by an increase in Tier 2 capital.**
- B. If the exposure on derivative asset positions decreases, holding other factors constant, total capital ratio would decrease.**
- C. The increase in the credit valuation adjustment (CVA) due to the bank's asset counterparty positions would tend to raise the bank's risk-weighted assets.**
- D. If the bank raises additional CET1 capital and invests the same amount in gold, Bank LGX's net stable funding ratio (NSFR) will not change.**

5 Output Floor

OUTPUT FLOOR

1996
MR
STANDARDIZED
INTERNAL MODELS
VAR 99%, 10 DAYS
↓ 10, 20, 60, 120, 250
FRTB EL5 97.5%

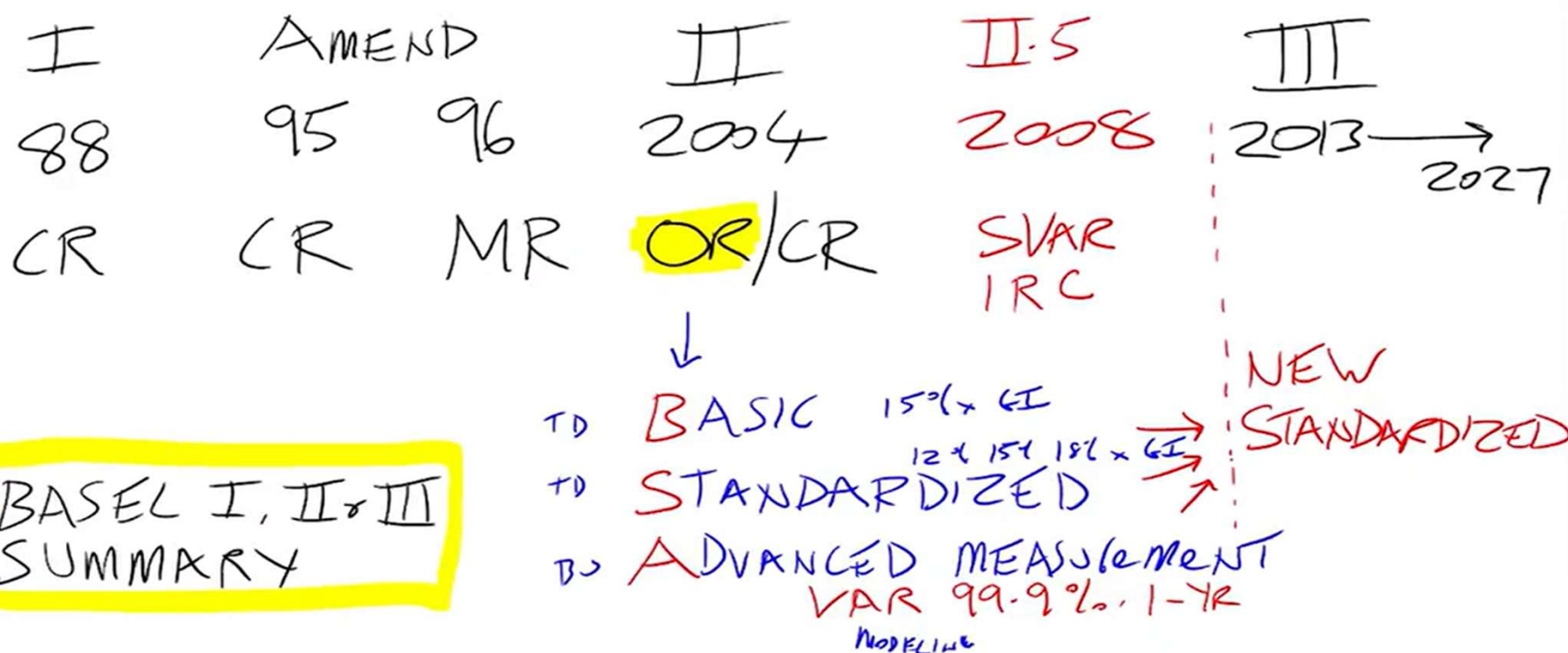
II 2004
OR
CR
~~BASIC~~
~~STANDARDIZED~~
~~AMA (VAR 99.9%)~~
14R
SMA

STANDARDIZED
EXTERNAL RATING
IRB-F } PD
IRB-A } VAR 99.9%
1-4R
PD/LGD/EAD/M
RWA
→ RWA 100%
↓
72.5%
MIN RWA
2027

BASEL III

OUTPUT FLOOR

5 Operational Risk



5 Operational Risk

OR SMA BASEL III

$$\text{CAPITAL} = \text{BUSINESS INDICATOR} \times \text{INTERNAL LOSS MULTIPLIER}$$

$\text{GI} \times \text{ADJ'S}$
 $\downarrow$
 € DIC

$\text{Ave loss} = 1$
 > 1
 < 1

BUCKET	BI RANGE	%
1	€0 – €1 Billion	0.12
2	€1b – €30 Billion	0.15
3	€30 Billion +	0.18

NO ILM IF ONLY BUCKET 1

5 Operational Risk example

An operational risk manager is asked to report a bank's operational risk capital under the Standardized Measurement Approach (SMA) proposed by the Basel Committee in March 2016. The Treasury Department produces the following data for the bank, calculated according to the SMA guidelines:

- Business indicator: EUR 1,200 million
- Internal loss multiplier: 1

Bucket	BI Range	BI Component
1	EUR 0 – EUR 1 billion	$0.12 \times \text{BI}$
2	EUR 1 – EUR 30 billion	EUR 120m + $0.15 (\text{BI} - \text{EUR 1 billion})$
3	EUR 30 billion to infinity	EUR 4.47 billion + $0.18 (\text{BI} - 30 \text{ billion})$

What is the correct operational risk capital that the bank should report under the SMA?

- A. EUR 120 million.
- B. EUR 150 million.
- C. EUR 158 million.
- D. EUR 180 million.

5 Operational Risk example

A bank owned several retail branch buildings that were destroyed in a hurricane. A financial analyst at the bank wants to determine the correct costs to include in reporting this loss in its operational risk event database. Which of the following costs associated with this loss should be included in the operational loss report?

- A. Costs of insurance premiums paid to insure the buildings before the storm took place**
- B. A provision for the estimated opportunity costs of lost banking business at the affected branches**
- C. Legal costs paid to obtain construction permits to rebuild the destroyed branch buildings**
- D. Costs of a program to train branch managers on ways to prepare buildings to mitigate potential damage from future hurricanes**

$$RWA \Rightarrow 100 \times 6\% \Rightarrow \textcircled{6}$$

$$, \text{Exp} \Rightarrow 2000 \times 3\% \Rightarrow \underline{60} (\text{of } T_{\text{MI}})$$

Or

$$RWA = 2200 \times 6\% = \underline{132}$$

$$\text{Exp} = 3000 \times 3\% = 90$$

