Banking

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Fall Semester 2024

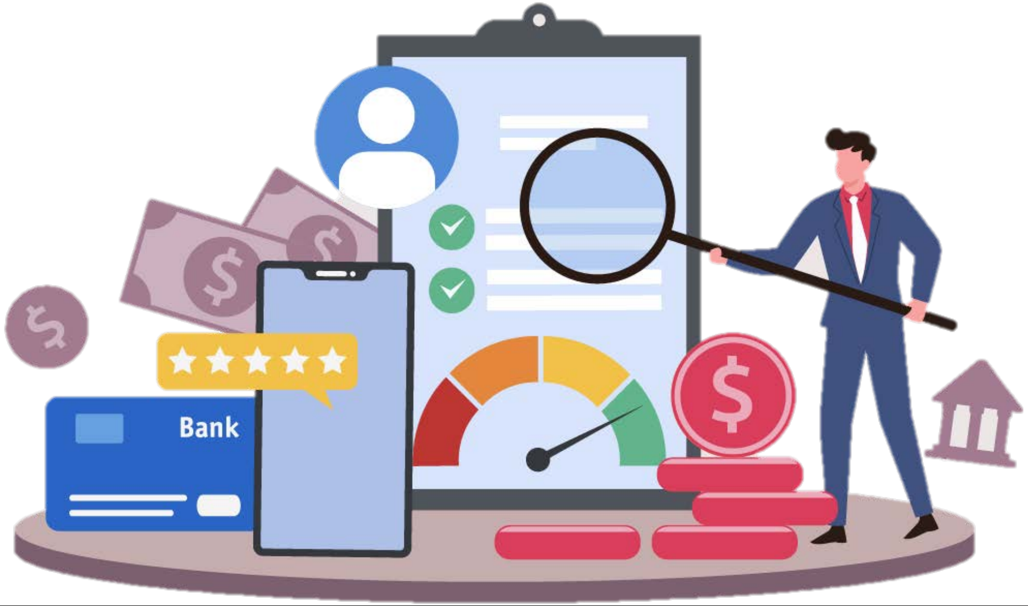
Course: Banking [2206]

Class 3 [Part II]

Disclaimer: The views expressed are my own and do not necessarily represent the views of Banco de Portugal.

To be covered today

- Credit Underwriting
- Credit Risk
- Accounting standards (IAS/IFRS)



Press Corner

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SUPERVISION NEWSLETTER

COVID-19: gaps in credit risk management identified

19 May 2021

As part of its coordinated coronavirus (COVID-19) credit risk strategy, ECB Banking Supervision launched a number of complementary projects to get a full picture of how banks are measuring and managing credit risk during the pandemic. This is the first article in our related series.

Risk Quantum

RISK QUANTUM

EU banks' credit risk estimates stabilised at year-end

Louie Woodall

12 Apr 2021

Probability of default (PD) estimates for corporate borrowers – as gauged by European Union banks' **internal ratings-based (IRB) models** – edged lower in Q4 2020 and, for some countries, ended the year tighter than in 2019 despite the ravages of the coronavirus pandemic.

The mean weighted average (WA) PD of corporate exposures for counterparties across 39 countries was 2.15% in Q4 2020, barely changed from 2.14% the year-ago quarter. However, it did represent a big increase on the **low of 1.92%** reported for Q1 2020.

Press Corner

McKinsey & Company

Risk Practice

Managing and monitoring credit risk after the COVID-19 pandemic

The unique features of the pandemic-triggered recession have led banks to move more quickly to build real-time data and analytics into their credit-decision engines.

by Efstathia Koulouridi, Sameer Kumar, Luis Nario, Theo Pepanides, and Marco Vettori

Credit Suisse ready for 'good risk opportunities', says new risk chief

Swiss bank moves away from cautious approach to pursue more profitable business

Chief risk officer David Wildermuth said Credit Suisse was 'moving the pendulum back the other way' after previously ditching risker clients © Pascal Mora/Bloomberg

Owen Walker, European Banking Correspondent JUNE 28 2022 63

Credit Suisse is once again preparing to take on riskier business after high-profile crises had prompted the bank to adopt a more cautious approach, according to the Swiss lender's new chief risk officer.

The crises had prompted the bank to adopt a more conservative approach. It reduced its risk-weighted assets by SFr30bn ($31.4bn) and cut its leverage exposure by SFr90bn, while also closing accounts for its riskiest clients.

Press Corner

UK banks face up to £225bn in climate-related credit losses, stress test finds

BoE exercise comes as HSBC executive questions 'hyperbole' on environment

The BoE said that Inland and coastal flooding was likely to drive up claims in the UK © Getty Images

Camilla Hodgson and **Ian Smith** MAY 24 2022 · 25

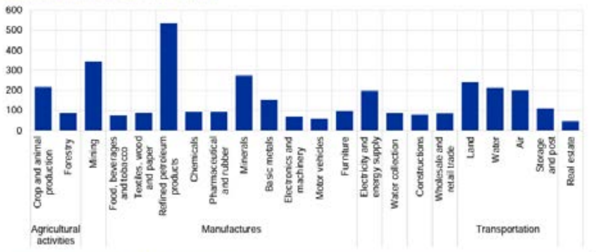
UK banks and insurers that fail to manage the risks associated with climate change could suffer a 10-15 per cent hit to their annual profits, the Bank of England warned on Tuesday.

CREDIT RISK MATERIALIZATION?

Losses from 22 GHG-intensive sectors increase significantly in a short-term disorderly transition scenario

Cumulative loan losses in the short-term disorderly vs baseline scenario by 2024

(basis points of the REA of exposures in scope)



Sources: Bank submissions and ECB calculations.
Note: REA stands for risk exposure amount.

Regulators raise the pressure on banks over loan losses

Lenders struggle to work out true financial health of borrowers after pandemic shock

LAURA NOONAN + Add to myFT

Banks' risk management departments knew they were in trouble as soon as the pandemic hit © Simon Dawson/Reuters

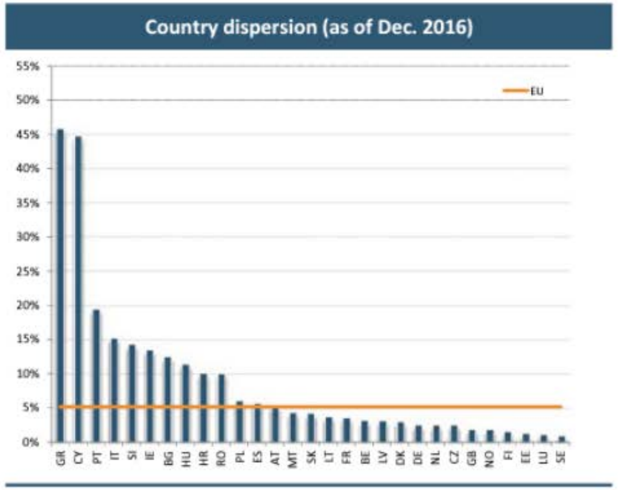
Laura Noonan NOVEMBER 23 2021 · 18

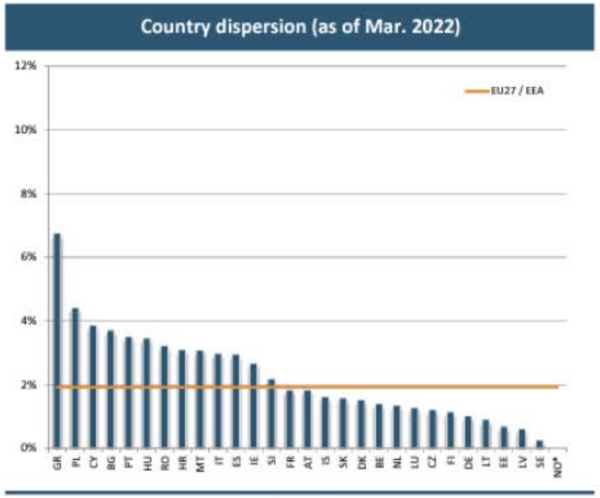
As the end of the year approaches, banks across the world are scrambling to update estimates of likely losses on bad loans, a crucial number for investors in banks and watchers of economies.

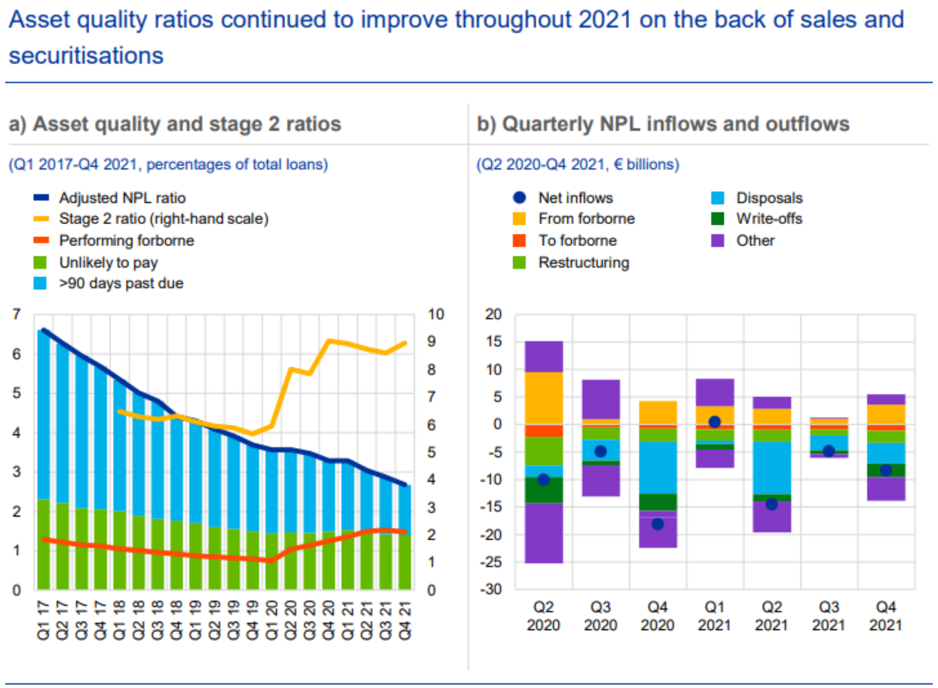
Press Corner

NPL → Credit risk materialization!

NPL Ratio







Credit risk @research corner

JOURNAL ARTICLE

Banks' Incentives and Inconsistent Risk Models

Matthew C Plosser, João A C Santos

The Review of Financial Studies, Volume 31, Issue 6, June 2018, Pages 2080–2112,
https://doi.org/10.1093/rfs/hhy028
Published: 10 May 2018

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Abstract

This paper investigates banks' incentive to bias the risk estimates they report to regulators. Within loan syndicates, we find that banks with less capital report lower risk estimates. Consistent with an effort to mitigate capital requirements, the sensitivity to capital is robust to bank fixed effects and greater for large, risky, and opaque credits. Also, low-capital banks' risk estimates have less explanatory power than those of high-capital banks with regard to loan prices, indicating that their estimates incorporate less information. Our results suggest banks underreport risk in response to capital constraints and highlight the perils of regulation premised on self-reporting.

ELSEVIER

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Capital requirements under the credit risk-based framework ☆

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ARTICLE INFO

Article history:
Received 13 July 2009
Accepted 6 October 2010
Available online 5 November 2010

JEL classification:
G21
G28

ABSTRACT

This work aims to study the hypothesis of lower capitalization of banks under the risk-based rules introduced in Basel II. In this sense, an assessment of the impact of these rules on the capital requirements for non-financial firms' credit risk is performed. A comparison with Basel I is presented and intervals of variation for the risk drivers such that capital requirements exceed the ones under Basel I are established. Data for a European country supports the hypothesis of a smaller capitalization of banks under the risk-based framework, as far as credit risk in concerned.

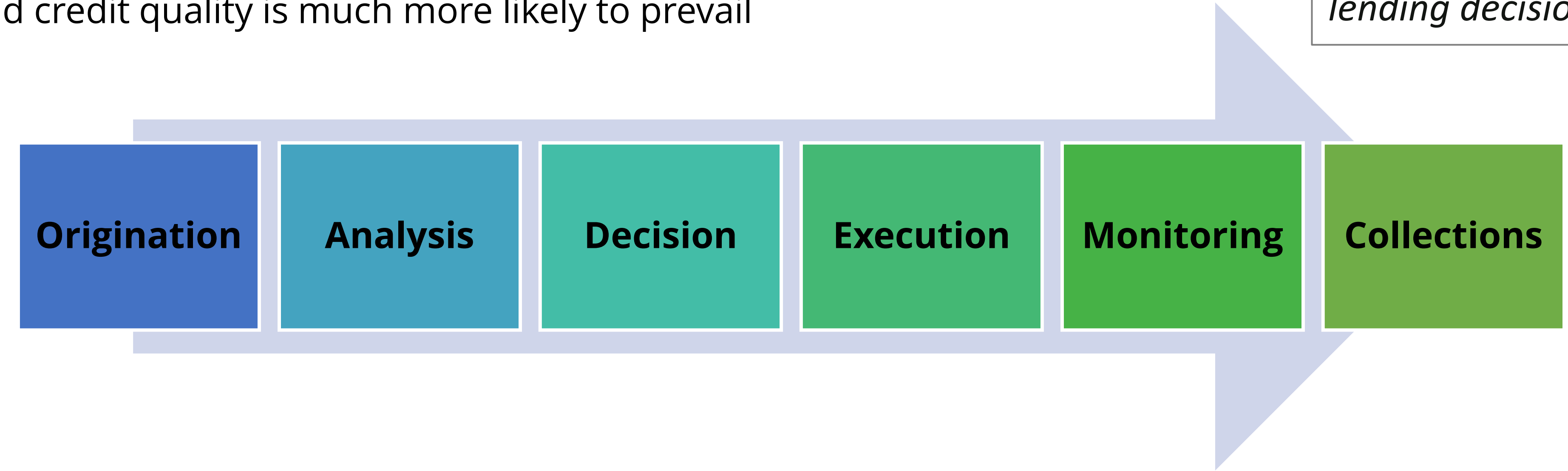
Credit: Underwriting Process

Underwriting is the process by which lenders assess whether an applicant is creditworthy and should receive a loan.

An effective underwriting and loan approval process is crucial for favorable portfolio quality. The primary goal is to minimize undue risks as much as possible.

When is underwritten with sensible and well-defined credit principles, sound credit quality is much more likely to prevail

<u>EBA guidelines:</u>
Lenders must assess the creditworthiness of borrowers comprehensively. This includes evaluating financial history, repayment capacity, and other relevant factors.
Should also establish clear, consistent, and well-defined underwriting standards that guide lending decisions.



Credit: Underwriting Process - Origination

- Origination
- Analysis
- Decision
- Execution
- Monitoring
- Collections

- **Marketing:** design products suited to client needs and life cycles.
- **Price:** competitive, but giving a fair return for capital and risk.
- **Sales:** front line staff must perform a correct sale of products.

Credit: Underwriting Process - Origination

Client	Short Term	Medium Term	Long Term
Individuals	Credit card, salary advance	Consumer loan	Mortgage loan
Business and SME	Credit line, trade finance, factoring	Investment, leasing	
Corporates	Credit line, letter of credit	Investment, real estate, leasing	Project finance, Bond finance
Sovereign	Credit line, T-bills	Investment, T-Bonds	Infrastructure, T-Bonds, **Green Bonds**
Banks	Money market, repos	Bonds	Bonds

Credit: Underwriting Process - Origination – Conditioning factors

- The expected **economic cycle**: an up-cycle means more future cash flows on a project;
- The **level of interest rates** / risk premia: for the same level of future cash flows, lower rates mean high net present values, and so more projects are worthwhile;
- The **borrower net worth**: to avoid moral hazard, banks demand borrowers to risk their own money. As such, the level of net worth among borrowers is also conditioning the level of loan granting in an economy (this is known as the BNWC - borrower net worth channel);
- The **level of capital of the bank** (this is the BLC - bank lending channel).

Credit: Underwriting Process - Analysis

- **Origination**
- **Analysis**
- **Decision**
- **Execution**
- **Monitoring**
- **Collections**

Analysis:

- Rating: 5 C's
- Scoring

Credit: Underwriting Process – Analysis - Rating vs Scoring

Rating	Scoring
Traditional model for relationship banking => *focused on the client risk profile*	Model for transactional banking => *focused on the transaction*
Data source is KYC	Data source is past observations (you need a large sample)
The method is close to 5 C, with subjective appraisal	No subjectivity, only calibration
Internal rating is a quality aggregation	The score is a statistical output

Credit: Underwriting Process – Analysis - Rating vs Scoring

The 5 "C"		Notes
Character	of the debtor	account movement
Capacity	to pay the loan	business cash flows
Capital	risk of the debtor	it absorbs first losses and reveals commitment
Conditions	covenants, payment schedule	adapted to cash flows
Collateral	what can the bank claim in case of default	collateral value must be appraised for the case of default
Cycle	Economy	unemployment risk, lost of clients

Credit: Underwriting Process - Decision

- **Origination**
- **Analysis**
- **Decision**
- **Execution**
- **Monitoring**
- **Collections**

- Depends on customer segment, type of loan, decision model.
- The amount of the loan will also affect the decision model, as well as the authorisation procedure (simple or hierarchical).
- It is paramount to have clear written rules on who decides what (an automatic decision is the responsibility of the one that authorised the system).

Credit: Underwriting Process - Execution

- Origination
- Analysis
- Decision
- Execution
- Monitoring
- Collections

- Collection, confirmation and authentication of all client documents
- Make contracts and other documents; Grant funding
- Deliver physical goods (car, equipment)
- Deliver documentation (contract copies, ownership registry, guarantees, insurance policies, letters of credit)
- Input on the bank information system

Credit: Underwriting Process - Monitoring

- Origination
- Analysis
- Decision
- Execution
- **Monitoring**
- Collections

- A monitoring process aims at:
  - early warning system;
  - the disclosure for the all bank of the warning;
  - Increase success probability in recoveries.
- Warning levels: close monitoring, reduce exposure, exit.
- Action Plans
- Client classification when there is an alert sign.

Credit: Underwriting Process - Collections

- Origination
- Analysis
- Decision
- Execution
- Monitoring
- Collections

- When a credit falls on collections, the business relationship ends. A special department should take the lead from now on.
- Fast action gives an edge to the bank (leaving behind other banks, suppliers and even the Court).
  - but don't pull the trigger too soon, as you will lose a lot of customers.
- Collection methods depend on values and products:
  - for small amounts, there is a factory with a letter from the bank, then the lawyer and finally the Court;
  - for a mortgage loan, the bank calls the mortgage;
  - for businesses, there are recovery plans, creditor general meetings.

Credit: Risk adjusted pricing

Funding Cost	internal transfer pricing for the period (ask)
+	
Expected Loss	PD x LGD using middle values of bracket
+	
Capital Charge	(RWA x 8%) x (WACC - transfer price)
+	
Processing	fixed charge / loan amount

Credit: Let's calculate min rate for a loan

- Mr. Client asks for a loan of 8000 euros, one year maturity.
- According to the credit analysis of the bank, Mr. Client has a 2.5% probability of default, in which case the bank may lose 60% of the loan amount.
- The bank faces 28 euros annually of operating costs to deal with Mr. Client loan.
- The law forces the bank to have 8% equity over assets.
- The Treasury department of the bank quotes liquidity at bid/ask of 3,25% - 3,75%.
- Capital at the bank costs 8.75%. Consider a risk weight of 100%.

How much (at least) should the bank ask in interests?

Credit: Risk adjusted pricing

Funding Cost	3,75%
+	
Expected Loss	2,5% x 60% = 1,5%
+	
Capital Charge	8% x (8,75% - 3,75%) = 0,4%
+	
Processing	28 / 8000 = 0,35%
=	
Min Rate	6%

Credit Risk

Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms.

The goal of credit risk management is to maximise a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters.

Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions.

Banks should also consider the relationships between credit risk and other risks.

For most banks, loans are the largest and most obvious source of credit risk; however, other sources of credit risk exist throughout the activities of a bank, including in the banking book and in the trading book, and both on and off the balance sheet.

Source: Principles for the Management of Credit Risk, Basel Committee on Banking Supervision

Credit Risk

Important elements to bear in mind:

- However, only the unexpected default is in fact a risk, as all banks incorporate in the price of the loan some expected probability of default.

- Currently, with impairments, the notion of credit risk may be even broader: the unexpected rating downgrade (called "migration risk"), even with no default, forces banks to incur losses, and so it is credit risk

Credit Risk: key concepts

$ **Exposure at Default (EAD)**

% **Probability of Default (PD)**

% **Loss Given Default (LGD)**

Expected Loss (EL)

relative EL = PD x LGD %

absolute EL = PD x LGD x EAD $

Credit Risk: key concepts

Expected loss

- $EL = PD \times LGD_{LR} \times EAD$
- **The expected loss is intended to be covered by provisions - Impacts P&L immediately.**

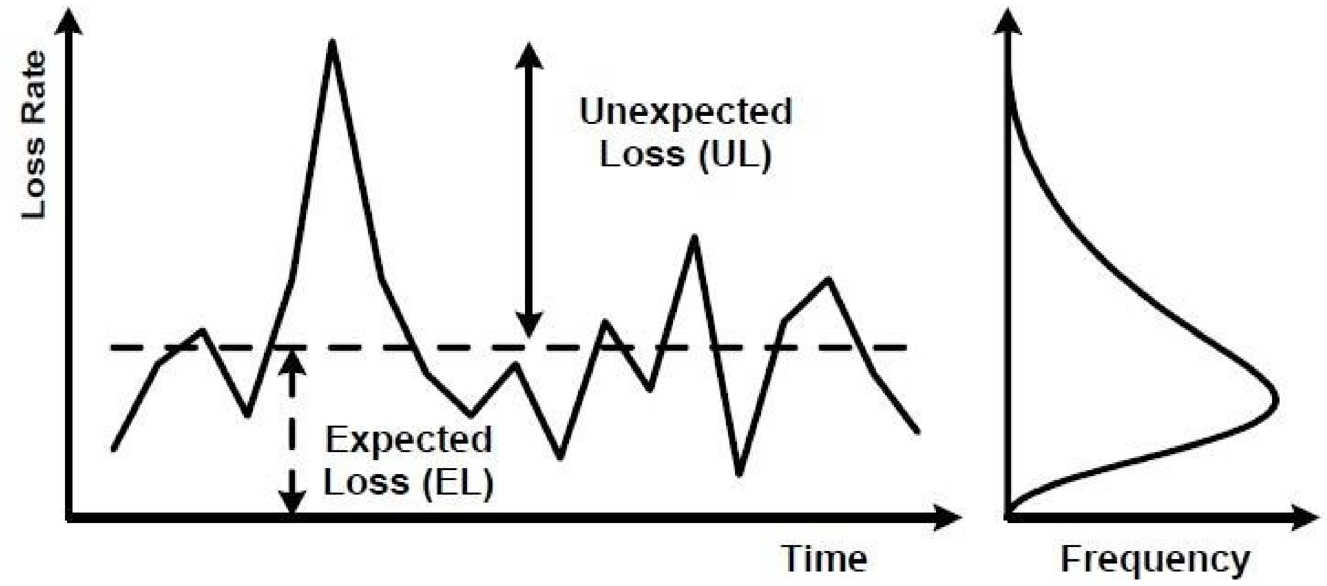
Credit Risk: key concepts

Unexpected loss

- UL = EAD x f (PD, LGD, M)
- **The unexpected loss is intended to be covered by own funds requirements**
  - **(forming RWAs = Credit Risk requirements).**

- Measures a loss-disaster to be suffered by the loan portfolio in excess of the expected loss…
- In the event of a worst case scenario corresponding to an extremely high level of confidence (99.9% for Basel II).
- Parameters will vary depending on the type of portfolios.

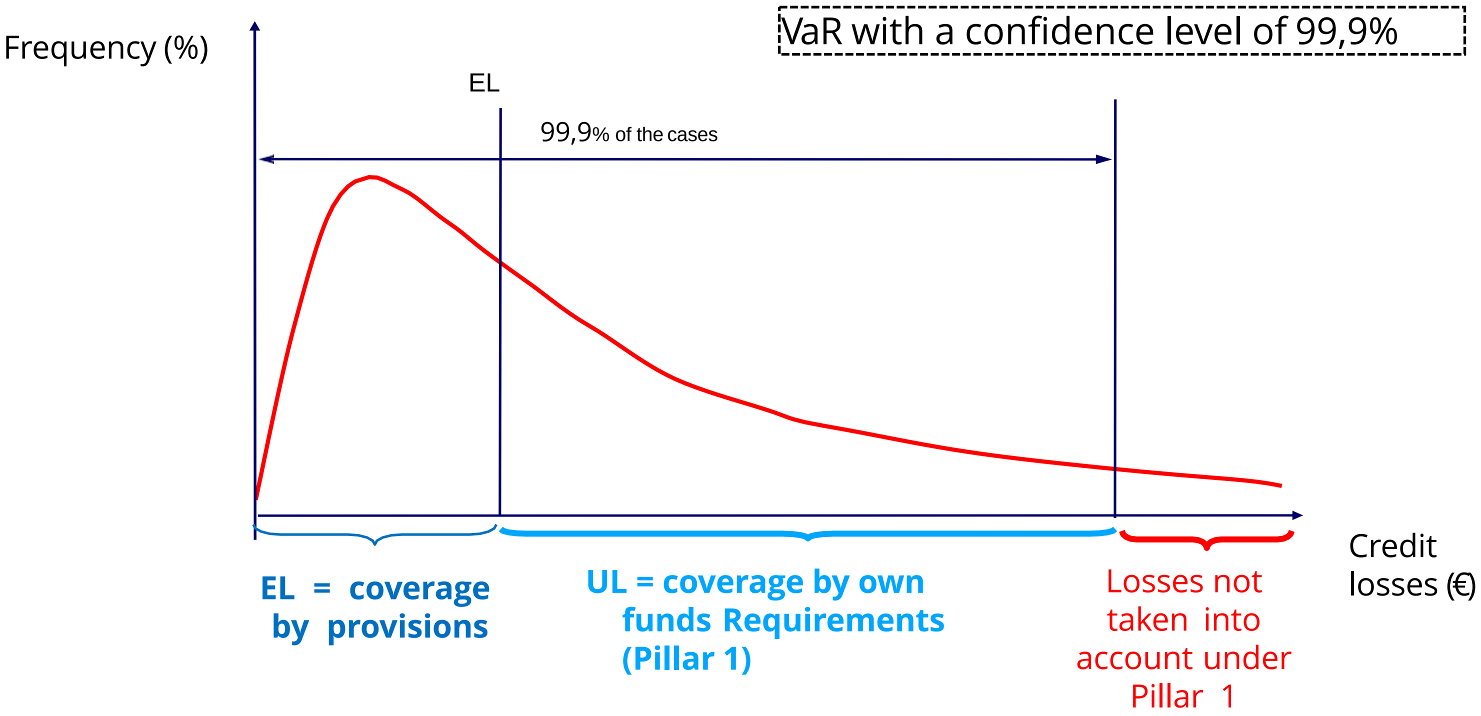
Credit Risk: General Approach



EXPECTED LOSS (EL)	UNEXPECTED LOSS (UL)
A Bank can estimate, based on experience or expectations, the average level of credit Losses.	Peak losses do not occur every year (low frequency) but they can be very large when they occur (high severity).

Credit Risk: General Approach

- The potential losses of a credit portfolio can be measured by a Value at Risk (VaR) approach
- VaR is composed by the expected loss (EL) and the unexpected loss (UL) : VaR = EL + UL



Credit Risk: Regulatory approaches

	Internal Ratings Based (IRB models)	
	Foundation	**Advanced**
PD	Internal model	Internal model
LGD	Defined by the Regulator	Internal model
EAD	Defined by the Regulator	Internal model
M	Defined by the Regulator	Internal model

PD – Probability of default
- Average percentage of obligors that default per rating grade in the course of one year.

LGD – Loss given default
- Percentage of exposure the bank might lose in case the borrower defaults (as a percentage).

EAD – Exposure at default
- Estimate of the amount outstanding (drawn amounts + likely future drawdowns of yet undrawn lines) in case the borrower defaults.

M – Maturity
- Estimate of the maturity of the exposure (in years)

$$\boxed{\text{Own Funds Requirements}} = f\left[\sum\left(\underbrace{f(\text{PD};\ \text{LGD};\ \text{M})}_{\text{Risk Weighting}} \times \underbrace{\text{EAD}}_{\text{Exposition}}\right)\right]$$

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Risk parameters: probability of default

Concept

- Probability that the borrower will default against its payment obligations to the bank.
- PD floor: 0,03%*
- For unfunded credit protection, PD can be substituted by the PD of the protection provider.

Related to the <u>debtor</u>

Calculation

- PD tends to vary as the time horizon of the loan evolves (PD @ Yr 1 ≠ PD @ term).
- Modelled PD should be based on the observed historical average 1-Yr probability of occurrence of default.
- PD calculated through a rating given by the bank or by a rating agency rating.
- Historical data shall be through-the-cycle.

* Subject to changes (e.g. by type of risk class)

Risk parameters: loss given default

Concept

- Percentage reflecting the proportion of the exposure that will be lost if the debtor is unable to pay. It is a terminated economic loss rate (based on the concept of economic loss).
- Can be expressed by the formula (1- recovery rate).
- Reflects possibility of recovery via guarantees, pledges, credit derivatives or other types of collaterals attached to the loan.

Calculation

LGD rate = 1 - **Recovery rate** = 1- ($\frac{Expected\ cash\ flows\ discounted\ to\ default\ date}{EA}$)

LGD rate = f (
- discount rate
- $\boxed{\text{recovery flow and costs involved}}$

) ➡ f (
- nature of transaction (consumer credit, real estate leasing,...)
- financed property (house, car, goodwill, acquisition, ...)
- borrower (Retail, Corporate,...)

)

Risk parameters: Mitigation and colateral types

Collateral type	Risk reduction technique	Guarantees nature	Calculation approach
Real Estate	Mortgage of property	• Residential real estate • Commercial Real Estate • Subject to a set of rules regarding the verification of property value.	• As seen before in the Risk weight explanation of Loans secured by real estate class.
	Eligible forms of Credit Risk Mitigation		
Other liquid assets	Funded Credit Protection (ensures right to liquidate, transfer or appropriate an underlying asset)	• Cash and deposits • Debt Securities • Shares • Gold, among others	• Two approaches: i. simplified - similar to unfunded credit protection; ii. comprehensive - subtraction of the EAD by the collateral value adjusted by an haircut
No assets	Unfunded Credit Protection	Contracts must be direct, explicit, irrevocable and unconditional and meet certain minimum operational requirements in terms of risk management to be taken into account.	Substitution of the weighting of the guarantor / protection seller to that of the borrower for the covered portion of the exposure, the uncovered keeps the counterparty weight

Risk parameters: Exposure-at-default

Concept

On BS

Amount owed by the counterparty at the moment of its default on a commitment, for a period of time corresponding to that used for the PD (1-Yr under Basel II).

- **EAD = Principal outstanding + Past due amounts**
- **OTC derivative: EAD = Market Value + add-on x Nominal value ***

Off BS

EAD involves determining credit conversion factors (CCF) in order to transform the off-balance sheet exposure in an on-balance sheet figure.

- **Off-balance sheet commitments: EAD = off-balance sheet value x CCF**
- **CCF internal estimates must be downturn. The estimate shall reflect the possibility of additional drawings <u>up to and after</u> the time a default event is triggered.**

Mrs. X has an authorized overdraft of € 1,000, of which she used €200 Euros.

EAD = 200 + (800 x CCF). Considering a CCF of 50%, EAD = 600 Euros

Risk parameters: Maturity

Concept	• Maturity is a key risk driver of a bond or a loan: a shorter maturity will increase the bank's flexibility to limit future losses in case the client's financial situation deteriorates

Rules	**IRB Foundation**	• Corporates, Institutions and Sovereigns: • Fixed maturity of 2.5 years • Fixed maturity of 0,5 for repo-style transactions or securities
	IRB Advanced	• Actual maturity is systematically taken into account through the calculation of the effective maturity of between 1 and 5 years, except for short-term operations where the floor of 1 year is not applicable.

$$M = MAX\left\{1; MIN\left\{\sum_t t * CF_t / \sum_t CF_t ; 5\right\}\right\}$$

Credit Risk: Risk Weighted Formula

conditional PD

Downturn LGD

$$Capital\ Requirements(K) = \underbrace{\left[LGD \times N\left[\frac{1}{\sqrt{1-R}} \times G(PD) + \sqrt{\frac{R}{1-R}} \times G(0.999) \right]\right.}_{\textit{Conditional Expected Loss (or VAR)}} \left. - \overbrace{PD \times LGD}^{\text{Expected Loss}} \right] \times \underbrace{\left(\frac{1 + (M - 2.5) \times b(PD)}{1 - 1.5 \times b(PD)} \right)}_{\text{Maturity adjustment}}$$

average PD

Accounting standards (IAS/IFRS)

Changes in credit quality since initial recognition

Recognition of expected credit losses

12-month expected credit losses	Lifetime expected credit losses	Lifetime expected credit losses
Stage 1	***Stage 2***	***Stage 3***
Performing (Initial recognition)	Underperforming (Assets with significant increase in credit risk since initial recognition*)	Non-performing (Credit-impaired assets)

NPLs

Prudential

Banking

Ana Lacerda

Fall Semester 2024

Course: Banking [2206]

Class 3 [Part II]